ZYXEL
Your Networking Ally

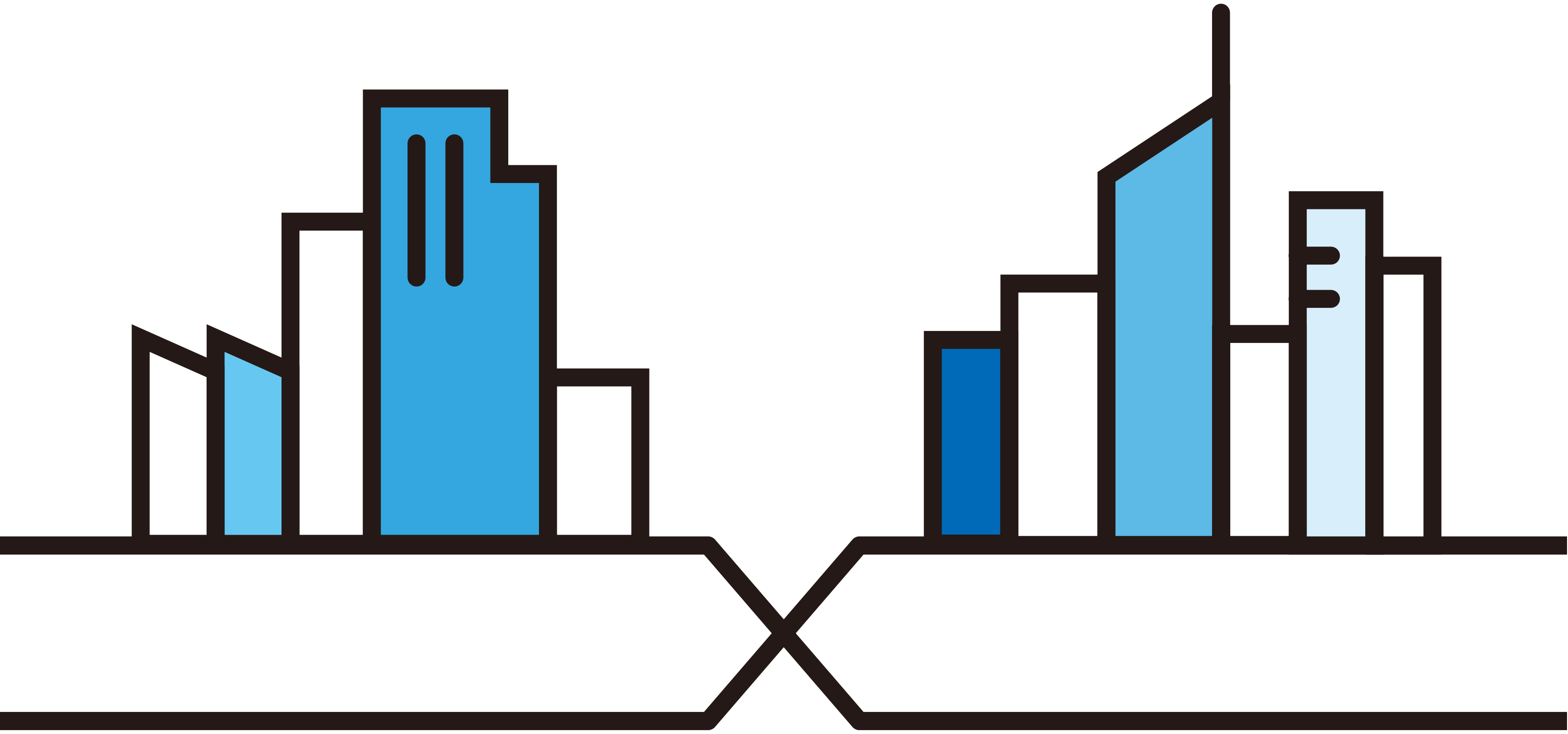
CLI Reference Guide

ZyWALL USG/ATP Series

Default Login Details

LAN Port IP Address	https://192.168.1.1
User Name	admin
Password	1234

Version 4.33 Edition 1, 1/2019



IMPORTANT!
READ CAREFULLY BEFORE USE.
KEEP THIS GUIDE FOR FUTURE REFERENCE.

This is a Reference Guide for a series of products intended for people who want to configure the Zyxel Device via Command Line Interface (CLI).

Note: The version number on the cover page refers to the latest firmware version supported by the Zyxel Device. This guide applies to versions 4.10, 4.11, 4.13, 4.15, 4.16, 4.20, 4.25, 4.30, 4.31, 4.32, and 4,33 at the time of writing.

How To Use This Guide

1 Read Chapter 1 on page 23 for how to access and use the CLI (Command Line Interface).

2 Read Chapter 2 on page 38 to learn about the CLI user and privilege modes.

Some commands or command options in this guide may not be available in your product. See your product's User's Guide for a list of supported features.Do not use commands not documented in this guide. Use of undocumented commands or misconfiguration can damage the unit and possibly render it unusable.

Related Documentation

- Quick Start Guide

  The Quick Start Guide shows how to connect the Zyxel Device and access the Web Configurator.

- User's Guide

  The ATP Series User's Guide explains how to use the Web Configurator to configure the Zyxel Device. It also shows the product feature matrix for each device. General feature differences are written in the Introduction chapter while a more detailed table is in the Product Feature appendix.

  The USG Series User's Guide explains how to use the Web Configurator to configure the Zyxel Device. It also shows the product feature matrix for each device. General feature differences are written in the Introduction chapter while a more detailed table is in the Product Feature appendix.

Note: It is recommended you use the Web Configurator to configure the Zyxel Device.

- More Information

  Go to **support.zyxel.com** to find other information on Zyxel Device.

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PART I
Introduction

CHAPTER 1
Command Line Interface

This chapter describes how to access and use the CLI (Command Line Interface).

1.1 Overview

Zyxel Device refers to these models as outlined below

- ZyWALL
  - ZyWALL 110
  - ZyWALL 310
  - ZyWALL 1100
- ZyWALL USG (Unified Security Gateway)
  - USG40
  - USG40W
  - USG60
  - USG60W
  - USG110
  - USG210
  - USG310
  - USG1100
  - USG1900
  - USG2200
  - USG20-VPN
  - USG20W-VPN
  - USG2200-VPN
- ZyWALL ATP (Advanced Threat Protection)
  - ATP200
  - ATP500
  - ATP800

If you have problems with your Zyxel Device, customer support may request that you issue some of these commands to assist them in troubleshooting.

Use of undocumented commands or misconfiguration can damage the Zyxel Device and possibly render it unusable.

1.1.1 The Configuration File

When you configure the Zyxel Device using either the CLI (Command Line Interface) or the web configurator, the settings are saved as a series of commands in a configuration file on the Zyxel Device. You can store more than one configuration file on the Zyxel Device. However, only one configuration file is used at a time.

You can perform the following with a configuration file:

- Back up Zyxel Device configuration once the Zyxel Device is set up to work in your network.
- Restore Zyxel Device configuration.
- Save and edit a configuration file and upload it to multiple Zyxel Devices (of the same model) in your network to have the same settings.

Note: You may also edit a configuration file using a text editor.

1.2 Accessing the CLI

You can access the CLI using a terminal emulation program on a computer connected to the console port, from the web configurator or access the Zyxel Device using Telnet or SSH (Secure SHell).

Note: The Zyxel Device might force you to log out of your session if reauthentication time, lease time, or idle timeout is reached. See Chapter 45 on page 337 for more information about these settings.

1.2.1 Console Port

The default settings for the console port are as follows.

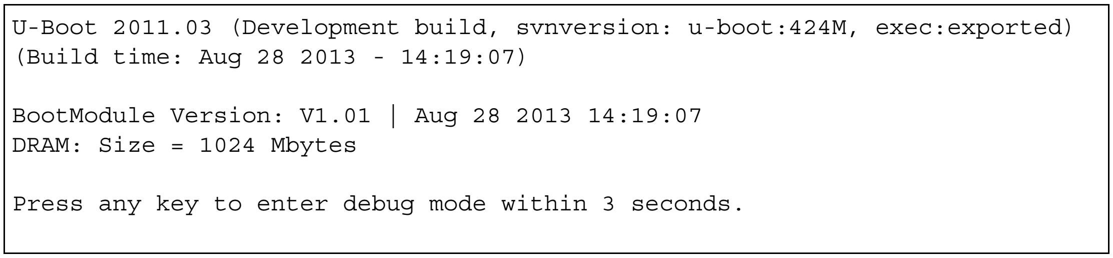
Table 1 Managing the Zyxel Device: Console Port

SETTING	VALUE
Speed	115200 bps
Data Bits	8
Parity	None
Stop Bit	1
Flow Control	Off

When you turn on your Zyxel Device, it performs several internal tests as well as line initialization. You can view the initialization information using the console port.

- Garbled text displays if your terminal emulation program's speed is set lower than the Zyxel Device's.
- No text displays if the speed is set higher than the Zyxel Device's.
- If changing your terminal emulation program's speed does not get anything to display, restart the Zyxel Device.
- If restarting the Zyxel Device does not get anything to display, contact your local customer support.

Figure 1 Console Port Power-on Display



```
U-Boot 2011.03 (Development build, svnversion: u-boot:424M, exec:exported)
(Build time: Aug 28 2013 - 14:19:07)

BootModule Version: V1.01 | Aug 28 2013 14:19:07
DRAM: Size = 1024 Mbytes

Press any key to enter debug mode within 3 seconds.
```

After the initialization, the login screen displays.

Figure 2 Login Screen

```
Welcome to USG60W

Username:
```

Enter the user name and password at the prompts.

Note: The default login username is **admin** and password is **1234**. The username and password are case-sensitive.

1.2.2 Web Configurator Console

Note: Before you can access the CLI through the web configurator, make sure your computer supports the Java Runtime Environment. You will be prompted to download and install the Java plug-in if it is not already installed.

When you access the CLI using the web console, your computer establishes a SSH (Secure SHell) connection to the Zyxel Device. Follow the steps below to access the web console.

1 Log into the web configurator.

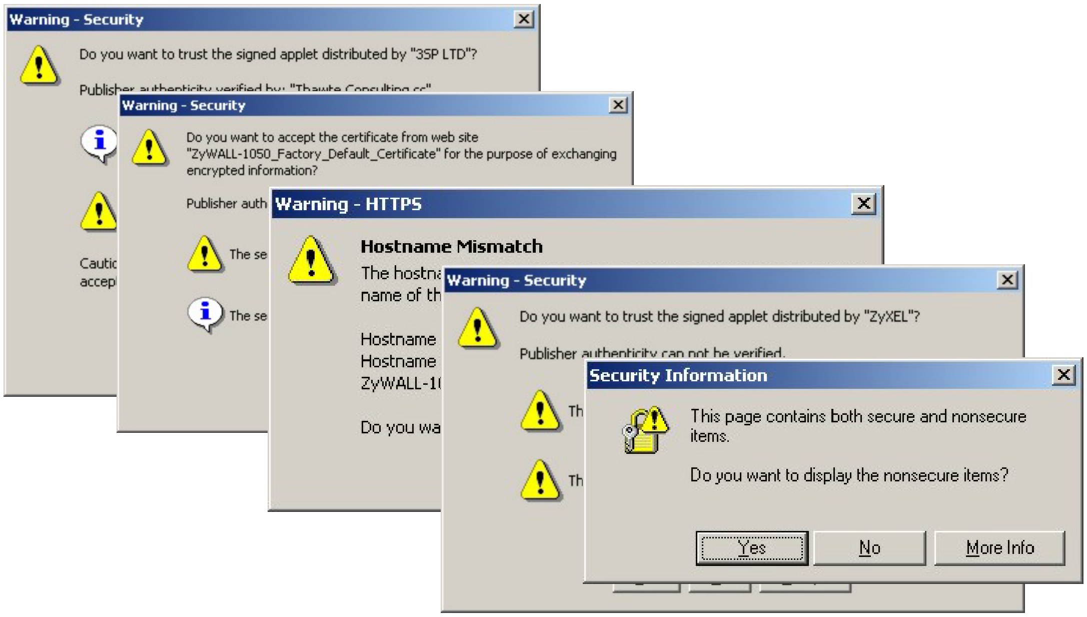
2 Click the **Console** icon 🖥 in the top-right corner of the web configurator screen.

3 If the Java plug-in is already installed, skip to step 4.

Otherwise, you will be prompted to install the Java plug-in. If the prompt does not display and the screen remains gray, you have to download the setup program.

4 The web console starts. This might take a few seconds. One or more security screens may display. Click **Yes** or **Always**.

Figure 3 Web Console: Security Warnings



Warning - Security

Do you want to trust the signed applet distributed by "3SP LTD"?

Warning - Security

Do you want to accept the certificate from web site "ZyWALL-1050_Factory_Default_Certificate" for the purpose of exchanging encrypted information?

Warning - HTTPS

Hostname Mismatch

Warning - Security

Do you want to trust the signed applet distributed by "ZyXEL"?

Publisher authenticity can not be verified.

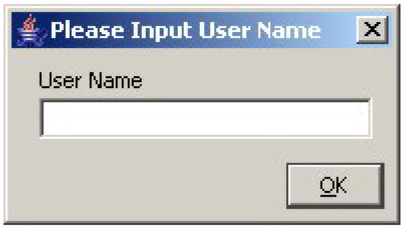
Security Information

This page contains both secure and nonsecure items.

Do you want to display the nonsecure items?

Finally, the **User Name** screen appears.

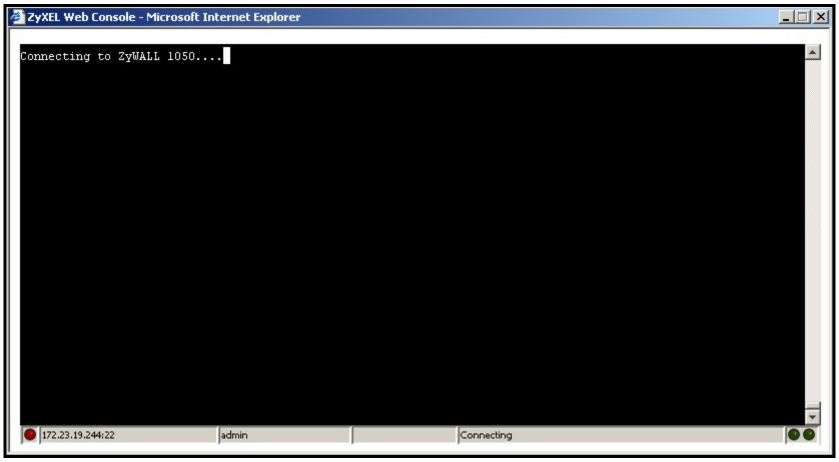
Figure 4 Web Console: User Name



5 Enter the user name you want to use to log in to the console. The console begins to connect to the Zyxel Device.

Note: The default login username is **admin**. It is case-sensitive.

Figure 5 Web Console: Connecting

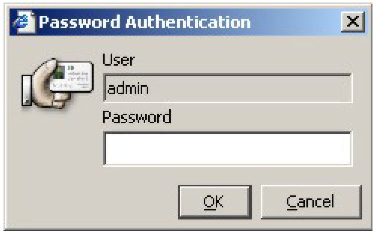


```
Connecting to ZyWALL 1050....
```

172.23.19.244:22 | admin | Connecting

Then, the **Password** screen appears.

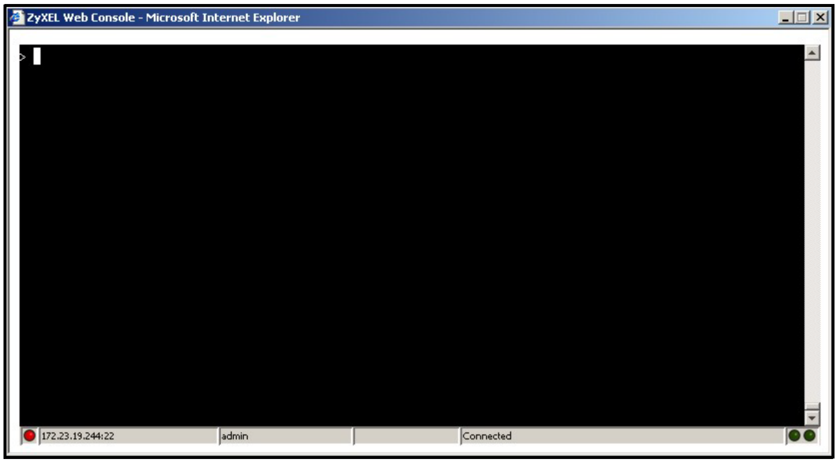
Figure 6 Web Console: Password



User
admin
Password

6 Enter the password for the user name you specified earlier, and click **OK.** If you enter the password incorrectly, you get an error message, and you may have to close the console window and open it again. If you enter the password correctly, the console screen appears.

Figure 7 Web Console



```
>
```

7 To use most commands in this User's Guide, enter `configure terminal`. The prompt should change to `Router(config)#`.

1.2.3 Telnet

Use the following steps to Telnet into your Zyxel Device.

1 If your computer is connected to the Zyxel Device over the Internet, skip to the next step. Make sure your computer IP address and the Zyxel Device IP address are on the same subnet.

2 In Windows, click **Start** (usually in the bottom left corner) and **Run**. Then type `telnet` and the Zyxel Device's IP address. For example, enter `telnet 192.168.1.1` (the default management IP address).

3 Click **OK**. A login screen displays. Enter the user name and password at the prompts.

Note: The default login username is **admin** and password is **1234**. The username and password are case-sensitive.

1.2.4 SSH (Secure SHell)

You can use an SSH client program to access the CLI. The following figure shows an example using a text-based SSH client program. Refer to the documentation that comes with your SSH program for information on using it.

Note: The default login username is **admin** and password is **1234**. The username and password are case-sensitive.

Figure 8 SSH Login Example

```
C:\>ssh2 admin@192.168.1.1
Host key not found from database.
Key fingerprint:
xolor-takel-fipef-zevit-visom-gydog-vetan-bisol-lysob-cuvun-muxex
You can get a public key's fingerprint by running
% ssh-keygen -F publickey.pub
on the keyfile.
Are you sure you want to continue connecting (yes/no)? yes

Host key saved to C:/Documents and Settings/user/Application Data/SSH/
hostkeys/
ey_22_192.168.1.1.pub
host key for 192.168.1.1, accepted by user Tue Aug 09 2005 07:38:28
admin's password:
Authentication successful.
```

1.3 How to Find Commands in this Guide

You can simply look for the feature chapter to find commands. In addition, you can use the List of Commands (Alphabetical) at the end of the guide. This section lists the commands in alphabetical order that they appear in this guide.

If you are looking at the CLI Reference Guide electronically, you might have additional options (for example, bookmarks or **Find...**) as well.

1.4 How Commands Are Explained

Each chapter explains the commands for one keyword. The chapters are divided into the following sections.

1.4.1 Background Information (Optional)

Note: See the User's Guide for background information about most features.

This section provides background information about features that you cannot configure in the web configurator. In addition, this section identifies related commands in other chapters.

1.4.2 Command Input Values (Optional)

This section lists common input values for the commands for the feature in one or more tables

1.4.3 Command Summary

This section lists the commands for the feature in one or more tables.

1.4.4 Command Examples (Optional)

This section contains any examples for the commands in this feature.

1.4.5 Command Syntax

The following conventions are used in this User's Guide.

- A command or keyword in `courier new` must be entered literally as shown. Do not abbreviate.
- Values that you need to provide are in *italics*.
- Required fields that have multiple choices are enclosed in curly brackets { }.
- A range of numbers is enclosed in angle brackets <>.
- Optional fields are enclosed in square brackets [].
- The | symbol means OR.

For example, look at the following command to create a TCP/UDP service object.

```
service-object object-name {tcp | udp} {eq <1..65535> | range <1..65535> <1..65535>}
```

1 Enter `service-object` exactly as it appears.

2 Enter the name of the object where you see *object-name*.

3 Enter `tcp` or `udp`, depending on the service object you want to create.

4 Finally, do one of the following.

- Enter `eq` exactly as it appears, followed by a number between 1 and 65535.
- Enter `range` exactly as it appears, followed by two numbers between 1 and 65535.

1.4.6 Naming Conventions

The ATP and USG devices may have different names for the same service, but the commands for both devices are the same. The command names will be used to refer to these services throughout this reference guide. A list of naming differences are in the next table.

Table 2 Naming differences between USG and ATP devices

COMMAND NAME	USG SERIES NAME	ATP SERIES NAME
anti-virus	Anti-Virus	Anti-Malware
anti-spam	Anti-Spam	Email Security

1.4.7 Changing the Password

It is highly recommended that you change the password for accessing the Zyxel Device. See Section 45.2 on page 338 for the appropriate commands.

1.4.8 Idle Timeout

See Section 45.2.1 on page 338 for commands on changing the default logout time when no activity is recorded.

1.5 CLI Modes

You run CLI commands in one of several modes.

After you log into the Zyxel Device, you will see this prompt `Router>` in **User** mode.

Type `enable` and you will see this prompt `Router#` in **Privilege** mode.

Type `configure terminal` and you will see this prompt `Router(config)#` in **Configuration** mode.

This is a summary of the modes.

Table 3 CLI Modes

	USER	PRIVILEGE	CONFIGURATION	SUB-COMMAND
What **Guest** users can do	Unable to access	Unable to access	Unable to access	Unable to access
What **User** users can do	• Look at (but not run) available commands	Unable to access	Unable to access	Unable to access
What **Limited-Admin** users can do	• Look at system information (like **Status** screen) • Run basic diagnostics	• Look at system information (like **Status** screen) • Run basic diagnostics	Unable to access	Unable to access
What **Admin** users can do	• Look at system information (like **Status** screen) • Run basic diagnostics	• Look at system information (like **Status** screen) • Run basic diagnostics	• Configure simple features (such as an address object) • Create or remove complex parts (such as an interface)	• Configure complex parts (such as an interface) in the Zyxel Device
How you enter it	Log in to the Zyxel Device	Type **enable** in **User** mode	Type **configure terminal** in **User** or **Privilege** mode	Type the command used to create the specific part in **Configuration** mode

What the prompt looks like	`Router>`	`Router#`	`Router(config)#`	(varies by part)
				`Router(zone)#`
				`Router(config-if-ge)#`
				`...`

How you exit it	Type **exit**	Type **disable**	Type **exit**	Type **exit**

See Chapter 45 on page 337 for more information about the user types. **User** users can only log in, look at (but not run) the available commands in **User** mode, and log out. **Limited-Admin** users can look at the configuration in the web configurator and CLI, and they can run basic diagnostics in the CLI. **Admin** users can configure the Zyxel Device in the web configurator or CLI.

At the time of writing, there is not much difference between **User** and **Privilege** mode for admin users. This is reserved for future use.

1.6 Shortcuts and Help

1.6.1 List of Available Commands

A list of valid commands can be found by typing `?` or [TAB] at the command prompt. To view a list of available commands within a command group, enter `<command> ?` or `<command>` [TAB].

Figure 9 Help: Available Commands Example 1

```
Router> ?
<cr>
apply
atse
clear
configure
------------------[Snip]--------------------
shutdown
telnet
test
traceroute
write
Router>
```

Figure 10 Help: Available Command Example 2

```
Router> show ?
<wlan ap interface>
aaa
access-page
account
ad-server
address-object
------------------[Snip]--------------------
wlan
workspace
zone
Router> show
```

1.6.2 List of Sub-commands or Required User Input

To view detailed help information for a command, enter `<command> <sub command> ?`.

Figure 11 Help: Sub-command Information Example

```
Router(config)# ip telnet server ?
;
<cr>
port
rule
|
Router(config)# ip telnet server
```

Figure 12 Help: Required User Input Example

```
Router(config)# ip telnet server port ?
<1..65535>
Router(config)# ip telnet server port
```

1.6.3 Entering Partial Commands

The CLI does not accept partial or incomplete commands. You may enter a unique part of a command and press [TAB] to have the Zyxel Device automatically display the full command.

For example, if you enter **`config`** and press [TAB] , the full command of **`configure`** automatically displays.

If you enter a partial command that is not unique and press [TAB], the Zyxel Device displays a list of commands that start with the partial command.

Figure 13 Non-Unique Partial Command Example

```
Router# c [TAB]
clear      configure  copy
Router# co [TAB]
configure  copy
```

1.6.4 Entering a ? in a Command

Typing a `?` (question mark) usually displays help information. However, some commands allow you to input a `?`, for example as part of a string. Press [CTRL+V] on your keyboard to enter a `?` without the Zyxel Device treating it as a help query.

1.6.5 Command History

The Zyxel Device keeps a list of commands you have entered for the current CLI session. You can use any commands in the history again by pressing the up (↑) or down (↓) arrow key to scroll through the previously used commands and press [ENTER].

1.6.6 Navigation

Press [CTRL]+A to move the cursor to the beginning of the line. Press [CTRL]+E to move the cursor to the end of the line.

1.6.7 Erase Current Command

Press [CTRL]+U to erase whatever you have currently typed at the prompt (before pressing [ENTER]).

1.6.8 The no Commands

When entering the no commands described in this document, you may not need to type the whole command. For example, with the “`[no] mss <536..1452>`” command, you use “`mss 536`” to specify the MSS value. But to disable the MSS setting, you only need to type “`no mss`” instead of “no mss 536”.

1.7 Input Values

You can use the ? or [TAB] to get more information about the next input value that is required for a command. In some cases, the next input value is a string whose length and allowable characters may not be displayed in the screen. For example, in the following example, the next input value is a string called `<description>`.

```
Router# configure terminal
Router(config)# interface ge1
Router(config-if-ge)# description
<description>
```

When you use the example above, note that Zyxel Device USG 200 and below models use a name such as wan1, wan2, opt, lan1, ext-wlan, or dmz.

The following table provides more information about input values like `<description>`.

Table 4 Input-Value Formats for Strings in CLI Commands

TAG	# VALUES	LEGAL VALUES
*	1	*
all	--	ALL
authentication key	Used in IPSec SA	
	32-40 16-20	“0x” or “0X” + 32-40 hexadecimal values alphanumeric or ;|`~!@#$%^&*()_+\\{}':,./<>=-
	Used in MD5 authentication keys for RIP/OSPF and text authentication key for RIP	
	0-16	alphanumeric or _-
	Used in text authentication keys for OSPF	
	0-8	alphanumeric or _-
certificate name	1-31	alphanumeric or ;`~!@#$%^&()_+[\]{}',.=-
community string	0-63	alphanumeric or .- first character: alphanumeric or -
connection_id	1+	alphanumeric or -_:
contact	1-61	alphanumeric, spaces, or '()+,/:=?;!*#@$_%-.
country code	0 or 2	alphanumeric

Table 4 Input-Value Formats for Strings in CLI Commands (continued)

<table>
<tr><th>TAG</th><th># VALUES</th><th>LEGAL VALUES</th></tr>
<tr><td><i>custom signature file name</i></td><td>0-30</td><td>alphanumeric or _-.
first character: letter</td></tr>
<tr><td rowspan="4"><i>description</i></td><td colspan="2">Used in keyword criteria for log entries</td></tr>
<tr><td>1-64</td><td>alphanumeric, spaces, or '()+,/:=?;!*#@$_%-.</td></tr>
<tr><td colspan="2">Used in other commands</td></tr>
<tr><td>1-61</td><td>alphanumeric, spaces, or '()+,/:=?;!*#@$_%-</td></tr>
<tr><td><i>distinguished name</i></td><td>1-511</td><td>alphanumeric, spaces, or .@=,_-</td></tr>
<tr><td rowspan="6"><i>domain name</i></td><td colspan="2">Used in content filtering</td></tr>
<tr><td>0+</td><td>lower-case letters, numbers, or .-</td></tr>
<tr><td colspan="2">Used in ip dns server</td></tr>
<tr><td>0-247</td><td>alphanumeric or .-
first character: alphanumeric or -</td></tr>
<tr><td colspan="2">Used in domainname, ip dhcp , and ip domain</td></tr>
<tr><td>0-254</td><td>alphanumeric or ._-
first character: alphanumeric or -</td></tr>
<tr><td><i>email</i></td><td>1-63</td><td>alphanumeric or .@_-</td></tr>
<tr><td><i>e-mail</i></td><td>1-64</td><td>alphanumeric or .@_-</td></tr>
<tr><td><i>encryption key</i></td><td>16-64
8-32</td><td>“0x” or “0X” + 16-64 hexadecimal values
alphanumeric or ;\|`~!@#$%^&*()_+\\{}':,./<>=-</td></tr>
<tr><td><i>file name</i></td><td>0-31</td><td>alphanumeric or _-</td></tr>
<tr><td><i>filter extension</i></td><td>1-256</td><td>alphanumeric, spaces, or '()+,/:=?;!*#@$_%.-</td></tr>
<tr><td rowspan="4"><i>fqdn</i></td><td colspan="2">Used in ip dns server</td></tr>
<tr><td>0-252</td><td>alphanumeric or .-
first character: alphanumeric or -</td></tr>
<tr><td colspan="2">Used in ip ddns, time server, device HA, VPN, certificates, and interface ping check</td></tr>
<tr><td>0-254</td><td>alphanumeric or .-
first character: alphanumeric or -</td></tr>
<tr><td><i>full file name</i></td><td>0-256</td><td>alphanumeric or _/.-</td></tr>
<tr><td rowspan="4"><i>hostname</i></td><td colspan="2">Used in hostname command</td></tr>
<tr><td>0-63</td><td>alphanumeric or .-_
first character: alphanumeric or -</td></tr>
<tr><td colspan="2">Used in other commands</td></tr>
<tr><td>0-252</td><td>alphanumeric or .-
first character: alphanumeric or -</td></tr>
<tr><td><i>import configuration file</i></td><td>1-26+”.conf”</td><td>alphanumeric or ;`~!@#$%^&()_+[]{}',.=-
add “.conf” at the end</td></tr>
<tr><td><i>import shell script</i></td><td>1-26+”.zysh”</td><td>alphanumeric or ;`~!@#$%^&()_+[]{}',.=-
add “.zysh” at the end</td></tr>
<tr><td><i>initial string</i></td><td>1-64</td><td>alphanumeric, spaces, or '()+,/:=!*#@$_%-.&</td></tr>
<tr><td><i>isp account password</i></td><td>0-63</td><td>alphanumeric or `~!@#$%^&*()_\-+={}|\;:'<,>./</td></tr>
<tr><td><i>isp account username</i></td><td>0-30</td><td>alphanumeric or -_@$./</td></tr>
</table>

Table 4   Input-Value Formats for Strings in CLI Commands (continued)

TAG	# VALUES	LEGAL VALUES
ipv6_addr		An IPv6 address. The 128-bit IPv6 address is written as eight 16-bit hexadecimal blocks separated by colons (:). This is an example IPv6 address 2001:0db8:1a2b:0015:0000:0000:1a2f:0000. IPv6 addresses can be abbreviated in two ways: Leading zeros in a block can be omitted. So 2001:0db8:1a2b:0015:0000:0000:1a2f:0000 can be written as 2001:db8:1a2b:15:0:0:1a2f:0. Any number of consecutive blocks of zeros can be replaced by a double colon. A double colon can only appear once in an IPv6 address. So 2001:0db8:0000:0000:1a2f:0000:0000:0015 can be written as 2001:0db8::1a2f:0000:0000:0015, 2001:0db8:0000:0000:1a2f::0015, 2001:db8::1a2f:0:0:15 or 2001:db8:0:0:1a2f::15.
key length	--	512, 768, 1024, 1536, 2048, 4096
license key	25	"S-" + 6 upper-case letters or numbers + "-" + 16 upper-case letters or numbers
mac address	--	aa:bb:cc:dd:ee:ff (hexadecimal)
mail server fqdn		lower-case letters, numbers, or -.
name	1-31	alphanumeric or _-
notification message	1-81	alphanumeric, spaces, or '()+,/:=?;!*#@$_%-
password: less than 15 chars	1-15	alphanumeric or `~!@#$%^&*()_\-+={}|\;:'<,>./
password: less than 8 chars	1-8	alphanumeric or ;/?:@&=+$\.-_!~*'()%,#$
password	Used in user and ip ddns	
	1-63	alphanumeric or `~!@#$%^&*()_-+={}|\;:'<,>./
	Used in e-mail log profile SMTP authentication	
	1-63	alphanumeric or `~!@#$%^&*()_-+={}|\;:'<>./
	Used in device HA synchronization	
	1-63	alphanumeric or ~#%^*_-={}:,.
	Used in registration	
	6-20	alphanumeric or .@_-
phone number	1-20	numbers or ,+
preshared key	16-64	"0x" or "0X" + 16-64 hexadecimal values alphanumeric or ;|`~!@#$%^&*()_+\{}':,./<>=-
profile name	0-30	alphanumeric or _- first character: letters or _-
proto name	1-16	lower-case letters, numbers, or -
protocol name	0-30	alphanumeric or _- first character: letters or _-
quoted string less than 127 chars	1-255	alphanumeric, spaces, or ;/?:@&=+$\.-_!~*'()%,
quoted string less than 63 chars	1-63	alphanumeric, spaces, or ;/?:@&=+$\.-_!~*'()%

Table 4   Input-Value Formats for Strings in CLI Commands (continued)

TAG	# VALUES	LEGAL VALUES
quoted string	0+	alphanumeric, spaces, or punctuation marks enclosed in double quotation marks (“) must put a backslash (\) before double quotation marks that are part of input value itself
service name	0-63	alphanumeric or -_@$./
spi	2-8	hexadecimal
string less than 15 chars	1-15	alphanumeric or -_
string: less than 63 chars	1-63	alphanumeric or `~!@#$%^&*()_-+={}|\;:'<,>./
string	1+	alphanumeric or -_@
subject	1-61	alphanumeric, spaces, or '()+,./:=?;!*#@$_%-
system type	0-2	hexadecimal
timezone [-+]*hh*	--	-12 through +12 (with or without “+”)
url	1-511	alphanumeric or '()+,/:.=?;!*#@$_%-
url	Used in content filtering redirect	
	“http://”+ “https://”+	alphanumeric or ;/?:@&=+$\.-_!~*'()%, starts with “http://” or “https://” may contain one pound sign (#)
	Used in other content filtering commands	
	“http://”+	alphanumeric or ;/?:@&=+$\.-_!~*'()%, starts with “http://” may contain one pound sign (#)
user name	Used in VPN extended authentication	
	1-31	alphanumeric or _-
	Used in other commands	
	0-30	alphanumeric or _- first character: letters or _-
username	6-20	alphanumeric or .@_- registration
user name	1+	alphanumeric or -_. logging commands
user@domainname	1-80	alphanumeric or .@_-
vrrp group name: less than 15 chars	1-15	alphanumeric or _-
week-day sequence, i.e. 1=first,2=second	1	1-4
xauth method	1-31	alphanumeric or _-
xauth password	1-31	alphanumeric or ;|`~!@#$%^&*()_+\{}':,./<>=-
mac address	0-12 (even number)	hexadecimal for example: aa aabbcc aabbccddeeff

1.8 Ethernet Interfaces

How you specify an Ethernet interface depends on the Zyxel Device model.

- For some Zyxel Device models, use ge*x*, *x* = 1~N, where N equals the highest numbered Ethernet interface for your Zyxel Device model.
- For other Zyxel Device models use a name such as wan1, wan2, opt, lan1, or dmz.

1.9 Saving Configuration Changes

Use the `write` command to save the current configuration to the Zyxel Device.

Note: Always save the changes before you log out after each management session. All unsaved changes will be lost after the system restarts.

1.10 Logging Out

Enter the `exit` or `end` command in configure mode to go to privilege mode.

Enter the `exit` command in user mode or privilege mode to log out of the CLI.

1.11 Resetting the Zyxel Device

If you cannot access the Zyxel Device by any method, try restarting it by turning the power off and then on again. If you still cannot access the Zyxel Device by any method or you forget the administrator password(s), you can reset the Zyxel Device to its factory-default settings. Any configuration files or shell scripts that you saved on the Zyxel Device should still be available afterwards.

Use the following command to reset the Zyxel Device to its factory-default settings. This overwrites the settings in the startup-config.conf file with the settings in the system-default.conf file.

Note: This procedure removes the current configuration. Note that there is a space after apply in the command.

Figure 14   Resetting the Zyxel Device

```
Router> apply /conf/system-default.conf
```

CHAPTER 2
User and Privilege Modes

This chapter describes how to use these two modes.

2.1 User And Privilege Modes

This is the mode you are in when you first log into the CLI. (Do not confuse 'user mode' with types of user accounts the Zyxel Device uses. See Chapter 45 on page 337 for more information about the user types. 'User' type accounts can only run 'exit' in this mode. However, they may need to log into the device in order to be authenticated for 'user-aware' policies, for example a firewall rule that a particular user is exempt from or a VPN tunnel that only certain people may use.)

Type 'enable' to go to 'privilege mode'. No password is required. All commands can be run from here except those marked with an asterisk. Many of these commands are for trouble-shooting purposes, for example debug commands. Customer support may ask you to run some of these commands and send the results if you need assistance troubleshooting your device.

For admin logins, all commands are visible in 'user mode' but not all can be run there. The following table displays which commands can be run in 'user mode'. All commands can be run in 'privilege mode'.

The `psm` commands are for Zyxel's internal manufacturing process.

Table 5 User (U) and Privilege (P) Mode Commands

COMMAND	MODE	DESCRIPTION
`apply`	P	Applies a configuration file.
`atse`	U/P	Displays the seed code
`clear`	U/P	Clears system or debug logs or DHCP binding.
`configure`	U/P	Use 'configure terminal' to enter configuration mode.
`copy`	P	Copies configuration files.
`debug (*)`	U/P	For support personnel only! The device needs to have the debug flag enabled.
`delete`	P	Deletes configuration files.
`details`	P	Performs diagnostic commands.
`diag`	P	Provided for support personnel to collect internal system information. It is not recommended that you use these.
`diag-info`	P	Has the Zyxel Device create a new diagnostic file.
`dir`	P	Lists files in a directory.
`disable`	U/P	Goes from privilege mode to user mode
`enable`	U/P	Goes from user mode to privilege mode
`exit`	U/P	Goes to a previous mode or logs out.

Table 5 User (U) and Privilege (P) Mode Commands (continued)

COMMAND	MODE	DESCRIPTION
`interface`	U/P	Dials or disconnects an interface.
`no packet-trace`	U/P	Turns off packet tracing.
`nslookup`	U/P	Resolves an IP address to a host name and vice-versa.
`packet-trace`	U/P	Performs a packet trace.
`ping`	U/P	Pings an IP address or host name.
`ping6`	U/P	Pings an IPv6 address or a host name.
`psm`	U/P	Goes to psm (product support module) mode for setting product parameters. Only use psm commands if your customer support Engineer asks you to during troubleshooting. Note: These commands are for Zyxel's internal manufacturing process.
`reboot`	P	Restarts the device.
`release`	P	Releases DHCP information from an interface.
`rename`	P	Renames a configuration file.
`renew`	P	Renews DHCP information for an interface.
`run`	P	Runs a script.
`setenv`	U/P	Turns stop-on-error on (terminates booting if an error is found in a configuration file) or off (ignores configuration file errors and continues booting).
`show`	U/P	Displays command statistics. See the associated command chapter in this guide.
`shutdown`	P	Writes all d data to disk and stops the system processes. It does not turn off the power.
`telnet`	U/P	Establishes a connection to the TCP port number 23 of the specified host name or IP address.
`test aaa`	U/P	Tests whether the specified user name can be successfully authenticated by an external authentication server.
`traceroute`	P	Traces the route to the specified host name or IP address.
`traceroute6`	P	Traces the route to the specified host name or IPv6 address.
`write`	P	Saves the current configuration to the Zyxel Device. All unsaved changes are lost after the Zyxel Device restarts.

Subsequent chapters in this guide describe the configuration commands. User/privilege mode commands that are also configuration commands (for example, 'show') are described in more detail in the related configuration command chapter.

2.1.1 Debug Commands

The debug commands follow a Linux-based syntax, so if there is a Linux equivalent, it is displayed in this chapter for your reference. You must know a command listed here well before you use it. Otherwise, it may cause undesired results.

Note: Debug commands marked with an asterisk (*) are not available when the debug flag is on and are for Zyxel service personnel use only.

Table 6 Debug Commands

COMMAND SYNTAX	DESCRIPTION	LINUX COMMAND EQUIVALENT
`debug alg`	FTP/SIP ALG debug commands	
`debug anti-spam`	Anti-Spam debug commands	
`debug app`	Application patrol debug command	
`debug app show l7protocol (*)`	Shows app patrol protocol list	`> cat /etc/l7_protocols/protocol.list`
`debug ca (*)`	Certificate debug commands	
`debug content-filter`	Content Filtering debug commands	
`debug show content-filter https-domain-filter cache`	Displays content filtering HTTPs Domain Filter cache entries.	
`debug content-filter https-domain-filter cache flush`	Removes content filtering HTTPs Domain Filter cache entries.	
`debug device-ha (*)`	Device HA debug commands	
`debug force-auth (*)`	Authentication policy debug commands	
`debug gui (*)`	GUI cgi related debug commands	
`debug gui (*)`	Web Configurator related debug commands	
`debug hardware (*)`	Hardware debug commands	
`debug idp`	IDP debug commands	
`debug idp-av`	IDP and Anti-Virus debug commands	
`debug interface`	Interface debug commands	
`debug interface ifconfig [interface]`	Shows system interfaces detail	`> ifconfig [interface]`
`debug interface-group`	Port grouping debug commands	
`debug ip dns`	DNS debug commands	
`debug ip virtual-server`	Virtual Server (NAT) debug commands	
`debug ipsec`	IPSec VPN debug commands	
`debug logging`	System logging debug commands	
`debug manufacture`	Manufacturing related debug commands	
`debug myzyxel-server (*)`	myZyxel debug commands	
`debug network arpignore (*)`	Enable/Display the ignoring of ARP responses for interfaces which don't own the IP address	`cat /proc/sys/net/ipv4/conf/*/arp_ignore`
`debug server register`	Set the myZyxel registration server	
`debug policy-route (*)`	Policy route debug command	
`debug reset content-filter profiling`	Content Filtering debug commands	
`debug service-register`	Service registration debug command	
`debug show content-filter server`	Category-based content filtering debug command	

Table 6   Debug Commands (continued)

COMMAND SYNTAX	DESCRIPTION	LINUX COMMAND EQUIVALENT
`debug show myzyxel-server status`	myZyxel status debug commands	
`debug show ipset`	Lists the Zyxel Device's received cards	
`debug sslvpn`	SSL VPN debug commands	
`debug system ipv6`	IPv6 debug commands	
`debug [cmdexec|corefile|ip |kernel|mac-id-rewrite|observer|switch |system|zyinetpkt|zysh-ipt-op] (*)`	ZLD internal debug commands	

PART II
Reference

CHAPTER 3 Object Reference

This chapter describes how to use object reference commands.

3.1 Object Reference Commands

The object reference commands are used to see which configuration settings reference a specific object. You can use this table when you want to delete an object because you have to remove references to the object first.

Table 7 `show reference` Commands

COMMAND	DESCRIPTION
`show reference object username [`*`username`*`]`	Displays which configuration settings reference the specified user object.
`show reference object address [`*`object_name`*`]`	Displays which configuration settings reference the specified address object.
`show reference object address6 [`*`object_name`*`]`	Displays which configuration settings reference the specified IPv6 address object.
`show reference object service [`*`object_name`*`]`	Displays which configuration settings reference the specified service object.
`show reference object schedule [`*`object_name`*`]`	Displays which configuration settings reference the specified schedule object.
`show reference object interface [`*`interface_name`*` | `*`virtual_interface_name`*`]`	Displays which configuration settings reference the specified interface or virtual interface object.
`show reference object aaa authentication [default | `*`auth_method`*`]`	Displays which configuration settings reference the specified AAA authentication object.
`show reference object ca category {local|remote} [`*`cert_name`*`]`	Displays which configuration settings reference the specified authentication method object.
`show reference object account pppoe [`*`object_name`*`]`	Displays which configuration settings reference the specified PPPoE account object.
`show reference object account pptp [`*`object_name`*`]`	Displays which configuration settings reference the specified PPTP account object.
`show reference object app-patrol [`*`profile-name`*`]`	Displays which configuration settings reference the specified application patrol profile.
`show reference object sslvpn application [`*`object_name`*`]`	Displays which configuration settings reference the specified SSL VPN application object.
`show reference object crypto map [`*`crypto_name`*`]`	Displays which configuration settings reference the specified VPN connection object.

Table 7 `show reference` Commands (continued)

COMMAND	DESCRIPTION
`show reference object isakmp policy` [*isakmp_name*]	Displays which configuration settings reference the specified VPN gateway object.
`show reference object sslvpn policy` [*object_name*]	Displays which configuration settings reference the specified SSL VPN object.
`show reference object zone` [*object_name*]	Displays which configuration settings reference the specified zone object.
`show reference object dhcp6-lease-object` [*object_name*]	Displays which configuration settings reference the specified DHCPv6 lease object.
`show reference object dhcp6-request-object` [*object_name*]	Displays which configuration settings reference the specified DHCPv6 request object.
`show reference object-group username` [*username*]	Displays which configuration settings reference the specified user group object.
`show reference object-group address` [*object_name*]	Displays which configuration settings reference the specified address group object.
`show reference object-group address6` [*object_name*]	Displays which configuration settings reference the specified IPv6 address group object.
`show reference object-group service` [*object_name*]	Displays which configuration settings reference the specified service group object.
`show reference object-group interface` [*object_name*]	Displays which configuration settings reference the specified trunk object.
`show reference object-group aaa ad` [*group_name*]	Displays which configuration settings reference the specified AAA AD group object.
`show reference object-group aaa ldap` [*group_name*]	Displays which configuration settings reference the specified AAA LDAP group object.
`show reference object-group aaa radius` [*group_name*]	Displays which configuration settings reference the specified AAA RADIUS group object.

3.1.1 Object Reference Command Example

This example shows how to check which configuration is using an address object named LAN1_SUBNET. For the command output, firewall rule 3 named LAN1-to-USG-2000 is using the address object.

```
Router(config)# show reference object address LAN1_SUBNET

LAN1_SUBNET References:
Category
Rule Priority         Rule Name
Description
===========================================================================
Security Policy Control
3                     N/A
LAN1-to-USG-2000
Router(config)#
```

CHAPTER 4
Status

This chapter explains some commands you can use to display information about the Zyxel Device's current operational state.

Table 8 Status Show Commands

COMMAND	DESCRIPTION
`show boot status`	Displays details about the Zyxel Device's startup state.
`show comport status`	Displays whether the console is on or off.
`show cpu status`	Displays the CPU utilization.
`show cpu all`	Displays the CPU utilization of each CPU.
`show disk`	Displays the disk utilization.
`show extension-slot`	Displays the status of the extension card slot and USB ports and the names of devices connected to them.
`show led status`	Displays the status of each LED on the Zyxel Device.
`show mac`	Displays the Zyxel Device's MAC address.
`show mem status`	Displays what percentage of the Zyxel Device's memory is currently being used.
`show ram-size`	Displays the size of the Zyxel Device's on-board RAM.
`show serial-number`	Displays the serial number of this Zyxel Device.
`show socket listen`	Displays the Zyxel Device's listening ports
`show socket open`	Displays the ports that are open on the Zyxel Device.
`show system uptime`	Displays how long the Zyxel Device has been running since it last restarted or was turned on.
`show version`	Displays the Zyxel Device's model, firmware and build information.
`show ap-info total {sta | usage} {24G | 5G | all}` *timer*	Displays how many wireless stations are connected to all managed APs or the amount of data (in bytes) sent/received by the connected stations. *timer*: a period of time (from 1 to 24 hours) over which the station number is recorded or the traffic flow occurred.
`show ap-info top` *number* `{sta | usage}` *timer*	Displays how many wireless stations are connected to the top managed AP(s) or the amount of data (in bytes) sent/received by the connected stations. *number*: 1 to 64, the top "N" number of managed APs. *timer*: a period of time (from 1 to 24 hours) over which the station number is recorded or the traffic flow occurred.
`show ap-info {`*mac_address* `| all} {sta | usage} {24G | 5G | all}` *timer*	Displays how many wireless stations are connected to a specific or all managed APs or the amount of data (in bytes) sent/received by the connected stations. *mac_address*: the managed AP's MAC address. *timer*: a period of time (from 1 to 24 hours) over which the station number is recorded or the traffic flow occurred.

Table 8   Status Show Commands

COMMAND	DESCRIPTION
show sta-info {*mac_address* | all} usage *timer*	Displays data usage of a specific or all connected wireless stations. *mac_address*: the wireless station's MAC address. *timer*: a period of time (from 1 to 24 hours) over which the traffic flow occurred.
show sta-info total usage *timer*	Displays data usage of all connected wireless station(s). *timer*: a period of time (from 1 to 24 hours) over which the traffic flow occurred.
show sta-info top *number* usage *timer*	Displays data usage of the top connected wireless station(s). *number*: 1 to 64, the top "N" number of connected wireless stations. *timer*: a period of time (from 1 to 24 hours) over which the traffic flow occurred.

Here are examples of the commands that display the CPU and disk utilization.

```
Router(config)# show cpu status
CPU utilization: 0 %
CPU utilization for 1 min: 0 %
CPU utilization for 5 min: 0 %
Router(config)# show disk
;      <cr>    |
Router(config)# show disk
No. Disk                    Size(MB)        Usage
===========================================================================
1   image                   67              83%
2   onboard flash           163             15%

Router(config)# show cpu all
CPU core 0 utilization: 0 %
CPU core 0 utilization for 1 min: 0 %
CPU core 0 utilization for 5 min: 0 %
CPU core 1 utilization: 0 %
CPU core 1 utilization for 1 min: 0 %
CPU core 1 utilization for 5 min: 2 %
CPU core 2 utilization: 0 %
CPU core 2 utilization for 1 min: 0 %
CPU core 2 utilization for 5 min: 0 %
CPU core 3 utilization: 0 %
CPU core 3 utilization for 1 min: 0 %
CPU core 3 utilization for 5 min: 0 %
```

Here are examples of the commands that display the MAC address, memory usage, RAM size, and serial number.

```
Router(config)# show mac
MAC address: 28:61:32:89:37:61-28:61:32:89:37:67
Router(config)# show mem status
memory usage: 39%
Router(config)# show ram-size
ram size: 510MB
Router(config)# show serial-number
serial number: S060Z12020460
```

Here is an example of the command that displays the listening ports.

```
Router(config)# show socket listen
No.   Proto Local_Address            Foreign_Address       State
===========================================================================
1     tcp   0.0.0.0:2601             0.0.0.0:0             LISTEN
2     tcp   0.0.0.0:2602             0.0.0.0:0             LISTEN
3     tcp   127.0.0.1:10443          0.0.0.0:0             LISTEN
4     tcp   0.0.0.0:2604             0.0.0.0:0             LISTEN
5     tcp   0.0.0.0:80               0.0.0.0:0             LISTEN
6     tcp   127.0.0.1:8085           0.0.0.0:0             LISTEN
7     tcp   1.1.1.1:53               0.0.0.0:0             LISTEN
8     tcp   172.16.37.205:53         0.0.0.0:0             LISTEN
9     tcp   10.0.0.8:53              0.0.0.0:0             LISTEN
10    tcp   172.16.37.240:53         0.0.0.0:0             LISTEN
11    tcp   192.168.1.1:53           0.0.0.0:0             LISTEN
12    tcp   127.0.0.1:53             0.0.0.0:0             LISTEN
13    tcp   0.0.0.0:21               0.0.0.0:0             LISTEN
14    tcp   0.0.0.0:22               0.0.0.0:0             LISTEN
15    tcp   127.0.0.1:953            0.0.0.0:0             LISTEN
16    tcp   0.0.0.0:443              0.0.0.0:0             LISTEN
17    tcp   127.0.0.1:1723           0.0.0.0:0             LISTEN
```

Here is an example of the command that displays the open ports.

```
Router(config)# show socket open
No.   Proto Local_Address         Foreign_Address       State
===========================================================================
1     tcp   172.23.37.240:22      172.23.37.10:1179     ESTABLISHED
2     udp   127.0.0.1:64002       0.0.0.0:0
3     udp   0.0.0.0:520           0.0.0.0:0
4     udp   0.0.0.0:138           0.0.0.0:0
5     udp   0.0.0.0:138           0.0.0.0:0
6     udp   0.0.0.0:138           0.0.0.0:0
7     udp   0.0.0.0:138           0.0.0.0:0
8     udp   0.0.0.0:138           0.0.0.0:0
9     udp   0.0.0.0:138           0.0.0.0:0
10    udp   0.0.0.0:138           0.0.0.0:0
11    udp   0.0.0.0:32779         0.0.0.0:0
12    udp   192.168.1.1:4500      0.0.0.0:0
13    udp   1.1.1.1:4500          0.0.0.0:0
14    udp   10.0.0.8:4500         0.0.0.0:0
15    udp   172.23.37.205:4500    0.0.0.0:0
16    udp   172.23.37.240:4500    0.0.0.0:0
17    udp   127.0.0.1:4500        0.0.0.0:0
18    udp   127.0.0.1:63000       0.0.0.0:0
19    udp   127.0.0.1:63001       0.0.0.0:0
20    udp   127.0.0.1:63002       0.0.0.0:0
21    udp   0.0.0.0:161           0.0.0.0:0
22    udp   127.0.0.1:63009       0.0.0.0:0
23    udp   192.168.1.1:1701      0.0.0.0:0
24    udp   1.1.1.1:1701          0.0.0.0:0
25    udp   10.0.0.8:1701         0.0.0.0:0
26    udp   172.23.37.205:1701    0.0.0.0:0
27    udp   172.23.37.240:1701    0.0.0.0:0
28    udp   127.0.0.1:1701        0.0.0.0:0
29    udp   127.0.0.1:63024       0.0.0.0:0
30    udp   127.0.0.1:30000       0.0.0.0:0
31    udp   1.1.1.1:53            0.0.0.0:0
32    udp   172.23.37.205:53      0.0.0.0:0
33    udp   10.0.0.8:53           0.0.0.0:0
34    udp   172.23.37.240:53      0.0.0.0:0
35    udp   192.168.1.1:53        0.0.0.0:0
36    udp   127.0.0.1:53          0.0.0.0:0
37    udp   0.0.0.0:67            0.0.0.0:0
38    udp   127.0.0.1:63046       0.0.0.0:0
39    udp   127.0.0.1:65097       0.0.0.0:0
40    udp   0.0.0.0:65098         0.0.0.0:0
41    udp   192.168.1.1:500       0.0.0.0:0
42    udp   1.1.1.1:500           0.0.0.0:0
43    udp   10.0.0.8:500          0.0.0.0:0
44    udp   172.23.37.205:500     0.0.0.0:0
45    udp   172.23.37.240:500     0.0.0.0:0
46    udp   127.0.0.1:500         0.0.0.0:0
```

Here are examples of the commands that display the system uptime and model, firmware, and build information.

```
Router> show system uptime
system uptime: 04:18:00
Router> show version
Zyxel Communications Corp.
model            : ZyWALL USG 110
firmware version: 2.20(AQQ.0)b3
BM version       : 1.08
build date       : 2014-01-21 01:18:06
```

This example shows the current LED states on the Zyxel Device. The **SYS** LED lights on and green. The **HDD** LEDs is off.

```
Router> show led status
sys: green
usbled: off
Router>
```

4.1 ATP Dashboard Commands

Use these commands to view status and statistics information about security services on the ZyWALL ATP models.

Table 9 Dashboard Commands

COMMAND	DESCRIPTION
`show anti-botnet dashboard statistics summary`	Displays the number of the connection attempts detected or blocked, and the number of malware threats.
`show anti-spam dashboard statistics summary`	Displays the number of emails that the Zyxel Device’s email security feature has checked, the number of spam emails and the number of suspicious websites known for phishing.
`show anti-virus statistics summary`	Displays the number of viruses detected.
`show content-filter dashboard statistics summary`	Displays the number of web pages that the Zyxel Device’s content filtering feature has checked.
`show idp dashboard statistics summary`	Displays the number of sessions and packets that the Zyxel Device’s IDP feature has checked.
`show sandbox dashboard statistics summary`	Displays the number of files that have been scanned or destroyed and the scan result.
`show security-service status`	Displays whether the security service, such as content filtering or sandboxing is enabled on the Zyxel Device.
`threat-website dashboard statistics flush`	Clears the anti-bonet statistics.

CHAPTER 5 Registration

This chapter introduces myZyxel and shows you how to register the Zyxel Device for IDP/AppPatrol, anti-virus, content filtering, and SSL VPN services using commands.

5.1 myZyxel Overview

myZyxel is Zyxel's online services center where you can register your Zyxel Device and manage subscription services available for the Zyxel Device.

Note: You need to create an account before you can register your device and activate the services at myZyxel.

First, go to *http://www.myZyxel* with the Zyxel Device's serial number and LAN MAC address to register the Zyxel Device. Refer to the web site's on-line help for details. You can also go to the portal and see license status using the **Licensing > Registration** screens.

Note: To activate a service on a Zyxel Device, you need to access myZyxel via that Zyxel Device.

5.1.1 Subscription Services Available on the Zyxel Device

Refer to Section 1.4.6 on page 29 for differences between ATP and USG license names.

The Zyxel Device can use anti-virus, anti-spam, IDP/AppPatrol (Intrusion Detection and Prevention and application patrol), SSL VPN, and content filtering subscription services.

ZyWALL models need a license for UTM (Unified Threat Management) functionality. See the Introduction chapter in the Zyxel Device User's Guide or the product datasheet for details.

You can purchase an EiCard and enter the license key from it, at *http://www.myZyxel.com* to have the ZyWALL use UTM services or have the Zyxel Device use more SSL VPN tunnels. See the respective chapters in the User's Guide for more information about UTM features.

- The Zyxel Device's anti-virus packet scanner uses signature files on the Zyxel Device to detect virus. Your Zyxel Device scans files transmitted through enabled interfaces into the network. Subscribe to signature updates for Zyxel's anti-virus engine. After the service is activated, the Zyxel Device can download the up-to-date signatures from the update server.

  After the trial expires, you need to purchase an EiCard and enter the PIN number (license key) at *http://www.myZyxel.com*.
- The IDP and application patrol features use IDP/AppPatrol signatures on the Zyxel Device. IDP detects malicious or suspicious packets and responds immediately. Application patrol conveniently manages the use of various applications on the network. After the service is activated, the Zyxel Device can download the up-to-date signature files from the update server.

- SSL VPN tunnels provide secure network access to remote users. You can purchase and enter a license key to have the Zyxel Device use more SSL VPN tunnels.
- Content filter allows or blocks access to web sites. Subscribe to category-based content filtering to block access to categories of web sites based on content. Your Zyxel Device accesses an external database that has millions of web sites categorized based on content. You can have the Zyxel Device block, block and/or log access to web sites based on these categories.
- You will get automatic e-mail notification of new signature releases from mySecurityZone after you activate the IDP/AppPatrol service. You can also check for new signatures at *http://mysecurity.zyxel.com*.

See the respective chapters for more information about these features.

Note: To update the signature file or use a subscription service, you have to register the Zyxel Device and activate the corresponding service at myZyxel (through the Zyxel Device).

5.2 Registration Commands

The following table describes the commands available for registration. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 10 Command Summary: Registration

COMMAND	DESCRIPTION
`service-register checkexpire`	Gets information of all service subscriptions from myZyxel and updates the status table.
`service-register _setremind {after-10-days | after-180-days | after-30-days | every-time | never}`	Sets how often you want to display the network risk warning screen in the Web Configurator. The screen shows the security services which are not registered or disabled on the Zyxel Device.
`show device-register status`	Displays whether the device is registered and account information.
`show service-register status {all | application-security | secu-reporter | as | av | concurrent-device-upgrade | content-filter | firmware-upgrade | geo-ip | idp | malware-blocker | managed-ap-service | pkg | sandbox | secu-reporter | sslvpn | sslvpn-status | web-security | zymesh}`	Displays the status of your service registration(s).
`show service-register status content-filter {commtouch}`	Displays Commtouch content filter service license information.
`show service-register content-filter-engine`	Displays which external web filtering service the Zyxel Device is set to use for content filtering.
`debug myzyxel2 show [as|av|idp|content-filter|sslvpn|extmaps|pkg] shm`	Shows debug information for services at myZyxel
`debug show myzyxel-server status`	Shows debug information for the myZyxel server.

5.2.1 Command Examples

The following command displays the account information and whether the device is registered.

```
Router# configure terminal
Router(config)# show device-register status
username               : example
password               : 123456
device register status : yes
expiration self check  : no
```

The following command displays the service registration status and type and how many days remain before the service expires.

```
Router# configure terminal
Router(config)# show service-register status all
Service              Status       Type     Count    Expiration
===========================================================================
IDP Signature        Licensed     Standard N/A      176
Anti-Virus           Not Licensed None     N/A      0
SSLVPN               Not Licensed None     5        N/A
Content-Filter       Not Licensed None     N/A      0
```

CHAPTER 6
AP Management

This chapter shows you how to configure wireless AP management options on your Zyxel Device.

6.1 AP Management Overview

The Zyxel Device allows you to remotely manage all of the Access Points (APs) on your network. You can manage a number of APs without having to configure them individually as the Zyxel Device automatically handles basic configuration for you.

The commands in this chapter allow you to add, delete, and edit the APs managed by the Zyxel Device by means of the CAPWAP protocol. An AP must be moved from the wait list to the management list before you can manage it. If you do not want to use this registration mechanism, you can disable it and then any newly connected AP is registered automatically.

6.2 AP Management Commands

The following table identifies the values required for many of these commands. Other input values are discussed with the corresponding commands.

Table 11 Input Values for General AP Management Commands

LABEL	DESCRIPTION
ap_mac	The Ethernet MAC address of the managed AP. Enter 6 hexidecimal pairs separated by colons. You can use 0-9, a-z and A-Z.
ap_model	The model name of the managed AP, such as NWA5160N, NWA5560-N, NWA5550-N, NWA5121-NI or NWA5123-NI.
slot_name	The slot name for the AP's on-board wireless LAN card. Use either *slot1* or *slot2*. (The NWA5560-N supports up to 2 radio slots.)
profile_name	The wireless LAN radio profile name. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
ap_description	The AP description. This is strictly used for reference purposes and has no effect on any other settings. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
sta_mac	The MAC address of the wireless client. Enter 6 hexidecimal pairs separated by colons. You can use 0-9, a-z and A-Z.

The following table describes the commands available for AP management. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 12 Command Summary: AP Management

COMMAND	DESCRIPTION
`capwap ap` *`ap_mac`*	Enters the sub-command mode for the specified AP.
`slot_name` `ap-profile` *`profile_name`*	Sets the radio (*`slot_name`*) to AP mode and assigns a created profile to the radio.
`no` *`slot_name`* `ap-profile`	Removes the AP mode profile assignment for the specified radio (*`slot_name`*).
`slot_name` `monitor-profile` *`profile_name`*	Sets the specified radio (*`slot_name`*) to monitor mode and assigns a created profile to the radio. Monitor mode APs act as wireless monitors, which can detect rogue APs and help you in building a list of friendly ones. See also Section 8.2 on page 68.
`no` *`slot_name`* `monitor-profile`	Removes the monitor mode profile assignment for the specified radio (*`slot_name`*).
`slot_name` `{ root-ap | repeater-ap }` *`zymesh-profile_name`*	Sets the specified radio (*`slot_name`*) to root AP or repeater mode and assigns a created ZyMesh profile to the radio. See also Section 8.6 on page 82 for more information about ZyMesh.
`slot_name` `wireless-bridge {enable | disable}`	Enables or disables wireless bridging on the specified radio (*`slot_name`*). The managed AP must support LAN provision and the radio should be in repeater mode. VLAN and bridge interfaces are created automatically according to the LAN port's VLAN settings. When wireless bridging is enabled, the managed repeater AP can still transmit data through its Ethernet port(s) after the ZyMesh/WDS link is up. Be careful to avoid bridge loops. The managed APs in the same ZyMesh/WDS must use the same static VLAN ID.
`antenna config` *`slot_name`* `chain3 {ceiling | wall}`	Adjusts coverage depending on each radio's antenna orientation for better coverage.
`[no] antenna sw-control enable`	Enables the adjustment of coverage depending on the orientation of the antenna for the AP radios using the web configurator or the command line interface (CLI), The `no` command disables adjustment through the web configurator or the command line interface (CLI). You can still adjust coverage using a physical antenna switch.
`ap-group-profile` *`ap-group-profile_name`*	Sets the AP group to which the AP belongs.
`description` *`ap_description`*	Sets the description for the specified AP.
`[no] force vlan`	Sets whether or not the Zyxel Device changes the AP's management VLAN to match the one you configure using the `vlan` sub-command. The management VLAN on the Zyxel Device and AP must match for the Zyxel Device to manage the AP. This takes priority over the AP's CAPWAP client commands described in Chapter 68 on page 468.

Table 12 Command Summary: AP Management (continued)

COMMAND	DESCRIPTION
lan-provision *lan_port* {activate | inactivate} pvid <1..4094>	Sets the Zyxel Device to enable or disable the specified LAN port on the AP and configures a PVID (Port VLAN ID) for this port. *lan_port*: the name of the AP's LAN port (lan1 for example).
lan-provision *vlan_interface* {activate | inactivate} vid <1..4094> join *lan_port* {tag | untag} [*lan_port* {tag | untag}] [*lan_port* {tag | untag}]	Sets the Zyxel Device to create a new VLAN or configure an existing VLAN. You can disable or enable the VLAN, set the VLAN ID, assign up to three ports to this VLAN as members and set whether the port is to tag outgoing traffic with the VLAN ID. *vlan_interface*: the name of the VLAN (vlan1 for example).
[no] override *slot_name* {output-power | radio-setting | ssid-setting}	Sets the Zyxel Device to overwrite the AP's output power, radio or SSID profile settings for the specified radio. Use the no command to not overwrite the specified settings.
[no] override lan-provision	Sets the Zyxel Device to overwrite the AP's LAN port settings. Use the no command to not overwrite the specified settings.
[no] override vlan-setting	Sets the Zyxel Device to overwrite the AP's LAN port settings. Use the no command to not overwrite the specified settings.
vlan <1..4094> {tag | untag}	Sets the VLAN ID for the specified AP as well as whether packets sent to and from that ID are tagged or untagged.
exit	Exits the sub-command mode for the specified AP.
capwap ap ac-ip *{primary_ac_ip} {secondary_ac_ip}*	Specifies the primary and secondary IP address or domain name of the AP controller (the Zyxel Device) to which the AP connects.
capwap ap ac-ip auto	Sets the AP to use DHCP to get the address of the AP controller (the Zyxel Device).
capwap ap add *ap_mac* [*ap_model*]	Adds the specified AP to the Zyxel Device for management. If manual add is disabled, this command can still be used; if you add an AP before it connects to the network, then this command simply preconfigures the management list with that AP's information.
capwap ap fallback disable	Sets the managed AP(s) to not change back to associate with the primary AP controller when the primary AP controller is available.
capwap ap fallback enable	Sets the managed AP(s) to change back to associate with the primary AP controller as soon as the primary AP controller is available.
capwap ap fallback interval <30..86400>	Sets how often (in seconds) the managed AP(s) check whether the primary AP controller is available.
capwap ap kick {all | *ap_mac*}	Removes the specified AP (*ap_mac*) or all connected APs (*all*) from the management list. Doing this removes the AP(s) from the management list. If the Zyxel Device is set to automatically add new APs to the AP management list, then any kicked APs are added back to the management list as soon as they reconnect.
capwap ap led-off *ap_mac*	Sets the LEDs of the specified AP to turn off after it's ready.
capwap ap led-on *ap_mac*	Sets the LEDs of the specified AP to stay lit after the Zyxel Device is ready.
capwap ap reboot *ap_mac*	Forces the specified AP (*ap_mac*) to restart. Doing this severs the connections of all associated stations.

Table 12 Command Summary: AP Management (continued)

COMMAND	DESCRIPTION
capwap manual-add {enable | disable}	Allows the Zyxel Device to either automatically add new APs to the network (*disable*) or wait until you manually confirm them (*enable*).
capwap station kick *sta_mac*	Forcibly disconnects the specified station from the network.
country-code *country_code*	Sets the country where the Zyxel Device is located/installed. This is the default country code the Zyxel Device uses in a new radio profile or monitor profile if you do not change it. The available channels vary depending on the country you selected. *country_code*: 2-letter country-codes, such as TW, DE, or FR.
lan-provision ap *ap_mac*	Enters the sub-command mode for the specified AP
lan_port {activate | inactivate} pvid <1..4094>	Enables or disables the specified LAN port on the AP and configures a PVID (Port VLAN ID) for this port. *lan_port*: the name of the AP's LAN port (lan1 for example).
vlan_interface {activate | inactivate} vid <1..4094> join *lan_port* {tag | untag} [*lan_port* {tag | untag}] [*lan_port* {tag | untag}]	Creates a new VLAN or configures an existing VLAN. You can disable or enable the VLAN, set the VLAN ID, assign up to three ports to this VLAN as members and set whether the port is to tag outgoing traffic with the VLAN ID. *vlan_interface*: the name of the VLAN (vlan1 for example).
[no] *vlan_interface*	Removes the specified VLAN.
show capwap ap {all | *ap_mac*}	Displays the management list (*all*) or whether the specified AP is on the management list (*ap_mac*).
show capwap ap *ap_mac slot_name* detail	Displays details for the specified radio (*slot_name*) on the specified AP (*ap_mac*).
show capwap ap {all | *ap_mac*} config status	Displays whether or not any AP's configuration or the specified AP's configuration is in conflict with the Zyxel Device's settings for the AP and displays the settings in conflict if there are any.
show capwap ap ac-ip	Displays the address of the Zyxel Device or auto if the AP finds the Zyxel Device through broadcast packets.
show capwap ap all statistics	Displays radio statistics for all APs on the management list.
show capwap ap fallback	Displays whether the managed AP(s) will change back to associate with the primary AP controller when the primary AP controller is available.
show capwap ap fallback interval	Displays the interval for how often the managed AP(s) check whether the primary AP controller is available.
show capwap ap wait-list	Displays a list of connected but as-of-yet unmanaged APs. This is known as the 'wait list'.
show capwap manual-add	Displays the current manual add option.
show capwap station all	Displays information for all stations connected to the APs on the management list.
show country-code list	Displays a reference list of two-letter country codes.

Table 12 Command Summary: AP Management (continued)

COMMAND	DESCRIPTION
`show default country-code`	Displays the default country code configured on the Zyxel Device.
`show lan-provision ap` *`ap_mac`* `interface {`*`lan_port`* `|` *`vlan_interface`* `| all| ethernet | uplink | vlan}`	Displays the port and/or VLAN settings for the specified AP. You can also set to display settings for a specified port, a sepcified VLAN, all physical Ethernet ports, the uplink port or all VLANs on the AP.

6.2.1 AP Management Commands Example

The following example shows you how to add an AP to the management list, and then edit it.

```
Router# show capwap ap wait-list
index: 1
  IP: 192.168.1.35, MAC: 00:11:11:11:11:FE
  Model: NWA5160N, Description: AP-00:11:11:11:11:FE
index: 2
  IP: 192.168.1.36, MAC: 00:19:CB:00:BB:03
  Model: NWA5160N, Description: AP-00:19:CB:00:BB:03
Router# configure terminal
Router(config)# capwap ap add 00:19:CB:00:BB:03
Router(config)# capwap ap 00:19:CB:00:BB:03
Router(AP 00:19:CB:00:BB:03)# slot1 ap-profile approf01
Router(AP 00:19:CB:00:BB:03)# exit
Router(config)# show capwap ap all
index: 1
  Status: RUN
  IP: 192.168.1.37, MAC: 40:4A:03:05:82:1E
  Description: AP-404A0305821E
  Model: NWA5160N
  R1 mode: AP, R1Prof: default
  R2 mode: AP, R2Prof: n/a
  Station: 0, RadioNum: 2
  Mgnt. VLAN ID: 1, Tag: no
  WTP VLAN ID: 1, WTP Tag: no
  Force VLAN: disable
  Firmware Version: 2.25(AAS.0)b2
  Recent On-line Time: 08:43:04 2013/05/24
  Last Off-line Time: N/A

Router(config)# show capwap ap 40:4A:03:05:82:1E slot1 detail
index: 1
  SSID: Zyxel, BSSID: 40:4A:03:05:82:1F
  SecMode: NONE, Forward Mode: Local Bridge, Vlan: 1

Router(config)# show capwap ap all statistics
index: 1
  Status: RUN, Loading: -
  AP MAC: 40:4A:03:05:82:1E
  Radio: 1, OP Mode: AP
  Profile: default, MAC: 40:4A:03:05:82:1F
  Description: AP-404A0305821E
  Model: NWA5160N
  Band: 2.4GHz, Channel: 6
  Station: 0
  RxPkt: 4463, TxPkt: 38848
  RxFCS: 1083323, TxRetry: 198478
```

The following example displays the management list and radio statistics for the specified AP.

```
Router(config)# show capwap ap all
index: 1
  Status: RUN
  IP: 192.168.1.37, MAC: 60:31:97:82:F5:AF
  Description: AP-60319782F5AF
  Model: WAC5302D-S
  CPU Usage: 12 %
  R1 mode: AP, R1Prof: default
  R2 mode: AP, R2Prof: default2
  AP Group Profile: default
  Override Slot1 Radio Profile: disable
  Override Slot1 SSID Profile: disable
  slot1-SSID Profile 1: default
  slot1-SSID Profile 2:
  slot1-SSID Profile 3:
  slot1-SSID Profile 4:
  slot1-SSID Profile 5:
  slot1-SSID Profile 6:
  slot1-SSID Profile 7:
  slot1-SSID Profile 8:
  Override Slot1 Output Power: disable
  Slot1 Output Power: 30dBm
  Override Slot2 Radio Profile: disable
  Override Slot2 SSID Profile: disable
  slot2-SSID Profile 1: default
  slot2-SSID Profile 2:
  slot2-SSID Profile 3:
  slot2-SSID Profile 4:
  slot2-SSID Profile 5:
  slot2-SSID Profile 6:
  slot2-SSID Profile 7:
  slot2-SSID Profile 8:
  Override Slot2 Output Power: disable
  Slot2 Output Power: 30dBm
  Station: 2, RadioNum: 2
  Override VLAN Setting: disable
  Mgnt. VLAN ID: 1, Tag: no
  WTP VLAN ID: 1, WTP Tag: no
  Force VLAN: disable
  Support Lan-provision: yes
  Override LAN Provision: disable
  Firmware Version: 5.00(ABFH.1)b1
  Primary AC IP: broadcast
  Secondary AC IP: N/A
  Recent On-line Time: 03:15:30 2016/11/11
  Last Off-line Time: 03:10:48 2016/11/11
  Loop State: N/A
  LED Status: N/A
  Suppress Mode Status: Enable
  Locator LED Status: N/A
  Locator LED Time: 0
  Locator LED Time Lease: 0
  Power Mode: Full
  Antenna Switch SW-Control: N/A
  Antenna Switch Radio 1: N/A
  Antenna Switch Radio 2: N/A
  Compatible: No
  Capability: 32
  Port Number: 4
Router(config)# show capwap ap 60:31:97:82:F5:AF slot1 detail
index: 1
  SSID: ZyXEL
  BSSID: 60:31:97:82:F5:B0
  SecMode: NONE, Forward Mode: Local Bridge, Vlan: 1
Router(config)# show capwap ap all statistics
index: 1
  Status: RUN, Loading: -
  AP MAC: 60:31:97:82:F5:AF
  Radio: 1, OP Mode: AP
  Profile: default, MAC: F0:FD:F0:FD:F0:FD
  Description: AP-60319782F5AF
  Model: WAC5302D-S
  Band: 2.4GHz, Channel: 6
  Station: 0
  Rx: 101395, Tx: 866288
  RxFCS: 42803, TxRetry: 897
  TxPower: 15 dBm
  Antenna Type: N/A

index: 2
  Status: RUN, Loading: -
  AP MAC: 60:31:97:82:F5:AF
  Radio: 2, OP Mode: AP
  Profile: default2, MAC: F0:FD:F0:FD:F0:FD
  Description: AP-60319782F5AF
  Model: WAC5302D-S
  Band: 5GHz, Channel: 36/40
  Station: 2
  Rx: 864251, Tx: 1076862
  RxFCS: 169608, TxRetry: 2816
  TxPower: 16 dBm
  Antenna Type: N/A

Router(config)#
```

CHAPTER 7
AP Group

This chapter shows you how to configure AP groups, which define the radio, port, VLAN and load balancing settings and apply the settings to all APs in the group. An AP can belong to one AP group at a time.

7.1 Wireless Load Balancing Overview

Wireless load balancing is the process whereby you limit the number of connections allowed on an wireless access point (AP) or you limit the amount of wireless traffic transmitted and received on it. Because there is a hard upper limit on the AP's wireless bandwidth, this can be a crucial function in areas crowded with wireless users. Rather than let every user connect and subsequently dilute the available bandwidth to the point where each connecting device receives a meager trickle, the load balanced AP instead limits the incoming connections as a means to maintain bandwidth integrity.

7.2 AP Group Commands

The following table identifies the values required for many of these commands. Other input values are discussed with the corresponding commands.

Table 13 Input Values for General AP Management Commands

LABEL	DESCRIPTION
ap_group_profile_name	The wireless LAN radio profile name. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
slot_name	The slot name for the AP's on-board wireless LAN card. Use either *slot1* or *slot2*. (The NWA5560-N supports up to 2 radio slots.)

The following table describes the commands available for AP groups. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 14 Command Summary: AP Group

COMMAND	DESCRIPTION
`ap-group first-priority` *ap_group_profile_name*	Sets an AP group file that is used as the default group file. Any AP that is not configured to associate with a specific AP group belongs to the default group automatically.
`ap-group flush wtp-setting` *ap_group_profile_name*	Sets the Zyxel Device to overwrite the settings of all managed APs in the specified group with the group profile settings.
`ap-group-member` *ap_group_wlan_name*`[no] member local-ap`	Specifies the SSID of the built-in AP that you want to apply the specified AP group profile and add to the group. Use the `no` command to remove the built-in AP from this group.

Table 14 Command Summary: AP Group (continued)

COMMAND	DESCRIPTION
`ap-group-member` *`ap_group_profile_name`* `[no] member` *`mac_address`*	Specifies the MAC address of the AP that you want to apply the specified AP group profile and add to the group. Use the `no` command to remove the specified AP from this group.
`[no] ap-group-profile` *`ap_group_profile_name`*	Enters configuration mode for the specified AP group profile. Use the `no` command to remove the specified profile.
`[no]` *`slot_name`* `ap-profile` *`radio_profile_name`*	Sets the specified radio to work as an AP and specifies the radio profile the radio is to use. Use the `no` command to remove the specified profile.
`[no]` *`slot_name`* `monitor-profile` *`monitor_profile_name`*	Sets the specified radio to work in monitor mode and specifies the monitor profile the radio is to use. Use the `no` command to remove the specified profile.
`[no]` *`slot_name`* `output-power` *`wlan_power`*	Sets the output power (between 0 to 30 dBm) for the radio on the AP that belongs to this group. Use the `no` command to remove the output power setting.
`[no]` *`slot_name`* `ssid-profile <1..8>` *`ssid_profile_name`*	Sets the SSID profile that is associated with this profile. You can associate up to eight SSID profiles with an AP radio. Use the `no` command to remove the specified profile.
`[no]` *`slot_name`* `repeater-ap` *`radio_profile_name`*	Sets the specified AP radio to work as a repeater and specifies the radio profile the radio is to use. Use the `no` command to remove the specified profile.
`[no]` *`slot_name`* `root-ap` *`radio_profile_name`*	Sets the specified radio to work as a root AP and specifies the radio profile the radio is to use. A root AP supports the wireless connections with other APs (in repeater mode) to form a ZyMesh to extend its wireless network. Use the `no` command to remove the specified profile.
`[no]` *`slot_name`* `zymesh-profile` *`zymesh_profile_name`*	Sets the ZyMesh profile the radio (in root AP or repeater mode) uses to connect to a root AP or repeater. Use the `no` command to remove the specified profile.
`description` *`description`*	Sets a description for this group. You can use up to 31 characters, spaces and underscores allowed. Use the `no` command to remove the specified description.
`exit`	Exits configuration mode for this profile.
`[no] force vlan`	Sets the Zyxel Device to change the AP's management VLAN to match the configuration in this profile. Use the `no` command to not change the AP's management VLAN setting.
`[no] lan-provision model {nwa5301-nj | wac6502d-e | wac6502d-s | wac6503d-s | wac6553d-e}` *`ap_lan_port`* `activate pvid <1..4094>`	Sets the model of the managed AP and enable the model-specific LAN port and configure the port VLAN ID. Use the `no` command to remove the specified port and VLAN settings. *`ap_lan_port`*: the Ethenet LAN port on the managed AP, such as lan1 or lan2.

Table 14 Command Summary: AP Group (continued)

COMMAND	DESCRIPTION
`[no] lan-provision model {nwa5301-nj | wac6502d-e | wac6502d-s | wac6503d-s | wac6553d-e} ap_lan_port inactivate pvid <1..4094>`	Sets the model of the managed AP and disable the model-specific LAN port and configure the port VLAN ID. Use the `no` command to remove the specified port and VLAN settings. *ap_lan_port*: the Ethenet LAN port on the managed AP, such as lan1 or lan2.
`[no] lan-provision model {nwa5301-nj | wac6502d-e | wac6502d-s | wac6503d-s | wac6553d-e} vlan_interface activate vid <1..4094> join ap_lan_port {tag | untag} [ap_lan_port {tag | untag}] [ap_lan_port {tag | untag}]`	Sets the model of the managed AP, enable a VLAN and configure the VLAN ID. It also sets the Ethernet port(s) on the managed AP to be a member of the VLAN, and sets the port(s) to send packets with or without a VLAN tag. Use the `no` command to remove the specified port and VLAN settings. *vlan_interface*: the name of the VLAN, such as vlan0. *ap_lan_port*: the Ethenet LAN port on the managed AP, such as lan1 or lan2.
`[no] lan-provision model {nwa5301-nj | wac6502d-e | wac6502d-s | wac6503d-s | wac6553d-e} vlan_interface inactivate vid <1..4094> join ap_lan_port {tag | untag} [ap_lan_port {tag | untag}] [ap_lan_port {tag | untag}]`	Sets the model of the managed AP, disable a VLAN and configure the VLAN ID. It also sets the Ethernet port(s) on the managed AP to be a member of the VLAN, and sets the port(s) to send packets with or without a VLAN tag. Use the `no` command to remove the specified port and VLAN settings. *vlan_interface*: the name of the VLAN, such as vlan0. *ap_lan_port*: the Ethenet LAN port on the managed AP, such as lan1 or lan2.
`[no] load-balancing activate`	Enables load balancing. Use the `no` parameter to disable it.
`load-balancing alpha <1..255>`	Sets the load balancing alpha value. When the AP is balanced, then this setting delays a client's association with it by this number of seconds. Note: This parameter has been optimized for the Zyxel Device and should not be changed unless you have been specifically directed to do so by Zyxel support.
`load-balancing beta <1..255>`	Sets the load balancing beta value. When the AP is overloaded, then this setting delays a client's association with it by this number of seconds. Note: This parameter has been optimized for the Zyxel Device and should not be changed unless you have been specifically directed to do so by Zyxel support.
`load-balancing kickInterval <1..255>`	Enables the kickout feature for load balancing and also sets the kickout interval in seconds. While load balancing is enabled, the AP periodically disconnects stations at intervals equal to this setting. This occurs until the load balancing threshold is no longer exceeded.
`[no] load-balancing kickout`	Enables an overloaded AP to disconnect ("kick") idle clients or clients with noticeably weak connections.

Table 14 Command Summary: AP Group (continued)

COMMAND	DESCRIPTION
`load-balancing liInterval <1..255>`	Sets the interval in seconds that each AP communicates with the other APs in its range for calculating the load balancing algorithm. Note: This parameter has been optimized for the Zyxel Device and should not be changed unless you have been specifically directed to do so by Zyxel support.
`load-balancing max sta <1..127>`	If load balancing by the number of stations/wireless clients, this sets the maximum number of devices allowed to connect to a load-balanced AP.
`load-balancing mode {station | traffic | smart-classroom}`	Enables load balancing based on either number of stations (also known as wireless clients) or wireless traffic on an AP. station or traffic: once the threshold is crossed (either the maximum station numbers or with network traffic), the AP delays association request and authentication request packets from any new station that attempts to make a connection. smart-classroom: the AP ignores association request and authentication request packets from any new station when the maximum number of stations is reached.
`load-balancing sigma <51..100>`	Sets the load balancing sigma value. This value is algorithm parameter used to calculate whether an AP is considered overloaded, balanced, or underloaded. It only applies to 'by traffic mode'. Note: This parameter has been optimized for the Zyxel Device and should not be changed unless you have been specifically directed to do so by Zyxel support.
`load-balancing timeout <1..255>`	Sets the length of time that an AP retains load balancing information it receives from other APs within its range.
`load-balancing traffic level {high | low | medium}`	If load balancing by traffic threshold, this sets the traffic threshold level.
`vlan <1..4094> {tag | untag}`	Sets the management VLAN ID for the AP(s) in this group as well as whether packets sent to and from that VLAN ID are tagged or untagged.
`show ap-group first-priority`	Displays the name of the default AP group profile.
`show ap-group-profile {all |` *`ap_group_profile_name`*`}`	Displays the settings of the AP group profile(s). `all`: Displays all profiles. *`ap_group_profile_name`*: Displays the specified profile.
`show ap-group-profile` *`ap_group_profile_name`* `load-balancing config`	Displays the load balancing configuration of the specified AP group profile.
`show ap-group-profile` *`ap_group_profile_name`* `lan-provision interface {all | vlan | ethernet |` *`ap_lan_port`* `|` *`vlan_interface`*`} model {nwa5301-nj | wac6502d-e | wac6502d-s | wac6503d-s | wac6553d-e}`	Displays the LAN port and/or VLAN settings on the managed AP which is in the specified AP group and of the specified model. *`vlan_interface`*: the name of the VLAN, such as vlan0. *`ap_lan_port`*: the Ethenet LAN port on the managed AP, such as lan1 or lan2.

Table 14 Command Summary: AP Group (continued)

COMMAND	DESCRIPTION
`show ap-group-profile ap_group_profile_name lan-provision model`	Shows the model name of the managed AP which belongs to the specified AP group.
`show ap-group-profile rule_count`	Displays how many AP group profiles have been configured on the Zyxel Device.
`ap-group-profile rename` *`ap_group_profile_name1 ap_group_profile_name2`*	Gives an existing AP group profile (*`ap_group_profile_name1`*) a new name (*`ap_group_profile_name2`*).

7.2.1 AP Group Examples

The following example shows you how to create an AP group profile (named "TEST") and configure the AP's first radio to work in repeater mode using the "default" radio profile and the "ZyMesh_TEST" ZyMesh profile. It also adds the AP with the MAC address 00:a0:c5:01:23:45 to this AP group.

```
Router(config)# ap-group-profile TEST
Router(config-ap-group TEST)# slot1 repeater-ap default
Router(config-ap-group TEST)# exit
Router(config)# ap-group-member TEST member 00:a0:c5:01:23:45
Router(config)#
```

The following example shows you how to create an AP group profile (named GP1) and configure AP load balancing in "by station" mode. The maximum number of stations is set to 1.

```
Router(config)# ap-group-profile GP1
Router(config-ap-group GP1)# load-balancing mode station
Router(config-ap-group GP1)# load-balancing max sta 1
Router(config-ap-group GP1)# exit
Router(config)# show ap-group-profile GP1 load-balancing config
AP Group Profile:GP1
load balancing config:
Activate: yes
Kickout: no
Mode: station
Max-sta: 1
Traffic-level: high
Alpha: 5
Beta: 10
Sigma: 60
Timeout: 20
LIInterval: 10
KickoutInterval: 20
Router(config)#
```

The following example shows you how to create an AP group profile (named GP2) and configure AP load balancing in "by traffic" mode. The traffic level is set to low, and "disassociate station" is enabled.

```
Router(config)# ap-group-profile GP2
Router(config-ap-group GP2)# load-balancing mode traffic
Router(config-ap-group GP2)# load-balancing traffic level low
Router(config-ap-group GP2)# load-balancing kickout
Router(config-ap-group GP2)# exit
Router(config)# show ap-group-profile GP2 load-balancing config
AP Group Profile:GP2
load balancing config:
Activate: yes
Kickout: yes
Mode: traffic
Max-sta: 1
Traffic-level: low
Alpha: 5
Beta: 10
Sigma: 60
Timeout: 20
LIInterval: 10
KickoutInterval: 20
Router(config)#
```

The following example shows the settings and status of the VLAN(s) configured for the managed APs (NWA5301-NJ) in the default AP group.

```
Router(config)# show ap-group-profile default lan-provision interface vlan
model nwa5301-nj
No. Name            Active VID   Member
===========================================================================
1   vlan0           yes    1     lan1,lan2,lan3
Router(config)# show ap-group-profile default lan-provision interface vlan0
model nwa5301-nj
active: yes
interface name: vlan0
VID: 1
member: lan1&lan2&lan3
lan1_tag: untag
lan2_tag: untag
lan3_tag: untag
Router(config)#
```

The following example shows the status of Ethernet ports for the managed APs (NWA5301-NJ) in the default AP group. It also shows whether the lan1 port is enabled and what the port’s VLAN ID is.

```
Router(config)# show ap-group-profile default lan-provision interface
ethernet model nwa5301-nj
No. Name            Active PVID
===========================================================================
1   uplink          yes    n/a
2   lan1            yes    1
3   lan2            yes    1
4   lan3            yes    1
Router(config)# show ap-group-profile default lan-provision interface lan1
model nwa5301-nj
Name            Active PVID
===========================================================================
lan1            yes    1
Router(config)#
```

CHAPTER 8 Wireless LAN Profiles

This chapter shows you how to configure wireless LAN profiles on your Zyxel Device.

8.1 Wireless LAN Profiles Overview

The managed Access Points designed to work explicitly with your Zyxel Device do not have on-board configuration files, you must create “profiles” to manage them. Profiles are preset configurations that are uploaded to the APs and which manage them. They include: Radio and Monitor profiles, SSID profiles, Security profiles, and MAC Filter profiles. Altogether, these profiles give you absolute control over your wireless network.

8.2 AP Radio & Monitor Profile Commands

The radio profile commands allow you to set up configurations for the radios onboard your various APs. The monitor profile commands allow you to set up monitor mode configurations that allow your APs to scan for other APs in the vicinity.

The following table identifies the values required for many of these commands. Other input values are discussed with the corresponding commands.

Table 15 Input Values for General Radio and Monitor Profile Commands

LABEL	DESCRIPTION
radio_profile_name	The radio profile name. You may use 1-31 alphanumeric characters, underscores (_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
monitor_profile_name	The monitor profile name. You may use 1-31 alphanumeric characters, underscores (_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
interval	Enters the dynamic channel selection interval time. The range is 10 ~ 1440 minutes.
wlan_role	Sets the wireless LAN radio operating mode. At the time of writing, you can use `ap` for Access Point.
wireless_channel_2g	Sets the 2 GHz channel used by this radio profile. The channel range is `1 ~ 14`. Note: Your choice of channel may be restricted by regional regulations.
`wireless_channel_5g`	Sets the 5 GHz channel used by this radio profile. The channel range is `36 ~ 165`. Note: Your choice of channel may be restricted by regional regulations.
wlan_htcw	Sets the HT channel width. Select either `20`, `20/40` or `20/40/80`.
wlan_htgi	Sets the HT guard interval. Select either `long` or `short`.
chain_mask	Sets the network traffic chain mask. The range is `1 ~ 7`.

Table 15 Input Values for General Radio and Monitor Profile Commands (continued)

LABEL	DESCRIPTION
wlan_power	Sets the radio output power.
scan_method	Sets the radio's scan method while in Monitor mode. Select `manual` or `auto`.
wlan_interface_index	Sets the radio interface index number. The range is `1 ~ 8`.
ssid_profile	Sets the associated SSID profile name. This name must be an existing SSID profile. You may use 1-31 alphanumeric characters, underscores (_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.

The following table describes the commands available for radio and monitor profile management. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 16 Command Summary: Radio Profile

COMMAND	DESCRIPTION
`show wlan-radio-profile {all | radio_profile_name}`	Displays the radio profile(s). *all*: Displays all profiles. *radio_profile_name*: Displays the specified profile.
`wlan-radio-profile rename radio_profile_name1 radio_profile_name2`	Gives an existing radio profile (*radio_profile_name1*) a new name (*radio_profile_name2*).
`[no] wlan-radio-profile radio_profile_name`	Enters configuration mode for the specified radio profile. Use the *no* parameter to remove the specified profile.
`2g-channel wireless_channel_2g`	Sets the broadcast band for this profile in the 2.4 GHz frequency range. The default is 6.
`5g-channel wireless_channel_5g`	Sets the broadcast band for this profile in the 5 GHz frequency range. The default is 36.
`2g-multicast-speed wlan_2g_support_speed`	When you disable **multicast to unicast**, use this command to set the data rate { `1.0 | 2.0 |` … } in Mbps for 2.4 GHz multicast traffic.
`5g-multicast-speed wlan_5g_basic_speed`	When you disable **multicast to unicast**, use this command to set the data rate { `6.0 | 9.0 |` … } in Mbps for 5 GHz multicast traffic.
`[no] activate`	Makes this profile active or inactive.
`band {2.4G |5G} band-mode {bg | bgn | a | ac | an}`	Sets the radio band (2.4 GHz or 5 GHz) and band mode for this profile. Band mode details: For 2.4 GHz, `bg` lets IEEE 802.11b and IEEE 802.11g clients associate with the AP. For 2.4 GHz, `bgn` lets IEEE 802.11b, IEEE 802.11g, and IEEE 802.11n clients associate with the AP. For 5 GHz, `a` lets only IEEE 802.11a clients associate with the AP. For 5 GHz, `ac` lets IEEE 802.11a, IEEE 802.11n, and IEEE 802.11ac clients associate with the AP. For 5 GHz, `an` lets IEEE 802.11a and IEEE 802.11n clients associate with the AP.

Table 16 Command Summary: Radio Profile (continued)

COMMAND	DESCRIPTION
`beacon-interval <40..1000>`	Sets the beacon interval for this profile. When a wirelessly networked device sends a beacon, it includes with it a beacon interval. This specifies the time period before the device sends the beacon again. The interval tells receiving devices on the network how long they can wait in low-power mode before waking up to handle the beacon. This value can be set from 40ms to 1000ms. A high value helps save current consumption of the access point. The default is 100.
`country-code country_code`	Sets the country where the Zyxel Device is located/installed. The available channels vary depending on the country you selected. Be sure to select the correct/same country for both radios on an AP and all connected APs, in order to prevent roaming failure and interference to other systems. `country_code`: 2-letter country-codes, such as TW, DE, or FR.
`[no] dcs activate`	Starts dynamic channel selection to automatically find a less-used channel in an environment where there are many APs and there may be interference. Use the `no` parameter to turn it off.
`dcs 2g-selected-channel 2.4g_channels`	Specifies the channels that are available in the 2.4 GHz band when you manually configure the channels an AP can use.
`dcs 5g-selected-channel 5g_channels`	Specifies the channels that are available in the 5 GHz band when you manually configure the channels an AP can use.
`dcs dcs-2g-method {auto|manual}`	Sets the AP to automatically search for available channels or manually configure the channels the AP uses in the 2.4 GHz band.
`dcs dcs-5g-method {auto|manual}`	Sets the AP to automatically search for available channels or manually configure the channels the AP uses in the 5 GHz band.
`dcs client-aware {enable|disable}`	When enabled, this ensures that an AP will not change channels as long as a client is connected to it. If disabled, the AP may change channels regardless of whether it has clients connected to it or not.
`dcs channel-deployment {3-channel|4-channel}`	Sets either a 3-channel deployment or a 4-channel deployment. In a 3-channel deployment, the AP running the scan alternates between the following channels: 1, 6, and 11. In a 4-channel deployment, the AP running the scan alternates between the following channels: 1, 4, 7, and 11 (FCC) or 1, 5, 9, and 13 (ETSI). Sets the option that is applicable to your region. (Channel deployment may be regulated differently between countries and locales.)
`dcs dfs-aware {enable|disable}`	Enables this to allow an AP to avoid phase DFS channels below the 5 GHz spectrum.
`dcs mode {interval|schedule}`	Sets the AP to use DCS at the end of the specified time interval or at a specifc time on selected days of the week.
`dcs schedule <hh:mm> {mon|tue|wed|thu|fri|sat|sun}`	Sets what time of day (in 24-hour format) the AP starts to use DCS on the specified day(s) of the week.

Table 16 Command Summary: Radio Profile (continued)

COMMAND	DESCRIPTION
`dcs sensitivity-level {high|medium |low}`	Sets how sensitive DCS is to radio channel changes in the vicinity of the AP running the scan.
`dcs time-interval` *`interval`*	Sets the interval that specifies how often DCS should run.
`[no] disable-dfs-switch`	Makes the DFS switch active or inactive. By default this is inactive.
`[no] dot11n-disable-coexistence`	Fixes the channel bandwidth as 40 MHz. The `no` command has the AP automatically choose 40 MHz if all the clients support it or 20 MHz if some clients only support 20 MHz.
`[no] ctsrts <0..2347>`	Sets or removes the RTS/CTS value for this profile. Use RTS/CTS to reduce data collisions on the wireless network if you have wireless clients that are associated with the same AP but out of range of one another. When enabled, a wireless client sends an RTS (Request To Send) and then waits for a CTS (Clear To Send) before it transmits. This stops wireless clients from transmitting packets at the same time (and causing data collisions). A wireless client sends an RTS for all packets larger than the number (of bytes) that you enter here. Set the RTS/CTS equal to or higher than the fragmentation threshold to turn RTS/CTS off. The default is 2347.
`[no] frag <256..2346>`	Sets or removes the fragmentation value for this profile. The threshold (number of bytes) for the fragmentation boundary for directed messages. It is the maximum data fragment size that can be sent. The default is 2346.
`dtim-period <1..255>`	Sets the DTIM period for this profile. Delivery Traffic Indication Message (DTIM) is the time period after which broadcast and multicast packets are transmitted to mobile clients in the Active Power Management mode. A high DTIM value can cause clients to lose connectivity with the network. This value can be set from 1 to 255. The default is 1.
`[no] ampdu`	Activates MPDU frame aggregation for this profile. Use the *`no`* parameter to disable it. Message Protocol Data Unit (MPDU) aggregation collects Ethernet frames along with their 802.11n headers and wraps them in a 802.11n MAC header. This method is useful for increasing bandwidth throughput in environments that are prone to high error rates. By default this is enabled.
`limit-ampdu` *`< 100..65535>`*	Sets the maximum frame size to be aggregated. By default this is 50000.
`subframe-ampdu` *`<2..64>`*	Sets the maximum number of frames to be aggregated each time. By default this is 32.

Table 16   Command Summary: Radio Profile (continued)

COMMAND	DESCRIPTION
`[no] amsdu`	Activates MPDU frame aggregation for this profile. Use the *no* parameter to disable it. Mac Service Data Unit (MSDU) aggregation collects Ethernet frames without any of their 802.11n headers and wraps the header-less payload in a single 802.11n MAC header. This method is useful for increasing bandwidth throughput. It is also more efficient than A-MPDU except in environments that are prone to high error rates. By default this is enabled.
`limit-amsdu` *<2290..4096>*	Sets the maximum frame size to be aggregated. The default is 4096.
`[no] multicast-to-unicast`	"Multicast to unicast" broadcasts wireless multicast traffic to all wireless clients as unicast traffic to provide more reliable transmission. The data rate changes dynamically based on the application's bandwidth requirements. Although unicast provides more reliable transmission of the multicast traffic, it also produces duplicate packets. The `no` command turns multicast to unicast off to send wireless multicast traffic at the rate you specify with the `2g-multicast-speed` or `5g-multicast-speed` command.
`[no] block-ack`	Makes `block-ack` active or inactive. Use the *no* parameter to disable it.
`ch-width` *wlan_htcw*	Sets the channel width for this profile.
`guard-interval` *wlan_htgi*	Sets the guard interval for this profile. The default for this is *short*.
`[no] htprotect`	Activates HT protection for this profile. Use the *no* parameter to disable it. By default, this is disabled.
`output-power` *wlan_power*	Sets the output power (between 0 to 30 dBm) for the radio in this profile.
`role` *wlan_role*	Sets the profile's wireless LAN radio operating mode.
`rssi-dbm <-20~-76>`	When using the RSSI threshold, set a minimum client signal strength for connecting to the AP. -20 dBm is the strongest signal you can require and -76 is the weakest.
`rssi-kickout <-20~-105>`	Sets a minimum kick-off signal strength. When a wireless client's signal strength is lower than the specified threshold, the Zyxel Device disconnects the wireless client from the AP. -20 dBm is the strongest signal you can require and -105 is the weakest.
`[no] rssi-retry`	Allows a wireless client to try to associate with the AP again after it is disconnected due to weak signal strength. Use the *no* parameter to disallow it.
`rssi-retrycount <1~100>`	Sets the maximum number of times a wireless client can attempt to re-connect to the AP.
`[no] rssi-thres`	Sets whether or not to use the Received Signal Strength Indication (RSSI) threshold to ensure wireless clients receive good throughput. This allows only wireless clients with a strong signal to connect to the AP.

Table 16 Command Summary: Radio Profile (continued)

COMMAND	DESCRIPTION
`[no] ssid-profile` *`wlan_interface_index ssid_profile`*	Assigns an SSID profile to this radio profile. Requires an existing SSID profile. Use the *no* parameter to disable it.
`tx-mask` *`chain_mask`*	Sets the outgoing chain mask rate.
`rx-mask` *`chain_mask`*	Sets the incoming chain mask rate.
`exit`	Exits configuration mode for this profile.
`show wlan-monitor-profile {all |` *`monitor_profile_name`*`}`	Displays all monitor profiles or just the specified one.
`wlan-monitor-profile rename` *`monitor_profile_name1 monitor_profile_name2`*	Gives an existing monitor profile (*monitor_profile_name1*) a new name (*monitor_profile_name2*).
`[no] wlan-monitor-profile` *`monitor_profile_name`*	Enters configuration mode for the specified monitor profile. Use the *no* parameter to remove the specified profile.
`[no] activate`	Makes this profile active or inactive. By default, this is enabled.
`country-code` *`country_code`*	Sets the country where the Zyxel Device is located/installed. The available channels vary depending on the country you selected. Be sure to select the correct/same country for both radios on an AP and all connected APs, in order to prevent roaming failure and interference to other systems. *country_code*: 2-letter country-codes, such as TW, DE, or FR.
`scan-method` *`scan_method`*	Sets the channel scanning method for this profile.
`[no] 2g-scan-channel` *`wireless_channel_2g`*	Sets the broadcast band for this profile in the 2.4 Ghz frequency range. Use the *no* parameter to disable it.
`[no] 5g-scan-channel` *`wireless_channel_5g`*	Sets the broadcast band for this profile in the 5 GHz frequency range. Use the *no* parameter to disable it.
`scan-dwell` *`<100..1000>`*	Sets the duration in milliseconds that the device using this profile scans each channel.
`exit`	Exits configuration mode for this profile.

8.2.1 AP Radio & Monitor Profile Commands Example

The following example shows you how to set up the radio profile named ‘RADIO01’, activate it, and configure it to use the following settings:

- 2.4G band with channel 6
- channel width of 20MHz
- a DTIM period of 2
- a beacon interval of 100ms
- AMPDU frame aggregation enabled
- an AMPDU buffer limit of 65535 bytes
- an AMPDU subframe limit of 64 frames
- AMSDU frame aggregation enabled
- an AMSDU buffer limit of 4096

- block acknowledgement enabled
- a short guard interval
- an output power of 100%

It will also assign the SSID profile labeled 'default' in order to create WLAN VAP (wlan-1-1) functionality within the radio profile.

```
Router(config)# wlan-radio-profile RADIO01
Router(config-profile-radio)# activate
Router(config-profile-radio)# band 2.4G band-mode bgn
Router(config-profile-radio)# 2g-channel 6
Router(config-profile-radio)# ch-width 20/40
Router(config-profile-radio)# dtim-period 2
Router(config-profile-radio)# beacon-interval 100
Router(config-profile-radio)# ampdu
Router(config-profile-radio)# limit-ampdu 65535
Router(config-profile-radio)# subframe-ampdu 64
Router(config-profile-radio)# amsdu
Router(config-profile-radio)# limit-amsdu 4096
Router(config-profile-radio)# block-ack
Router(config-profile-radio)# guard-interval short
Router(config-profile-radio)# tx-mask 5
Router(config-profile-radio)# rx-mask 7
Router(config-profile-radio)# output-power 21dBm
Router(config-profile-radio)# ssid-profile 1 default
```

8.3 SSID Profile Commands

The following table identifies the values required for many of these commands. Other input values are discussed with the corresponding commands.

Table 17 Input Values for General SSID Profile Commands

LABEL	DESCRIPTION
ssid_profile_name	The SSID profile name. You may use 1-31 alphanumeric characters, underscores (_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
ssid	The SSID broadcast name. You may use 1-32 alphanumeric characters, underscores (_), or dashes (-). This value is case-sensitive.

Table 17 Input Values for General SSID Profile Commands (continued)

LABEL	DESCRIPTION
wlan_qos	Sets the type of QoS the SSID should use. `disable`: Turns off QoS for this SSID. *wmm*: Turns on QoS for this SSID. It automatically assigns Access Categories to packets as the device inspects them in transit. *wmm_be*: Assigns the "best effort" Access Category to all traffic moving through the SSID regardless of origin. *wmm_bk*: Assigns the "background" Access Category to all traffic moving through the SSID regardless of origin. *wmm_vi*: Assigns the "video" Access Category to all traffic moving through the SSID regardless of origin. *wmm_vo*: Assigns the "voice" Access Category to all traffic moving through the SSID regardless of origin.
`vlan_iface`	The VLAN interface name of the controller (in this case, it is Zyxel Device). The maximum VLAN interface number is product-specific; for the Zyxel Device, the number is 512.
securityprofile	Assigns an existing security profile to the SSID profile. You may use 1-31 alphanumeric characters, underscores (_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
macfilterprofile	Assigns an existing MAC filter profile to the SSID profile. You may use 1-31 alphanumeric characters, underscores (_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
description2	Sets the description of the profile. You may use up to 60 alphanumeric characters, underscores (_), or dashes (-). This value is case-sensitive.

The following table describes the commands available for SSID profile management. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 18 Command Summary: SSID Profile

COMMAND	DESCRIPTION
`show wlan-ssid-profile {all | ssid_profile_name}`	Displays the SSID profile(s). `all`: Displays all profiles for the selected operating mode. *ssid_profile_name*: Displays the specified profile for the selected operating mode.
`wlan-ssid-profile rename ssid_profile_name1 ssid_profile_name2`	Gives an existing SSID profile (*ssid_profile_name1*) a new name (*ssid_profile_name2*).
`[no] wlan-ssid-profile ssid_profile_name`	Enters configuration mode for the specified SSID profile. Use the *no* parameter to remove the specified profile.
`[no] bandselect balance-ratio <1..8>`	Sets a ratio of the wireless clients using the 5 GHz band to the wireless clients using the 2.4 GHz band. Use the *no* parameter to turn off this feature.
`bandselect check-sta-interval <1..60000>`	Sets how often (in seconds) the AP checks and deletes old wireless client data.
`bandselect drop-authentication <1..16>`	Sets how many authentication request from a client to a 2.4GHz Wi-Fi network is ignored during the specified timeout period.
`bandselect drop-probe-request <1..32>`	Sets how many probe request from a client to a 2.4GHz Wi-Fi network is ignored during the specified timeout period.

Table 18 Command Summary: SSID Profile (continued)

COMMAND	DESCRIPTION
`bandselect min-sort-interval <1..60000>`	Sets the minimum interval (in seconds) at which the AP sorts the wireless client data when the client queue is full.
`bandselect mode {disable | force | standard}`	To improve network performance and avoid interference in the 2.4 GHz frequency band, you can enable this feature to use the 5 GHz band first. You should set 2.4GHz and 5 GHz radio profiles to use the same SSID and security settings. Note: The managed APs must be dual-band capable. `disable`: to turn off this feature. `force`: to have the wireless clients always connect to an SSID using the 5 GHZ band. Connections to an SSID using the 2.4GHz band are not allowed. It is recommanded you select this option when the AP and wireless clients can function in either frequency band. `standard`: to have the AP try to connect the wireless clients to the same SSID using the 5 GHZ band. Connections to an SSID using the 2.4GHz band are still allowed.
`[no] bandselect stop-threshold <10..20>`	Sets the threshold number of the connected wireless clients at which the AP disables the band select feature. Use the *`no`* parameter to turn off this feature.
`bandselect time-out-force <1..255>`	Sets the timeout period (in seconds) within which the AP accepts probe or authentication requests to a 2.4GHz Wi-Fi network when the band select mode is set to `force`.
`bandselect time-out-period <1..255>`	Sets the timeout period (in seconds) within which the AP drops the specified number of probe or authentication requests to a 2.4GHz Wi-Fi network.
`bandselect time-out-standard <1..255>`	Sets the timeout period (in seconds) within which the AP accepts probe or authentication requests to a 2.4GHz Wi-Fi network when the band select mode is set to `standard`.
`[no] block-intra`	Enables intra-BSSID traffic blocking. Use the `no` parameter to disable it in this profile. By default this is disabled.
`data-forward {localbridge | tunnel` *`vlan_iface`*`}`	Sets the data forwarding mode used by this SSID. The default is `localbridge`.
`downlink-rate-limit` *`data_rate`*	Sets the maximum incoming transmission data rate (either in mbps or kbps) on a per-station basis.
`[no] hide`	Prevents the SSID from being publicly broadcast. Use the `no` parameter to re-enable public broadcast of the SSID in this profile. By default this is disabled.
`[no] macfilter` *`macfilterprofile`*	Assigns the specified MAC filtering profile to this SSID profile. Use the `no` parameter to remove it. By default, no MAC filter is assigned.
`qos` *`wlan_qos`*	Sets the type of QoS used by this SSID.
`security` *`securityprofile`*	Assigns the specified security profile to this SSID profile.

Table 18 Command Summary: SSID Profile (continued)

COMMAND	DESCRIPTION
ssid	Sets the SSID. This is the name visible on the network to wireless clients. Enter up to 32 characters, spaces and underscores are allowed. The default SSID is 'ZyXEL'.
[no] ssid-schedule	Enables the SSID schedule. Use the no parameter to disable the SSID schedule.
{mon|tue|wed|thu|fri|sat|sun} {disable | enable} <hh:mm> <hh:mm>	Sets whether the SSID is enabled or disabled on each day of the week. This also specifies the hour and minute (in 24-hour format) to set the time period of each day during which the SSID is enabled/enabled. <hh:mm> <hh:mm>: If you set both start time and end time to 00:00, it indicates a whole day event. Note: The end time must be larger than the start time.
uplink-rate-limit *data_rate*	Sets the maximum outgoing transmission data rate (either in mbps or kbps) on a per-station basis.
vlan-id *<1..4094>*	Applies to each SSID profile that uses localbridge. If the VLAN ID is equal to the AP's native VLAN ID then traffic originating from the SSID is not tagged. The default VLAN ID is 1.
exit	Exits configuration mode for this profile.

8.3.1 SSID Profile Example

The following example creates an SSID profile with the name 'ZyXEL'. It makes the assumption that both the security profile (SECURITY01) and the MAC filter profile (MACFILTER01) already exist.

```
Router(config)# wlan-ssid-profile SSID01
Router(config-ssid-radio)# ssid ZyXEL
Router(config-ssid-radio)# qos wmm
Router(config-ssid-radio)# data-forward localbridge
Router(config-ssid-radio)# security SECURITY01
Router(config-ssid-radio)# macfilter MACFILTER01
Router(config-ssid-radio)# exit
Router(config)#
```

8.4 Security Profile Commands

The following table identifies the values required for many of these commands. Other input values are discussed with the corresponding commands.

Table 19 Input Values for General Security Profile Commands

LABEL	DESCRIPTION
security_profile_name	The security profile name. You may use 1-31 alphanumeric characters, underscores (_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
wep_key	Sets the WEP key encryption strength. Select either *64bit* or *128bit*.

Table 19 Input Values for General Security Profile Commands (continued)

LABEL	DESCRIPTION
wpa_key	Sets the WPA/WPA2 pre-shared key in ASCII. You may use 8~63 alphanumeric characters. This value is case-sensitive.
wpa_key_64	Sets the WPA/WPA2 pre-shared key in HEX. You muse use 64 alphanumeric characters.
secret	Sets the shared secret used by your network's RADIUS server.
auth_method	The authentication method used by the security profile.

The following table describes the commands available for security profile management. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 20 Command Summary: Security Profile

COMMAND	DESCRIPTION
`show wlan-security-profile {all | *security_profile_name*}`	Displays the security profile(s). `all`: Displays all profiles for the selected operating mode. *security_profile_name*: Displays the specified profile for the selected operating mode.
`wlan-security-profile rename` *security_profile_name1* *security_profile_name2*	Gives existing security profile (*security_profile_name1*) a new name, (*security_profile_name2*).
`[no] wlan-security-profile` *security_profile_name*	Enters configuration mode for the specified security profile. Use the `no` parameter to remove the specified profile.
`[no] accounting interim-interval <1..1440>`	Sets the time interval for how often the AP is to send an interim update message with current client statistics to the accounting server. Use the `no` parameter to clear the interval setting.
`[no] accounting interim-update`	Sets the AP to send accounting update messages to the accounting server at the specified interval. Use the `no` parameter to disable it.
`description` *description*	Sets the description for the profile. You may use up to 60 alphanumeric characters, underscores (_), or dashes (-). This value is case-sensitive
`[no] dot11r activate`	Turns on IEEE 802.11r fast roaming on the AP. Use the `no` parameter to turn it off.
`[no] dot11r over-the-ds activate`	Sets the clients to communicate with the target AP through the current AP. The communication between the client and the target AP is carried in frames between the client and the current AP, and is then sent to the target AP through the wired Ethernet connection. Use the `no` parameter to have the clients communicate directly with the target AP.
`[no] dot1x-eap`	Enables 802.1x secure authentication. Use the `no` parameter to disable it.

Table 20 Command Summary: Security Profile (continued)

COMMAND	DESCRIPTION
`[no] dot11w`	Data frames in 802.11 WLANs can be encrypted and authenticated with WEP, WPA or WPA2. But 802.11 management frames, such as beacon/probe response, association request, association response, de-authentication and disassociation are always unauthenticated and unencrypted. IEEE 802.11w Protected Management Frames allows APs to use the existing security mechanisms (encryption and authentication methods defined in IEEE 802.11i WPA/WPA2) to protect management frames. This helps prevent wireless DoS attacks. Enables management frame protection (MFP) to add security to 802.11 management frames. Use the `no` parameter to disable it.
`dot11w-op <1..2>`	Sets whether wireless clients have to support management frame protection in order to access the wireless network. `1`: if you do not require the wireless clients to support MFP. Management frames will be encrypted if the clients support MFP. `2`: wireless clients must support MFP in order to join the AP's wireless network.
`eap {external | internal` *`auth_method`*`}`	Sets the 802.1x authentication method.
`group-key <30..30000>`	Sets the interval (in seconds) at which the AP updates the group WPA/WPA2 encryption key. The default is 3000.
`idle <30..30000>`	Sets the idle interval (in seconds) that a client can be idle before authentication is discontinued. The default is 300.
`[no] internal-eap-proxy activate`	Allows the Zyxel Device to act as a proxy server and forward the authentication packets to the connected RADIUS server. Use the `no` parameter to disable it.
`[no] mac-auth activate`	MAC authentication has the AP use an external server to authenticate wireless clients by their MAC addresses. Users cannot get an IP address if the MAC authentication fails. The `no` parameter turns it off. RADIUS servers can require the MAC address in the wireless client's account (username/password) or Calling Station ID RADIUS attribute.
`mac-auth auth-method` *`auth_method`*	Sets the authentication method for MAC authentication.
`mac-auth case account {upper / lower}`	Sets the case (upper or lower) the external server requires for using MAC addresses as the account username and password. For example, use `mac-auth case account upper` and `mac-auth delimiter account dash` if you need to use a MAC address formatted like 00-11-AC-01-A0-11 as the username and password.
`mac-auth case calling-station-id {upper / lower}`	Sets the case (upper or lower) the external server requires for letters in MAC addresses in the Calling Station ID RADIUS attribute.

Table 20 Command Summary: Security Profile (continued)

COMMAND	DESCRIPTION
`mac-auth delimiter account {colon / dash / none}`	Specify the separator the external server uses for the two-character pairs within MAC addresses used as the account username and password. For example, use `mac-auth case account upper` and `mac-auth delimiter account dash` if you need to use a MAC address formatted like 00-11-AC-01-A0-11 as the username and password.
`mac-auth delimiter calling-station-id {colon / dash / none}`	Select the separator the external server uses for the pairs in MAC addresses in the Calling Station ID RADIUS attribute.
`mode {none | wep | wpa2 | wpa2-mix}`	Sets the security mode for this profile.
`[no] reauth <30..30000>`	Sets the interval (in seconds) between authentication requests. The default is 0.
`[no] server-acct <1..2> activate`	Enables user accounting through an external server. Use the `no` parameter to disable.
`server-acct <1..2> ip address` *`ipv4_address`* `port <1..65535> secret` *`secret`*	Sets the IPv4 address, port number and shared secret of the external accounting server.
`no server-acct <1..2>`	Clears the specified user accounting setting.
`[no] server-auth <1..2> activate`	Activates server authentication for the account. The `no` command deactivates authentication.
`server-auth <1..2> ip address` *`ipv4_address`* `port <1..65535> secret` *`secret`*	Sets the IPv4 address, port number and shared secret of the RADIUS server to be used for authentication.
`no server-auth <1..2>`	Clears the server authentication setting.
`wep <64 | 128> default-key <1..4>`	Sets the WEP encryption strength (*`64 or 128`*) and the default key value (*`1 ~ 4`*). If you select WEP-64 enter 10 hexadecimal digits in the range of “A-F”, “a-f” and “0-9” (for example, 0x11AA22BB33) for each Key used; or enter 5 ASCII characters (case sensitive) ranging from “a-z”, “A-Z” and “0-9” (for example, MyKey) for each Key used. If you select WEP-128 enter 26 hexadecimal digits in the range of “A-F”, “a-f” and “0-9” (for example, 0x00112233445566778899AABBCC) for each Key used; or enter 13 ASCII characters (case sensitive) ranging from “a-z”, “A-Z” and “0-9” (for example, MyKey12345678) for each Key used. You can save up to four different keys. Enter the `default-key` (*`1 ~ 4`*) to save your WEP to one of those four available slots.
`wep-auth-type {open | share}`	Sets the authentication key type to either *`open`* or *`share`*.

Table 20 Command Summary: Security Profile (continued)

COMMAND	DESCRIPTION
wpa-encrypt {tkip | aes | auto}	Sets the WPA/WPA2 encryption cipher type. auto: This automatically chooses the best available cipher based on the cipher in use by the wireless client that is attempting to make a connection. tkip: This is the Temporal Key Integrity Protocol encryption method added later to the WEP encryption protocol to further secure. Not all wireless clients may support this. aes: This is the Advanced Encryption Standard encryption method, a newer more robust algorithm than TKIP Not all wireless clients may support this.
wpa-psk {*wpa_key* | *wpa_key_64*}	Sets the WPA/WPA2 pre-shared key.
[no] wpa2-preauth	Enables pre-authentication to allow wireless clients to switch APs without having to re-authenticate their network connection. The RADIUS server puts a temporary PMK Security Authorization cache on the wireless clients. It contains their session ID and a pre-authorized list of viable APs. Use the no parameter to disable this.
exit	Exits configuration mode for this profile.

8.4.1 Security Profile Example

The following example creates a security profile with the name 'SECURITY01'.

```
Router(config)# wlan-security-profile SECURITY01
Router(config-security-profile)# mode wpa2
Router(config-security-profile)# wpa-encrypt aes
Router(config-security-profile)# wpa-psk 12345678
Router(config-security-profile)# idle 3600
Router(config-security-profile)# reauth 1800
Router(config-security-profile)# group-key 1800
Router(config-security-profile)# exit
Router(config)#
```

8.5 MAC Filter Profile Commands

The following table identifies the values required for many of these commands. Other input values are discussed with the corresponding commands.

Table 21 Input Values for General MAC Filter Profile Commands

LABEL	DESCRIPTION
macfilter_profile_name	The MAC filter profile name. You may use 1-31 alphanumeric characters, underscores (_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
description2	Sets the description of the profile. You may use up to 60 alphanumeric characters, underscores (_), or dashes (-). This value is case-sensitive.

The following table describes the commands available for security profile management. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 22 Command Summary: MAC Filter Profile

COMMAND	DESCRIPTION
show wlan-macfilter-profile {all | *macfilter_profile_name*}	Displays the security profile(s). *all*: Displays all profiles for the selected operating mode. *macfilter_profile_name*: Displays the specified profile for the selected operating mode.
wlan-macfilter-profile rename *macfilter_profile_name1* *macfilter_profile_name2*	Gives an existing security profile (*macfilter_profile_name1*) a new name (*macfilter_profile_name2*).
[no] wlan-macfilter-profile *macfilter_profile_name*	Enters configuration mode for the specified MAC filter profile. Use the *no* parameter to remove the specified profile.
filter-action {allow | deny}	Permits the wireless client with the MAC addresses in this profile to connect to the network through the associated SSID; select deny to block the wireless clients with the specified MAC addresses. The default is set to *deny*.
[no] *sta_mac* description *description2*	Sets the description of the wireless client with this MAC address. Enter up to 60 characters. Spaces and underscores allowed.
exit	Exits configuration mode for this profile.

8.5.1 MAC Filter Profile Example

The following example creates a MAC filter profile with the name ‘MACFILTER01’.

```
Router(config)# wlan-macfilter-profile MACFILTER01
Router(config-macfilter-profile)# filter-action deny
Router(config-macfilter-profile)# 01:02:03:04:05:06  description MAC01
Router(config-macfilter-profile)# 01:02:03:04:05:07  description MAC02
Router(config-macfilter-profile)# 01:02:03:04:05:08  description MAC03
Router(config-macfilter-profile)# exit
Router(config)#
```

8.6 ZyMesh Profile Commands

ZyMesh is a ZyXEL-proprietary feature. In a ZyMesh, multiple managed APs form a WDS (Wireless Distribution System) to expand the wireless network and provide services or forward traffic between the Zyxel Device and wireless clients. ZyMesh also allows the Zyxel Device to use CAPWAP to automatically update the configuration settings on the managed APs (in repeater mode) through wireless connections. The managed APs (in repeater mode) are provisioned hop by hop.The managed APs in a WDS or ZyMesh must use the same SSID, channel number and pre-shared key. A manged AP can be either a root AP or repeater in a ZyMesh.

Note: All managed APs should be connected to the Zyxel Device directly to get the configuration file before being deployed to build a ZyMesh/WDS. Ensure you restart the managed AP after you change its operating mode using the `wlan-radio-profile` *`radio_profile_name`* `role` commands.

- Root AP: a managed AP that can transmit and receive data from the Zyxel Device via a wired Ethernet connection.
- Repeater: a managed AP that transmit and/or receive data from the Zyxel Device via a wireless connection through a root AP.

Note: When managed APs are deployed to form a ZyMesh/WDS for the first time, the root AP must be connected to an AP controller (the Zyxel Device).

The maximum number of hops (the repeaters beteen a wireless client and the root AP) you can have in a ZyMesh varies according to how many wireless clients a managed AP can support.

Note: A ZyMesh/WDS link with more hops has lower throughput.

Note: When the wireless connection between the root AP and the repeater is up, in order to prevent bridge loops, the repeater would not be able to transmit data through its Ethernet port(s). The repeater then could only receive power from a PoE device if you use PoE to provide power to the managed AP via an 8-ping Etherent cable.

The following table identifies the values required for many of these commands. Other input values are discussed with the corresponding commands.

Table 23 Input Values for General ZyMesh Profile Commands

LABEL	DESCRIPTION
zymesh_profile_name	The ZyMesh profile name. You may use 1-31 alphanumeric characters, underscores (_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.

The following table describes the commands available for ZyMesh profile management. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 24 Command Summary: ZyMesh Profile

COMMAND	DESCRIPTION
`show zymesh ap info`	Displays the number of currently connected/offline ZyMesh APs.
`show zymesh link info {repeater-ap | root-ap}`	Displays the ZyMesh/WDS traffic statistics between the managed APs. `repeater-a`: the managed AP is acting as a repeater in a ZyMesh. `root-ap`: the managed AP is acting as a root AP in a ZyMesh.
`show zymesh provision-group`	Displays the current ZyMesh Provision Group MAC address in the Zyxel Device.
`show zymesh-profile {all |` *`zymesh_profile_name`*`}`	Displays the ZyMesh profile settings. *`all`*: Displays all profiles. *`zymesh_profile_name`*: Displays the specified profile.

Table 24 Command Summary: ZyMesh Profile (continued)

COMMAND	DESCRIPTION
`zymesh-profile rename` *`zymesh_profile_name1`* *`zymesh_profile_name2`*	Gives an existing radio profile (*zymesh_profile_name1*) a new name (*zymesh_profile_name2*).
`[no] zymesh-profile` *`zymesh_profile_name`*	Enters configuration mode for the specified ZyMesh profile. Use the *no* parameter to remove the specified profile.
`psk` *`psk`*	Sets a pre-shared key of between 8 and 63 case-sensitive ASCII characters (including spaces and symbols) or 64 hexadecimal characters.The key is used to encrypt the wireless traffic between the APs.
`ssid` *`ssid`*	Sets the SSID with which you want the managed AP to connect to a root AP or repeater to build a ZyMesh link. Note: The ZyMesh SSID is hidden in the outgoing beacon frame so a wireless device cannot obtain the SSID through scanning using a site survey tool.
`exit`	Exits configuration mode for this profile.
`zymesh provision-group` *`ac_mac`*	Enters the ZyMesh Provision Group MAC address of the primary AP controller in your network to use this Zyxel Device to replace the primary AP controller.

CHAPTER 9 Rogue AP

This chapter shows you how to set up Rogue Access Point (AP) detection and containment.

9.1 Rogue AP Detection Overview

Rogue APs are wireless access points operating in a network's coverage area that are not under the control of the network's administrators, and can potentially open holes in the network security. Attackers can take advantage of a rogue AP's weaker (or non-existent) security to gain illicit access to the network, or set up their own rogue APs in order to capture information from wireless clients.

Conversely, a friendly AP is one that the Zyxel Device network administrator regards as non-threatening. This does not necessarily mean the friendly AP must belong to the network managed by the Zyxel Device; rather, it is any unmanaged AP within range of the Zyxel Device's own wireless network that is allowed to operate without being contained. This can include APs from neighboring companies, for example, or even APs maintained by your company's employees that operate outside of the established network.

9.2 Rogue AP Detection Commands

The following table identifies the values required for many of these commands. Other input values are discussed with the corresponding commands.

Table 25 Input Values for Rogue AP Detection Commands

LABEL	DESCRIPTION
`ap_mac`	Specifies the MAC address (in XX:XX:XX:XX:XX:XX format) of the AP to be added to either the rogue AP or friendly AP list. The `no` command removes the entry.
`description2`	Sets the description of the AP. You may use 1-60 alphanumeric characters, underscores (_), or dashes (-). This value is case-sensitive.

The following table describes the commands available for rogue AP detection. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 26 Command Summary: Rogue AP Detection

COMMAND	DESCRIPTION
`rogue-ap detection`	Enters sub-command mode for rogue AP detection.
`    [no] activate`	Activates rogue AP detection. Use the `no` parameter to deactivate rogue AP detection.
`    rogue-ap` *`ap_mac description2`*	Sets the device that owns the specified MAC address as a rogue AP. You can also assign a description to this entry on the rogue AP list.

Table 26   Command Summary: Rogue AP Detection (continued)

COMMAND	DESCRIPTION
`no rogue-ap` *ap_mac*	Removes the device that owns the specified MAC address from the rogue AP list.
`friendly-ap` *ap_mac description2*	Sets the device that owns the specified MAC address as a friendly AP. You can also assign a description to this entry on the friendly AP list.
`no friendly-ap` *ap_mac*	Removes the device that owns the specified MAC address from the friendly AP list.
`monitoring flush`	Removes all detected APs from the rogue AP list.
`exit`	Exits configuration mode for rogue AP detection.
`show rogue-ap detection monitoring`	Displays a table of detected APs and information about them, such as their MAC addresses, when they were last seen, and their SSIDs, to name a few.
`show rogue-ap detection list {rogue | friendly| all}`	Displays the specified rogue/friendly/all AP list.
`show rogue-ap detection status`	Displays whether rogue AP detection is on or off.
`show rogue-ap detection info`	Displays a summary of the number of detected devices from the following categories: rogue, friendly, ad-hoc, unclassified, and total.

9.2.1 Rogue AP Detection Examples

This example sets the device associated with MAC address 00:13:49:11:11:11 as a rogue AP, and the device associated with MAC address 00:13:49:11:11:22 as a friendly AP. It then removes MAC address from the rogue AP list with the assumption that it was misidentified.

```
Router(config)# rogue-ap detection
Router(config-detection)# rogue-ap 00:13:49:11:11:11 rogue
Router(config-detection)# friendly-ap 00:13:49:11:11:22 friendly
Router(config-detection)# no rogue-ap 00:13:49:11:11:11
Router(config-detection)# exit
```

This example displays the rogue AP detection list.

```
Router(config)# show rogue-ap detection list rogue
no.   mac              description
contain
===========================================================================
1    00:13:49:18:15:5A
0
```

This example shows the friendly AP detection list.

```
Router(config)# show rogue-ap detection list friendly
no.   mac                 description
===========================================================================
1     11:11:11:11:11:11   third floor
2     00:13:49:11:22:33
3     00:13:49:00:00:05
4     00:13:49:00:00:01
5     00:0D:0B:CB:39:33   dept1
```

This example shows the combined rogue and friendly AP detection list.

```
Router(config)# show rogue-ap detection list all
no.   role         mac                 description
===========================================================================
1     friendly-ap  11:11:11:11:11:11   third floor
2     friendly-ap  00:13:49:11:22:33
3     friendly-ap  00:13:49:00:00:05
4     friendly-ap  00:13:49:00:00:01
5     friendly-ap  00:0D:0B:CB:39:33   dept1
6     rogue-ap     00:13:49:18:15:5A
```

This example shows both the status of rogue AP detection and the summary of detected APs.

```
Router(config)# show rogue-ap detection status
rogue-ap detection status: on

Router(config)# show rogue-ap detection info
rogue ap: 1
friendly ap: 4
adhoc: 4
unclassified ap: 0
total devices: 0
```

9.3 Rogue AP Containment Overview

These commands enable rogue AP containment. You can use them to isolate a device that is flagged as a rogue AP. They are global in that they apply to all managed APs on the network (all APs utilize the same containment list, but only APs set to monitor mode can actively engage in containment of rogue APs). This means if we add a MAC address of a device to the containment list, then every AP on the network will respect it.

Note: Containing a rogue AP means broadcasting unviable login data at it, preventing legitimate wireless clients from connecting to it. This is a kind of Denial of Service attack.

9.4 Rogue AP Containment Commands

The following table identifies the values required for many of these commands. Other input values are discussed with the corresponding commands.

Table 27 Input Values for Rogue AP Containment Commands

LABEL	DESCRIPTION
ap_mac	Specifies the MAC address (in XX:XX:XX:XX:XX:XX format) of the AP to be contained. The `no` command removes the entry.

The following table describes the commands available for rogue AP containment. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 28 Command Summary: Rogue AP Containment

COMMAND	DESCRIPTION
`rogue-ap containment`	Enters sub-command mode for rogue AP containment.
`    [no] activate`	Activates rogue AP containment. Use the `no` parameter to deactivate rogue AP containment.
`    [no] contain` *ap_mac*	Isolates the device associated with the specified MAC address. Use the `no` parameter to remove this device from the containment list.
`    exit`	Exits configuration mode for rogue AP containment.
`show rogue-ap containment config`	Displays whether rogue AP containment is enabled or not.
`show rogue-ap containment list`	Displays the rogue AP containment list.

9.4.1 Rogue AP Containment Example

This example contains the device associated with MAC address 00:13:49:11:11:12 then displays the containment list for confirmation.

```
Router(config)# rogue-ap containment
Router(config-containment)# activate
Router(config-containment)# contain 00:13:49:11:11:12
Router(config-containment)# exit
Router(config)# show rogue-ap containment list
no.   mac
=====================================================================
1     00:13:49:11:11:12
```

CHAPTER 10
Wireless Frame Capture

This chapter shows you how to configure and use wireless frame capture on the Zyxel Device.

10.1 Wireless Frame Capture Overview

Troubleshooting wireless LAN issues has always been a challenge. Wireless sniffer tools like Ethereal can help capture and decode packets of information, which can then be analyzed for debugging. It works well for local data traffic, but if your devices are spaced increasingly farther away then it often becomes correspondingly difficult to attempt remote debugging. Complicated wireless packet collection is arguably an arduous and perplexing process. The wireless frame capture feature in the Zyxel Device can help.

This chapter describes the wireless frame capture commands, which allows a network administrator to capture wireless traffic information and download it to an Ethereal/Tcpdump compatible format packet file for analysis.

10.2 Wireless Frame Capture Commands

The following table identifies the values required for many of these commands. Other input values are discussed with the corresponding commands.

Table 29 Input Values for Wireless Frame Capture Commands

LABEL	DESCRIPTION
ip_address	The IP address of the Access Point (AP) that you want to monitor. Enter a standard IPv4 IP address (for example, 192.168.1.2).
mon_dir_size	The total combined size (in kbytes) of all files to be captured. The maximum you can set is 50 megabtyes (52428800 bytes.)
file_name	The file name prefix for each captured file. The default prefix is monitor while the default file name is monitor.dump. You can use 1-31 alphanumeric characters, underscores or dashes but the first character cannot be a number. This string is case sensitive.

The following table describes the commands available for wireless frame capture. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 30 Command Summary: Wireless Frame Capture

COMMAND	DESCRIPTION
frame-capture configure	Enters sub-command mode for wireless frame capture.
src-ip {add|del} {*ipv4_address* | local}	Sets or removes the IPv4 address of an AP controlled by the Zyxel Device that you want to capture wireless network traffic going through the AP interfaces. You can use this command multiple times to add additional IPs to the list.
file-prefix *file_name*	Sets the file name prefix for each captured file. Enter up to 31 alphanumeric characters. Spaces and underscores are not allowed.
files-size *mon_dir_size*	Sets the total combined size (in kbytes) of all files to be captured.
exit	Exits configuration mode for wireless frame capture.
[no] frame-capture activate	Starts wireless frame capture. Use the `no` parameter to turn it off.
show frame-capture status	Displays whether frame capture is running or not.
show frame-capture config	Displays the frame capture configuration.

10.2.1 Wireless Frame Capture Examples

This example configures the wireless frame capture parameters for an AP located at IP address 192.168.1.2.

```
Router(config)# frame-capture configure
Router(frame-capture)# src-ip add 192.168.1.2
Router(frame-capture)# file-prefix monitor
Router(frame-capture)# files-size 1000
Router(frame-capture)# exit
Router(config)#
```

This example shows frame capture status and configuration.

```
Router(config)# show frame-capture status
capture status: off

Router(config)# show frame-capture config
capture source: 192.168.1.2
file prefix: monitor
file size: 1000
```

CHAPTER 11 Dynamic Channel Selection

This chapter shows you how to configure and use dynamic channel selection on the Zyxel Device.

11.1 DCS Overview

Dynamic Channel Selection (DCS) is a feature that allows an AP to automatically select the radio channel upon which it broadcasts by passively listening to the area around it and determining what channels are currently being broadcast on by other devices.

When numerous APs broadcast within a given area, they introduce the possibility of heightened radio interference, especially if some or all of them are broadcasting on the same radio channel. This can make accessing the network potentially rather difficult for the stations connected to them. If the interference becomes too great, then the network administrator must open his AP configuration options and manually change the channel to one that no other AP is using (or at least a channel that has a lower level of interference) in order to give the connected stations a minimum degree of channel interference.

11.2 DCS Commands

See Section 8.2 on page 68 for detailed information about how to configure DCS settings in a radio profile.

The following table describes the commands available for dynamic channel selection. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 31 Command Summary: DCS

COMMAND	DESCRIPTION
`dcs now {ap_mac | profile_name}`	Sets the managed AP to scan for and select an available channel immediately.

CHAPTER 12 Auto-Healing

This chapter shows you how to configure auto-healing settings.

12.1 Auto-Healing Overview

Auto-healing allows you to extend the wireless service coverage area of the managed APs when one of the managed APs fails.

12.2 Auto-Healing Commands

The following table identifies the values required for many of these commands. Other input values are discussed with the corresponding commands.

Table 32 Input Values for Auto-Healing Commands

LABEL	DESCRIPTION
interval	Enters the auto-healing interval time. The range is 5 ~ 30 minutes.

The following table describes the commands available for auto-healing. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 33 Command Summary: Auto-Healing

COMMAND	DESCRIPTION
`[no] auto-healing activate`	Turns on the auto-healing feature. Use the `no` parameter to turn it off.
`auto-healing healing-interval` *interval*	Sets the interval that specifies how often the managed APs scan their neighborhoods and report the status of neighbor APs to the AP controller (Zyxel Device). An AP is considered "failed" if the AP controller obtains the same scan result that the AP is missing from the neighbor list of other APs three times.
`auto-healing healing-threshold`	Sets a minimum signal strength. A managed AP is added to the neighbor lists only when the signal strength of the AP is stronger than the specified threshold.
`auto-healing power-threshold <-50~-80>`	Sets a power threshold (in dBm). This value is used to calculate the power level (`power-threshold` + `margin`) to which the neighbor APs of the failed AP increase their output power in order to extend their wireless service coverage areas. When the failed AP is working again, its neighbor APs return their output power to the original level.

Table 33   Command Summary: Auto-Healing (continued)

COMMAND	DESCRIPTION
`auto-healing margin`	Enters a number from 0 to 9. This value is used to calculate the power level (`power-threshold` + `margin`) to which the neighbor APs of the failed AP increase their output power in order to extend their wireless service coverage areas.
`auto-healing update`	Sets all manged APs to immediately scan their neighborhoods three times in a row and update their neighbor lists to the AP controller (Zyxel Device).
`show auto-healing config`	Displays the current auto-healing configuration.

12.2.1 Auto-Healing Examples

This example enables auto-healing and sets the power level (in dBm) to which the neighbor APs of the failed AP increase their output power.

```
Router(config)# auto-healing activate
Router(config)# auto-healing power-threshold -70
Router(config)# show auto-healing config
auto-healing activate: yes
auto-healing interval: 10
auto-healing power threshold: -70 dBm
auto-healing healing threshold: -85 dBm
auto-healing margin: 0
Router(config)#
```

CHAPTER 13
LEDs

This chapter describes two features that controls the LEDs of the managed APs connected to your Zyxel Device - Locator and Suppression.

13.1 LED Suppression Mode

The LED Suppression feature allows you to control how the LEDs of an AP behave after it’s ready. The deafult LED suppression setting of the AP is different depending on your AP model.

Note: When the AP is booting or performing firmware upgrade, the LEDs will light regardless of the setting in LED suppression.

13.2 LED Suppression Commands

Use these commands to set how you want the LEDs to behave after the device is ready. You must use the `configure terminal` command before you can use these commands.

Table 34 LED Suppression Commands

COMMAND	DESCRIPTION
led_suppress *ap_mac_address* enable	Sets the LEDs of the specified AP to turn off after it’s ready.
led_suppress *ap_mac_address* disable	Sets the LEDs of the specified AP to stay lit after the Zyxel Device is ready.
show led_suppress *ap_mac_address* status	Displays whether LED suppression mode is enabled or disabled on the specified AP.

13.2.1 LED Suppression Commands Example

The following example activates LED suppression mode on the AP with the MAC address 00:a0:c5:01:23:45 and displays the settings.

```
Router(config)# led_suppress 00:a0:c5:01:23:45 enable
Router(config)# show led_suppress 00:a0:c5:01:23:45 status
Suppress Mode Status : Enable
Router(config)#
```

13.3 LED Locator

The LED locator feature identifies the location of the WAC AP among several devices in the network. You can run this feature and set a timer.

13.4 LED Locator Commands

Use these commands to run the LED locator feature. You must use the `configure terminal` command before you can use these commands.

Table 35 LED Locator Commands

COMMAND	DESCRIPTION
`led_locator` *`ap_mac_address`* `on`	Enables the LED locator function on the specified AP. It will show the actual location of the AP among several devices in the network.
`led_locator` *`ap_mac_address`* `off`	Disables the LED locator function on the specified AP.
`led_locator` *`ap_mac_address`* `blink-timer <1..60>`	Sets a time interval between 1 and 60 minutes to stop the locator LED from blinking on the specified AP. Note: You should run this command before enabling the LED locator function.
`show led_locator` *`ap_mac_address`* `status`	Displays whether LED locator function is enabled on the specified AP and the timer setting.

13.4.1 LED Locator Commands Example

The following example turns on the LED locator feature on the AP with the MAC address 00:a0:c5:01:23:45, sets how long the locator LED stays blinking, and also displays the settings.

```
Router(config)# led_locator 00:a0:c5:01:23:45 blink-timer 5
Router(config)# led_locator 00:a0:c5:01:23:45 on
Router(config)# show led_locator 00:a0:c5:01:23:45 status
Locator LED Status : ON
Locator LED Time : 5
Router(config)#
```

CHAPTER 14 Interfaces

This chapter shows you how to use interface-related commands.

14.1 Interface Overview

In general, an interface has the following characteristics.

- An interface is a logical entity through which (layer-3) packets pass.
- An interface is bound to a physical port or another interface.
- Many interfaces can share the same physical port.
- An interface is bound to at most one zone.
- Many interfaces can belong to the same zone.
- Layer-3 virtualization (IP alias, for example) is a kind of interface.

Some characteristics do not apply to some types of interfaces.

14.1.1 Types of Interfaces

You can create several types of interfaces in each Zyxel Device model. The types supported vary by Zyxel Device model.

- **Port groups** create a hardware connection between physical ports at the layer-2 (data link, MAC address) level.
- **Ethernet interfaces** are the foundation for defining other interfaces and network policies. RIP and OSPF are also configured in these interfaces.
- **VLAN interfaces** receive and send tagged frames. The Zyxel Device automatically adds or removes the tags as needed. Each VLAN can only be associated with one Ethernet interface.
- **Bridge interfaces** create a software connection between Ethernet or VLAN interfaces at the layer-2 (data link, MAC address) level. Unlike port groups, bridge interfaces can take advantage of some security features in the Zyxel Device. You can also assign an IP address and subnet mask to the bridge.
- **PPPoE/PPTP interfaces** support Point-to-Point Protocols (PPP). ISP accounts are required for PPPoE/PPTP interfaces.
- **Cellular interfaces** are for 3G WAN connections via a connected 3G device.
- **Virtual interfaces** (IP alias) provide additional routing information in the Zyxel Device. There are three types: **virtual Ethernet interfaces**, **virtual VLAN interfaces**, and **virtual bridge interfaces**.
- **VPN Tunnel Interface (VTI**) encrypts or decrypts IPv4 traffic from or to the interface according to the IP routing table.
- **Link Aggregation Group (LAG) interfaces** combine multiple physical Ethernet interfaces into a single logical interface, thus increasing uplink bandwidth and availability in the event a link goes down.

- **Trunks** manage load balancing between interfaces.

Port groups, and trunks have a lot of characteristics that are specific to each type of interface. These characteristics are listed in the following tables and discussed in more detail farther on.

Table 36 Characteristics of Ethernet, VLAN, Bridge, PPPoE/PPTP, and Virtual Interface (for some Zyxel Device models)

CHARACTERISTICS	ETHERNET	VLAN	BRIDGE	PPPOE/PPTP	VIRTUAL
Name*	gex	vlanx	brx	pppx	**
IP Address Assignment					
static IP address	Yes	Yes	Yes	Yes	Yes
DHCP client	Yes	Yes	Yes	Yes	No
routing metric	Yes	Yes	Yes	Yes	Yes
Interface Parameters					
bandwidth restrictions	Yes	Yes	Yes	Yes	Yes
packet size (MTU)	Yes	Yes	Yes	Yes	No
data size (MSS)	Yes	Yes	Yes	Yes	No
traffic prioritization	Yes	Yes	Yes	Yes	No
DHCP					
DHCP server	Yes	Yes	Yes	No	No
DHCP relay	Yes	Yes	Yes	No	No
Ping Check	Yes	Yes	Yes	Yes	No

* - The format of interface names is strict. Each name consists of 2-4 letters (interface type), followed by a number (*x*, limited by the maximum number of each type of interface). For example, Ethernet interface names are ge1, ge2, ge3, ...; VLAN interfaces are vlan0, vlan1, vlan2, ...; and so on.

** - The names of virtual interfaces are derived from the interfaces on which they are created. For example, virtual interfaces created on Ethernet interface ge1 are called ge1:1, ge1:2, and so on. Virtual interfaces created on VLAN interface vlan2 are called vlan2:1, vlan2:2, and so on. You cannot specify the number after the colon(:) in the web configurator; it is a sequential number. You can specify the number after the colon if you use the CLI to set up a virtual Interface Parameters

Table 37 Ethernet, VLAN, Bridge, PPP, and Virtual Interface Characteristics (For other Zyxel Device models)

CHARACTERISTICS	ETHERNET	ETHERNET	ETHERNET	VLAN	BRIDGE	PPP	VIRTUAL
Name*	opt	wan1, wan2	lan1, ext-wlan, dmz	vlan*x*	br*x*	ppp*x*	**
Configurable Zone	Yes	No	No	Yes	Yes	No	No
IP Address Assignment							
Static IP address	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DHCP client	Yes	Yes	No	Yes	Yes	Yes	No
Routing metric	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interface Parameters							
Bandwidth restrictions	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Packet size (MTU)	Yes	Yes	Yes	Yes	Yes	Yes	No
Data size (MSS)	Yes	Yes	Yes	Yes	Yes	Yes	No
DHCP							

Table 37 Ethernet, VLAN, Bridge, PPP, and Virtual Interface Characteristics (For other Zyxel Device models) (continued)

CHARACTERISTICS	ETHERNET	ETHERNET	ETHERNET	VLAN	BRIDGE	PPP	VIRTUAL
DHCP server	Yes	No	Yes	Yes	Yes	No	No
DHCP relay	Yes	No	Yes	Yes	Yes	No	No
Connectivity Check	Yes	Yes	No	Yes	Yes	Yes	No

* - Each name consists of 2-4 letters (interface type), followed by a number (*x*). For most interfaces, x is limited by the maximum number of the type of interface. For VLAN interfaces, x is defined by the number you enter in the VLAN name field. For example, Ethernet interface names are wan1, wan2, opt, lan1, ext-wlan, dmz; VLAN interfaces are vlan0, vlan1, vlan2, ...; and so on.

** - The names of virtual interfaces are derived from the interfaces on which they are created. For example, virtual interfaces created on Ethernet interface wan1 are called wan1:1, wan1:2, and so on. Virtual interfaces created on VLAN interface vlan2 are called vlan2:1, vlan2:2, and so on. You cannot specify the number after the colon(:) in the web configurator; it is a sequential number. You can specify the number after the colon if you use the CLI to set up a virtual interface.

Table 38 Cellular and WLAN Interface Characteristics

CHARACTERISTICS	CELLULAR	
Name*	cellular*x*	
Configurable Zone	Yes**	
IP Address Assignment		
Static IP address	Yes	
DHCP client	Yes	
Routing metric	Yes	
Interface Parameters		
Bandwidth restrictions	Yes	
Packet size (MTU)	Yes	
Data size (MSS)	Yes	
DHCP		
DHCP server	No	
DHCP relay	No	
Connectivity Check	Yes	

* - Each name consists of letters (interface type), followed by a number (*x*). For most interfaces, x is limited by the maximum number of the type of interface. For WLAN interfaces, the first number identifies the slot and the second number identifies the individual interface.

** - Cellular interfaces can be added to the WAN zone or no zone.

14.1.2 Relationships Between Interfaces

In the Zyxel Device, interfaces are usually created on top of other interfaces. Only Ethernet interfaces are created directly on top of the physical ports (or port groups). The relationships between interfaces are explained in the following table.

Table 39 Relationships Between Different Types of Interfaces

INTERFACE	REQUIRED PORT / INTERFACE
Ethernet interface	physical port port group
VLAN interface	Ethernet interface
bridge interface	Ethernet interface* VLAN interface*
PPPoE/PPTP interface (For some Zyxel Device models)	Ethernet interface* VLAN interface* bridge interface
PPPoE/PPTP interface (For other Zyxel Device models)	WAN1, WAN2, OPT*
virtual interface	
(virtual Ethernet interface)	Ethernet interface*
(virtual VLAN interface)	VLAN interface*
(virtual bridge interface)	bridge interface
trunk	Ethernet interface Cellular interface VLAN interface bridge interface PPPoE/PPTP interface

* - You cannot set up a PPPoE/PPTP interface, virtual Ethernet interface, or virtual VLAN interface if the underlying interface is a member of a bridge. You also cannot add an Ethernet interface or VLAN interface to a bridge if the member interface has a virtual interface or PPPoE/PPTP interface on top of it.

14.2 Interface General Commands Summary

The following table identifies the values required for many of these commands. Other input values are discussed with the corresponding commands.

Table 40 Input Values for General Interface Commands

LABEL	DESCRIPTION
interface_name	The name of the interface. Ethernet interface: For some Zyxel Device models, use ge*x*, *x* = 1 - N, where N equals the highest numbered Ethernet interface for your Zyxel Device model. For other Zyxel Device models use a name such as wan1, wan2, opt, lan1, ext-wlan, or dmz. virtual interface on top of Ethernet interface: add a colon (:) and the number of the virtual interface. For example: ge*x*:*y*, *x* = 1 - N, *y* = 1 - 4 VLAN interface: vlan*x*, *x* = 0 - 4094 virtual interface on top of VLAN interface: vlan*x*:*y*, *x* = 0 - 4094, *y* = 1 - 4 bridge interface: br*x*, *x* = 0 - N, where N depends on the number of bridge interfaces your Zyxel Device model supports. virtual interface on top of bridge interface: br*x*:*y*, *x* = the number of the bridge interface, *y* = 1 - 4 PPPoE/PPTP interface: ppp*x*, *x* = 0 - N, where N depends on the number of PPPoE/PPTP interfaces your Zyxel Device model supports.
profile_name	The name of the DHCP . You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
domain_name	Fully-qualified domain name. You may up to 254 alphanumeric characters, dashes (-), or periods (.), but the first character cannot be a period.

The following sections introduce commands that are supported by several types of interfaces. See Section 14.6 on page 122 for the unique commands for each type of interface.

14.2.1 Basic Interface Properties and IP Address Commands

This table lists basic properties and IP address commands.

Table 41 `interface` General Commands: Basic Properties and IP Address Assignment

COMMAND	DESCRIPTION
`show interface {ethernet	vlan	bridge	ppp} status`	Displays the connection status of the specified type of interfaces.
`show interface {`*`interface_name`*`	ethernet	vlan	bridge	ppp	virtual ethernet	virtual vlan	virtual bridge	all}`	Displays information about the specified interface, specified type of interfaces, or all interfaces. See Section 14.6.1 on page 125 for all possible cellular status description.
`show ipv6 interface {`*`interface_name`*`	all}`	Displays information about the specified IPv6 interface or all IPv6 interfaces.
`show ipv6 static address `*`interface`*	Displays the static IPv6 addresses configured on the specified IPv6 interface.
`show ipv6 nd ra status `*`config_interface`*	Displays the specified IPv6 interface's IPv6 router advertisement configuration.

Table 41 `interface` General Commands: Basic Properties and IP Address Assignment (continued)

COMMAND	DESCRIPTION
`show interface send statistics interval`	Displays the interval for how often the Zyxel Device refreshes the sent packet statistics for the interfaces.
`show interface summary all`	Displays basic information about the interfaces.
`show interface summary all status`	Displays the connection status of the interfaces.
`[no] interface` *`interface_name`*	Creates the specified interface if necessary and enters sub-command mode. The `no` command deletes the specified interface.
`[no] description` *`description`*	Specifies the description for the specified interface. The `no` command clears the description. *`description`*: You can use alphanumeric and `()+/:=?!*#@$_%-` characters, and it can be up to 60 characters long.
`[no] downstream <0..1048576>`	This is reserved for future use. Specifies the downstream bandwidth for the specified interface. The `no` command sets the downstream bandwidth to 1048576.
`exit`	Leaves the sub-command mode.
`[no] ip address dhcp`	Makes the specified interface a DHCP client; the DHCP server gives the specified interface its IP address, subnet mask, and gateway. The `no` command makes the IP address static IP address for the specified interface. (See the next command to set this IP address.)
`ip address dhcp option-60 <text>`	This command is available for external interfaces only. DHCP Option 60 is used by the Zyxel Device for identification to the DHCP server using the VCI (Vendor Class Identifier) on the DHCP server. The Zyxel Device adds it in the initial DHCP discovery message that a DHCP client broadcasts in search of an IP address. The DHCP server can assign different IP addresses or options to clients with the specific VCI or reject the request from clients without the specific VCI. Type a string using up to 64 of these characters [a-zA-Z0-9!\"#$%&\'()*+,-./:;<=>?@\[\\\]^_`{|}~] to identify this Zyxel Device to the DHCP server. For example, Zyxel-TW.
`[no] ip address` *`ip subnet_mask`*	Assigns the specified IP address and subnet mask to the specified interface. The `no` command clears the IP address and the subnet mask.
`[no] ip gateway` *`ip`*	Adds the specified gateway using the specified interface. The `no` command removes the gateway.
`ip gateway` *`ip`* `metric <0..15>`	Sets the priority (relative to every gateway on every interface) for the specified gateway. The lower the number, the higher the priority.
`[no] metric <0..15>`	Sets the tunnel, PPPoE/PPTP, or cellular interface's priority relative to other interfaces. The lower the number, the higher the priority.
`[no] mss <536..1460>`	Specifies the maximum segment size (MSS) the interface is to use. MSS is the largest amount of data, specified in bytes, that the interface can handle in a single, unfragmented piece. The `no` command has the interface use its default MSS.
`[no] mtu <576..1500>`	Specifies the Maximum Transmission Unit, which is the maximum number of bytes in each packet moving through this interface. The Zyxel Device divides larger packets into smaller fragments. The `no` command resets the MTU to 1500.
`[no] shutdown`	Deactivates the specified interface. The `no` command activates it.
`traffic-prioritize {tcp-ack|content-filter|dns|ipsec-vpn|ssl-vpn} bandwidth <0..1048576> priority <1..7> [maximize-bandwidth-usage];`	Applies traffic priority when the interface sends TCP-ACK traffic, traffic for querying the content filter, traffic for resolving domain names, or encrypted traffic for an IPSec or SSL VPN tunnel. It also sets how much bandwidth the traffic can use and can turn on maximize bandwidth usage.

Table 41 interface General Commands: Basic Properties and IP Address Assignment (continued)

COMMAND	DESCRIPTION
traffic-prioritize {tcp-ack|content-filter|dns|ipsec-vpn|ssl-vpn} deactivate	Turns off traffic priority settings for when the interface sends the specified type of traffic.
[no] upstream <0..1048576>	Specifies the upstream bandwidth for the specified interface. The no command sets the upstream bandwidth to 1048576.
interface *interface_name* ipv6	Creates the specified IPv6 interface if necessary and enters sub-command mode.
address *ipv6_addr_prefix*	Sets an IPv6 address with prefix for the interface.
gateway *ipv6_addr* metric <0..15>	Sets the specified IPv6 address's metric.
enable	Turns on the IPv6 interface.
nd ra accept	Sets the IPv6 interface to accept IPv6 neighbor discovery router advertisement messages.
nd ra advertise	Sets the IPv6 interface to send IPv6 neighbor discovery router advertisement messages.
nd ra managed-config-flag	Turns on the flag in IPv6 router advertisements that tells hosts to use managed (stateful) protocol for address autoconfiguration in addition to any addresses autoconfigured using stateless address autoconfiguration.
nd ra other-config-flag	Turns on the other stateful configuration flag in IPv6 router advertisements that tells hosts to use administered (stateful) protocol to obtain autoconfiguration information other than addresses.
nd ra mtu <1280..1500> | <0>	Sets the Maximum Transmission Unit (MTU) size of IPv6 packets sent on the interface.
nd ra hop-limit <0..255>	Sets the maximum number of hops for router advertisements and all IPv6 packets originating from the interface.
nd ra router-preference {low | medium | high }	Sets the Default Router Preference (DRP) extension metric (low, medium, or high) in the interface's IPv6 neighbor discovery router advertisement messages.
nd ra prefix-advertisement *ipv6_addr_prefix* [auto { on | off}] [link{ on | off }] [preferred-time { <0..4294967294> | infinity }] [valid-time{ <0..4294967294> | infinity }]	Sets the IPv6 prefix that the Zyxel Device advertises to its clients, whether or not to advertise it, and how long before the prefix's preference and lifetime expire.
nd ra min-rtr-interval <3..1350>	Sets the minimum IPv6 router advertisement transmission interval.
nd ra max-rtr-interval <4..1800>	Sets the maximum IPv6 router advertisement transmission interval.
nd ra reachable-time <0..3600000>	Sets the amount of time a remote IPv6 node is considered reachable after a reachability confirmation event.
nd ra default-lifetime <4..9000>	Sets the router lifetime value is included in all IPv6 router advertisements sent out the interface. The router lifetime value should be equal to or greater than the router advertisement interval.
nd ra retrans-timer <0..4294967295>	Sets the IPv6 router advertisement retransmission interval in milliseconds.

Table 41 `interface` General Commands: Basic Properties and IP Address Assignment (continued)

COMMAND	DESCRIPTION
`ipv6 address` *`dhcp6_profile dhcp6_suffix_128`*	Has the Zyxel Device obtain an IPv6 prefix from the ISP or a connected uplink router for an internal network, such as the LAN or DMZ. *`dhcp6_profile`*: Specify the DHCPv6 request object to use. *`dhcp6_suffix_128`*: Specify the ending part of the IPv6 address, a slash (/), and the prefix length. The Zyxel Device appends it to the delegated prefix. For example, you got a delegated prefix of 2003:1234:5678/48. You want to configure an IP address of 2003:1234:5678:1111::1/128 for this interface, then enter ::1111:0:0:0:1/128 for the *`dhcp6_suffix_128`*.
`nd ra prefix-advertisement` *`dhcp6_profile dhcp6_suffix_64`*	Configures the network prefix to use a delegated prefix as the beginning part of the network prefix. *`dhcp6_profile`*: Specify the DHCPv6 request object to use for generating the network prefix for the network. *`dhcp6_suffix_64`*: Specify the ending part of the IPv6 network address plus a slash (/) and the prefix length. The Zyxel Device appends it to the selected delegated prefix. The combined address is the network prefix for the network. For example, you got a delegated prefix of 2003:1234:5678/48. You want to divide it into 2003:1234:5678:1111/64 for this interface and 2003:1234:5678:2222/64 for another interface. You can use ::1111/64 and ::2222/64 for the suffix address respectively. But if you do not want to divide the delegated prefix into subnetworks, enter ::0/48 here, which keeps the same prefix length (/48) as the delegated prefix.
`dhcp6 { server | client | relay upper {` *`config_interface`* `|` *`ipv6_addr`* `} }`	Sets the IPv6 interface to be a DHCPv6 server, client or relay. For relay, specify an interface from which to get the DHCPv6 server's address or the IPv6 address of a DHCPv6 server.
`dhcp6 rapid-commit`	This shortens the DHCPv6 message exchange process from four to two steps to help reduce network traffic. Note: Make sure you also enable this option in the DHCPv6 clients to make rapid commit work.
`dhcp6 address-request`	Get this interface's IPv6 address from the DHCPv6 server.
`dhcp6 refresh-time { <600..4294967294> | infinity }`	Sets the number of seconds a DHCPv6 client should wait before refreshing information retrieved from DHCPv6.
`dhcp6 duid {` *`duid`* `| mac }`	Specify the DHCP Unique IDentifier (DUID) of the interface or have it generated from the interface's default MAC address.
`dhcp6-lease-object` *`dhcp6_profile`*	For a DHCPv6 server interface, specify the profile of DHCPv6 lease settings to offer to DHCPv6 clients.
`dhcp6-request-object` *`dhcp6_profile`*	For a DHCPv6 client interface, specify the profile of DHCPv6 request settings that determine what additional information to get from the DHCPv6 server.
`interface` *`interface_name`* `no ipv6`	Enters the sub-command mode for deleting the specified IPv6 address or removing it's settings.
`enable`	Turns off the IPv6 interface.
`address` *`ipv6_addr_prefix`*	Removes the IPv6 interface's IPv6 prefix setting.
`gateway`	Removes the IPv6 interface's gateway setting.
`nd ra accept`	Sets the IPv6 interface to discard IPv6 neighbor discovery router advertisement messages.
`nd ra advertise`	Has the IPv6 interface not send IPv6 neighbor discovery router advertisement messages.

Table 41 `interface` General Commands: Basic Properties and IP Address Assignment (continued)

COMMAND	DESCRIPTION
`nd ra managed-config-flag`	Turns off the flag in IPv6 router advertisements that tells hosts to use managed (stateful) protocol for address autoconfiguration in addition to any addresses autoconfigured using stateless address autoconfiguration.
`nd ra other-config-flag`	Turns off the other stateful configuration flag in IPv6 router advertisements that tells hosts to use administered (stateful) protocol to obtain autoconfiguration information other than addresses.
`nd ra mtu`	Removes the Maximum Transmission Unit (MTU) size setting for IPv6 packets the interface sends.
`nd ra hop-limit`	Removes the maximum number of hops setting for router advertisements and all IPv6 packets originating from the interface.
`nd ra min-rtr-interval`	Removes the minimum IPv6 router advertisement transmission interval setting.
`nd ra max-rtr-interval`	Removes the maximum IPv6 router advertisement transmission interval setting.
`nd ra reachable-time`	Sets the amount of time a remote IPv6 node is considered reachable after a reachability confirmation event to the default.
`nd ra default-lifetime`	Sets the router lifetime value included in all IPv6 router advertisements the interface sends to the default. The router lifetime value should be equal to or greater than the router advertisement interval.
`nd ra retrans-timer`	Sets the IPv6 router advertisement retransmission interval to the default.
`ipv6 address` *`dhcp6_profile dhcp6_suffix_128`*	Removes the specified setting for having the Zyxel Device obtain an IPv6 prefix from the ISP or a connected uplink router for an internal network.
`nd ra prefix-advertisement DHCP6_PROFILE DHCP6_SUFFIX_64`	Removes the specified setting for using a delegated prefix as the beginning part of the network prefix.
`dhcp6`	Sets the interface's DHCPv6 setting back to the default.
`dhcp6 address-request`	Has the Zyxel Device not get this interface's IPv6 address from the DHCPv6 server.
`dhcp6 rapid-commit`	Has the Zyxel Device use the full four-step DHCPv6 message exchange process. Note: Make sure you also disable this option in the DHCPv6 clients.
`dhcp6-lease-object` *`dhcp6_profile`*	Removes the specified profile of DHCPv6 lease settings to offer to DHCPv6 clients.
`dhcp6-request-object` *`dhcp6_profile`*	Removes the specified profile of DHCPv6 request settings that determine what additional information to get from the DHCPv6 server.
`interface reset {`*`interface_name`*`|`*`virtual_interface_name`*`|all}`	Resets the interface statistics TxPkts (transmitted packets) and RxPkts (received packets) counts to 0. You can use the `show interface summary all status` command to see the interface statistics.
`interface send statistics interval <15..3600>`	Sets how often the Zyxel Device sends interface statistics to external servers. For example, syslog server and Vantage Report server.
`show interface-name`	Displays all PPP and Ethernet interface system name and user-defined name mappings.

Table 41 `interface` General Commands: Basic Properties and IP Address Assignment (continued)

COMMAND	DESCRIPTION

`interface-name {`*`ppp_interface`*` | `*`ethernet_interface`*`}`
`user_defined_name`
	Specifies a name for a PPP or an Ethernet interface. It can use alphanumeric characters, hyphens, and underscores, and it can be up to 11 characters long.
	`ppp_interface` | *`ethernet_interface`*: This must be the system name of a PPP or an Ethernet interface. Use the `show interface-name` command to see the system name of interfaces.
	`user_defined_name`:
	• This name cannot be one of the follows:
	"ethernet", "ppp", "vlan", "bridge", "virtual", "wlan", "cellular", "aux", "tunnel", "status", "summary", "all"
	• This name cannot begin with one of the follows either:
	"ge", "ppp", "vlan", "wlan-", "br", "cellular", "aux", "tunnel".

`interface-rename` *`old_user_defined_name`* *`new_user_defined_name`*	Modifies the user-defined name of a PPP or an Ethernet interface.

14.2.1.1 Basic Interface Properties Command Examples

The following commands make Ethernet interface ge1 a DHCP client.

```
Router# configure terminal
Router(config)# interface ge1
Router(config-if)# ip address dhcp
Router(config-if)# exit
```

This example shows how to modify the name of interface ge4 to “VIP”. First you have to check the interface system name (ge4 in this example) on the Zyxel Device. Then change the name and display the result.

```
Router> show interface-name
No.  System Name     User Defined Name
===========================================================================
1    ge1             ge1
2    ge2             ge2
3    ge3             ge3
4    ge4             ge4
5    ge5             ge5
Router> configure terminal
Router(config)# interface-name ge4 VIP
Router(config)# show interface-name
No.  System Name     User Defined Name
===========================================================================
1    ge1             ge1
2    ge2             ge2
3    ge3             ge3
4    ge4             VIP
5    ge5             ge5
Router(config)#
```

This example shows how to change the user defined name from VIP to Partner. Note that you have to use the “interface-rename” command if you do not know the system name of the interface. To use the “interface-name” command, you have to find out the corresponding system name first (ge4 in this example). This example also shows how to change the user defined name from Partner to Customer using the “interface-name” command.

```
Router(config)# interface-rename VIP Partner
Router(config)# show interface-name
No.  System Name     User Defined Name
===========================================================================
1    ge1             ge1
2    ge2             ge2
3    ge3             ge3
4    ge4             Partner
5    ge5             ge5
Router(config)#
Router(config)# interface-name ge4 Customer
Router(config)# show interface-name
No.  System Name     User Defined Name
===========================================================================
1    ge1             ge1
2    ge2             ge2
3    ge3             ge3
4    ge4             Customer
5    ge5             ge5
```

This example shows how to restart an interface. You can check all interface names on the Zyxel Device. Then use either the system name or user-defined name of an interface (ge4 or Customer in this example) to restart it.

```
Router> show interface-name
No.  System Name     User Defined Name
===========================================================================
1    ge1             ge1
2    ge2             ge2
3    ge3             ge3
4    ge4             Customer
5    ge5             ge5
Router> configure terminal
Router(config)# interface reset ge4
Router(config)# interface reset Customer
Router(config)#
```

14.2.2 IGMP Proxy Commands

Internet Group Management Protocol (IGMP) proxy is used for multicast routing. IGMP proxy enables the Zyxel Device to issue IGMP host messages on behalf of hosts that the Zyxel Device discovered on its IGMP-enabled interfaces. The Zyxel Device acts as a proxy for its hosts.

Enter configuration terminal mode and select an interface

Table 42 `interface` Commands: IGMP Proxy Commands

COMMAND	DESCRIPTION
`[no]igmp activate`	Enables IGMP proxy on this interface. The `no` command disables IGMP proxy on this interface.
`igmp direction`	Sets the direction for IGMP proxy on this interface. • downstream - enable on the interface which connects to the multicast hosts. • upstream - enable on the interface which connects to a router running IGMP that is closer to the multicast server
`igmp version <1..3>`	Sets the IGMP version to be used on this Zyxel Device interface.

14.2.2.1 IGMP Command Example

The following commands activate IGMP version 2 upstream on the lan1 interface.

```
Router> enable
Router#
Router# configure terminal
Router(config)# interface lan1
Router(config-if-lan1)# igmp
activate
direction
version
Router(config-if-lan1)# igmp activate
Router(config-if-lan1)# igmp direction
downstream
upstream
Router(config-if-lan1)# igmp direction upstream
Router(config-if-lan1)# igmp version
<1..3>
Router(config-if-lan1)# igmp version 2
Router(config-if-lan1)#

Router(config-if-lan1)# exit
```

14.2.3 Proxy ARP Commands

Enable Proxy ARP (RFC 1027) to allow the Zyxel Device to answer external interface ARP requests on behalf of a device on its internal interface. Interfaces supported are:

- Ethernet
- VLAN
- Bridge

Enter configuration terminal mode and select an interface

Table 43 `interface` Commands: Proxy ARP Commands

COMMAND	DESCRIPTION
`[no] ip proxy-arp activate`	Enables proxy ARP on this interface. The `no` command disables proxy ARP on this interface.
`[no] ip proxy-arp {`*`ipv4`*` | `*`ipv4_range`*` | `*`ipv4_cidr`*`}`	Sets the proxy ARP target IP address, IP address range or IP address subnet on this interface. *`ipv4`*: IPv4 address <W.X.Y.Z> *`ipv4_range:`* Range of IPv4 addresses <W.X.Y.Z>-<W.X.Y.Z> *`ipv4_cidr:`* IPv4 subnet in CIDR format, i.e. 192.168.1.0/32 <W.X.Y.Z>/<1..32> The Zyxel Device answers external ARP requests only if they match one of these inputted target IP addresses. For example, if *`ipv4`* is 192.168.1.5, then the Zyxel Device will answer ARP requests coming from the WAN only if it contains 192.168.1.5 as the target IP address. The `no` command disables the proxy ARP target IP address, IP address range or IP address subnet on this interface.
`show interface `*`interface_name`*` proxy-arp address`	Displays the proxy ARP target IP address, IP address range or IP address subnet on the named interface.
`show interface `*`interface_name`*` proxy-arp status`	Displays if proxy ARP is enabled on the named interface.

14.2.3.1 Proxy ARP Command Example

The following commands activate proxy ARP on the lan1 interface.

```
Router(config)# interface lan1
Router(config-if-lan1)# ip proxy-arp activate
Router(config-if-lan1)# ip proxy-arp 192.168.1.5
Router(config-if-lan1)# exit
Router(config)# show interface lan1 proxy-arp status
Proxy ARP status: yes
Router(config)# show interface lan1 proxy-arp address
No. IP Address
===============================================================================
1   192.168.1.5
Router(config)#
```

14.2.4 DHCP Setting Commands

This table lists DHCP setting commands. DHCP is based on DHCP pools. Create a DHCP pool if you want to assign a static IP address to a MAC address or if you want to specify the starting IP address and pool size of a range of IP addresses that can be assigned to DHCP clients. There are different commands for each configuration. Afterwards, in either case, you have to bind the DHCP pool to the interface.

Table 44 `interface` Commands: DHCP Settings

COMMAND	DESCRIPTION
`show ip dhcp dhcp-options`	Shows the DHCP extended option settings.
`show ip dhcp pool [profile_name]`	Shows information about the specified DHCP pool or about all DHCP pools.
`show ip dhcp pool profile_name dhcp-options`	Shows the specified DHCP pool's DHCP extended option settings.
`ip dhcp pool rename profile_name profile_name`	Renames the specified DHCP pool from the first *profile_name* to the second *profile_name*.
`[no] ip dhcp pool profile_name`	Creates a DHCP pool if necessary and enters sub-command mode. You can use the DHCP pool to create a static entry or to set up a range of IP addresses to assign dynamically. About the sub-command settings: • If you use the `host` command, the Zyxel Device treats this DHCP pool as a static DHCP entry. • If you do not use the `host` command and use the `network` command, the Zyxel Device treats this DHCP pool as a pool of IP addresses. • If you do not use the `host` command or the `network` command, the DHCP pool is not properly configured and cannot be bound to any interface. The `no` command removes the specified DHCP pool.
`show`	Shows information about the specified DHCP pool.
	Use the following commands to create a static DHCP entry. If you do not use the `host` command, the commands that are not in this section have no effect, but you can still set them.
`[no] host ip`	Specifies the static IP address the Zyxel Device should assign. Use this command, along with `hardware-address`, to create a static DHCP entry. Note: The IP address must be in the same subnet as the interface to which you plan to bind the DHCP pool. When this command is used, the Zyxel Device treats this DHCP pool like a static entry, regardless of the `network` setting. The `no` command clears this field.
`[no] hardware-address mac_address`	Reserves the DHCP pool for the specified MAC address. Use this command, along with `host`, to create a static DHCP entry. The `no` command clears this field.
`[no] client-identifier mac_address`	Specifies the MAC address that appears in the DHCP client list. The `no` command clears this field.
`[no] client-name host_name`	Specifies the host name that appears in the DHCP client list. The `no` command clears this field. *host_name*: You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
	Use the following commands to create a pool of IP addresses. These commands have no effect if you use the `host` command. You can still set them, however.

Table 44 interface Commands: DHCP Settings (continued)

COMMAND	DESCRIPTION
dhcp-option <1..254> *option_name* {boolean <0..1>| uint8 <0..255> | uint16 <0..65535> | uint32 <0..4294967295> | ip *ipv4* [*ipv4* [*ipv4*]] | fqdn *fqdn* [*fqdn* [*fqdn*]] | text *text* | hex *hex* | vivc *enterprise_id hex_s* [*enterprise_id hex_s*] | vivs *enterprise_id hex_s* [*enterprise_id hex_s*]	Adds or edits a DHCP extended option for the specified DHCP pool. *text*: String of up to 250 characters *hex*: String of up to 250 hexadecimal pairs. *vivc*: Vendor-Identifying Vendor Class option. A DHCP client may use this option to unambiguously identify the vendor that manufactured the hardware on which the client is running, the software in use, or an industry consortium to which the vendor belongs. *enterprise_id*: Number <0..4294967295>. *hex_s*: String of up to 120 hexadecimal pairs. *vivs*: Vendor-Identifying Vendor-Specific option. DHCP clients and servers may use this option to exchange vendor-specific information.
no dhcp-option <1..254>	Removes the DHCP extended option for the specified DHCP pool.
network IP/<1..32> network *ip mask* no network	Specifies the IP address and subnet mask of the specified DHCP pool. The subnet mask can be written in w.x.y.z format or in /<1..32> format. Note: The DHCP pool must have the same subnet as the interface to which you plan to bind it. The no command clears these fields.
[no] default-router *ip*	Specifies the default gateway DHCP clients should use. The no command clears this field.
[no] description *description*	Specifies a description for the DHCP pool for identification. The no command removes the description.
[no] domain-name *domain_name*	Specifies the domain name assigned to DHCP clients. The no command clears this field.
[no] starting-address *ip* -size <1..65535>	Sets the IP start address and maximum pool size of the specified DHCP pool. The final pool size is limited by the subnet mask. Note: You must specify the network number first, and the start address must be in the same subnet. The no command clears the IP start address and maximum pool size.
[no] first-dns-server {*ip* | *interface_name* {1st-dns | 2nd-dns | 3rd-dns} | ZyWALL}	Sets the first DNS server to the specified IP address, the specified interface's first, second, or third DNS server, or the Zyxel Device itself. The no command resets the setting to its default value.
[no] second-dns-server {*ip* | *interface_name* {1st-dns | 2nd-dns | 3rd-dns} | ZyWALL}	Sets the second DNS server to the specified IP address, the specified interface's first, second, or third DNS server, or the Zyxel Device itself. The no command resets the setting to its default value.
[no] third-dns-server {*ip* | *interface_name* {1st-dns | 2nd-dns | 3rd-dns} | ZyWALL}	Sets the third DNS server to the specified IP address, the specified interface's first, second, or third DNS server, or the Zyxel Device itself. The no command resets the setting to its default value.
[no] first-wins-server *ip*	Specifies the first WINS server IP address to assign to the remote users. The no command removes the setting.

Table 44 `interface` Commands: DHCP Settings (continued)

COMMAND	DESCRIPTION
`[no] second-wins-server` *`ip`*	Specifies the second WINS server IP address to assign to the remote users. The `no` command removes the setting.
`[no] lease {<0..365> [<0..23> [<0..59>]] | infinite}`	Sets the lease time to the specified number of days, hours, and minutes or makes the lease time infinite. The `no` command resets the first DNS server setting to its default value.
`(no) bootp-server <`*`w.x.y.z`*`>`	Sets the PXE (Preboot eXecution Environment) server public IPv4 address. PXE is available for computers on internal interfaces to allow them to boot up using boot software on a PXE server. The Zyxel Device acts as an intermediary between the PXE server and the computers that need boot software. You must enable DHCP Server on the Zyxel Device so that it can receive information from the PXE server.
`(no) bootfile-name <`*`filename`*`>`	Sets the file name and extension of the boot loader software file (a computer program that loads the operating system for the computer) that is on the PXE server. If the wrong filename is typed, then the client computers cannot boot.
`interface` *`interface_name`*	Enters sub-command mode.
`[no] ip dhcp-pool` *`profile_name`*	Binds the specified interface to the specified DHCP pool. You have to remove any DHCP relays first. The `no` command removes the binding.
`[no] ip helper-address` *`ip`*	Creates the specified DHCP relay. You have to remove the DHCP pool first, if the DHCP pool is bound to the specified interface. The `no` command removes the specified DHCP relay.
`release dhcp` *`interface-name`*	Releases the TCP/IP configuration of the specified interface. The interface must be a DHCP client. This command is available in privilege mode, not configuration mode.
`renew dhcp` *`interface-name`*	Renews the TCP/IP configuration of the specified interface. The interface must be a DHCP client. This command is available in privilege mode, not configuration mode.
`show ip dhcp binding [`*`ip`*`]`	Displays information about DHCP bindings for the specified IP address or for all IP addresses.
`clear ip dhcp binding {`*`ip`*` | *}`	Removes the DHCP bindings for the specified IP address or for all IP addresses.

14.2.4.1 DHCP Setting Command Examples

The following example uses these commands to configure DHCP DHCP_TEST.

```
Router# configure terminal
Router(config)# ip dhcp  DHCP_TEST
Router(config-ip-dhcp-)#  network 192.168.1.0 /24
Router(config-ip-dhcp-)#  domain-name zyxel.com
Router(config-ip-dhcp-)#  first-dns-server 10.1.5.1
Router(config-ip-dhcp-)#  second-dns-server ge1 1st-dns
Router(config-ip-dhcp-)#  third-dns-server 10.1.5.2
Router(config-ip-dhcp-)#  default-router 192.168.1.1
Router(config-ip-dhcp-)#  lease 0 1 30
Router(config-ip-dhcp-)#  starting-address 192.168.1.10 -size 30
Router(config-ip-dhcp-)#  hardware-address 00:0F:20:74:B8:18
Router(config-ip-dhcp-)#  client-identifier 00:0F:20:74:B8:18
Router(config-ip-dhcp-)#  client-name TWtester1
Router(config-ip-dhcp-)# exit
Router(config)#  interface ge1
Router(config-if)# ip dhcp- DHCP_TEST
Router(config-if)# exit
Router(config)# show ip dhcp server status
binding interface : ge1
  binding     : DHCP_TEST
```

14.2.4.2 DHCP Extended Option Setting Command Example

The following example configures the DHCP_TEST with a SIP server (code 120) extended DHCP option with one IP address to provide to the SIP clients.

```
Router# configure terminal
Router(config)# ip dhcp  DHCP_TEST
Router(config-ip-dhcp-)#  dhcp-option 120 sip ip 192.168.1.20
Router(config-ip-dhcp-)# exit
```

14.2.5 Interface Parameter Command Examples

This table shows an example of each interface type's sub-commands. The sub-commands vary for different interface types.

Table 45 Examples for Different Interface Parameters

ETHERNET	VIRTUAL INTERFACE	PPPOE/PPTP
Router(config)# interface wan1 Router(config-if-wan1)# description downstream exit igmp intra-link ip ipv6 mac mss mtu no ping-check shutdown traffic-prioritize type upstream use-defined-mac	Router(config)# interface wan1:1 Router(config-if-vir)# description downstream exit ip no shutdown upstream	Router(config)# interface wan1_ppp Router(config-if-ppp)# account bind connectivity description downstream exit holdoff ipv6 local-address metric mss mtu no ping-check remote-address shutdown traffic-prioritize upstream
CELLULAR	**VLAN**	**BRIDGE**
Router(config)# interface cellular1 Router(config-if-cellular)# account band budget connectivity description device downstream encrypted-pin exit local-address metric mtu network-selection no pin ping-check remote-address shutdown traffic-prioritize upstream	Router(config)# interface vlan1 Router(config-if-vlan)# description downstream exit igmp intra-link ip ipv6 mac mss mtu no ping-check port priority-code shutdown traffic-prioritize type upstream use-defined-mac vlan-id	Router(config)# interface br0 Router(config-if-brg)# description downstream exit igmp intra-link ip ipv6 join mss mtu no ping-check shutdown traffic-prioritize type upstream

Table 45 Examples for Different Interface Parameters (continued)

TUNNEL	VTI	LAG
downstream exit ip ipv6 metric mtu no ping-check shutdown traffic-prioritize tunnel upstream	downstream exit ip metric no ping-check shutdown traffic-prioritize upstream	arp-interval arp-ip-target description downdelay downstream exit igmp intra-link ip ipv6 lacp-rate link-monitoring miimon mode mss mtu no ping-check primary shutdown slave traffic-prioritize type updelay upstream xmit-hash-policy

14.2.6 RIP Commands

This table lists the commands for RIP settings.

Table 46 `interface` Commands: RIP Settings

COMMAND	DESCRIPTION
`router rip`	Enters sub-command mode.
`[no] network` *`interface_name`*	Enables RIP for the specified interface. The `no` command disables RIP for the specified interface.
`[no] passive-interface` *`interface_name`*	Sets the RIP direction of the specified interface to in-only. The `no` command makes RIP bi-directional in the specified interface.
`[no] outonly-interface` *`interface_name`*	Sets the RIP direction of the specified interface to out-only. The `no` command makes RIP bi-directional in the specified interface.
`interface` *`interface_name`*	Enters sub-command mode.
`[no] ip rip {send | receive} version <1..2>`	Sets the send or receive version to the specified version number. The `no` command sets the send or received version to the current global setting for RIP. See Chapter 17 on page 155 for more information about routing protocols.
`[no] ip rip v2-broadcast`	Enables RIP-2 packets using subnet broadcasting. The `no` command uses multi-casting.
`show rip {global | interface {all |` *`interface_name`*`}}`	Displays RIP settings.

14.2.7 OSPF Commands

This table lists the commands for OSPF settings.

Table 47 `interface` Commands: OSPF Settings

COMMAND	DESCRIPTION
`router ospf`	Enters sub-command mode.
`[no] network` *`interface_name`* `area` *`ip`*	Makes the specified interface part of the specified area. The `no` command removes the specified interface from the specified area, disabling OSPF in this interface.
`[no] passive-interface` *`interface_name`*	Sets the OSPF direction of the specified interface to in-only. The `no` command makes OSPF bi-directional in the specified interface.
`interface` *`interface_name`*	Enters sub-command mode.
`[no] ip ospf priority <0..255>`	Sets the priority of the specified interface to the specified value. The `no` command sets the priority to 1.
`[no] ip ospf cost <1..65535>`	Sets the cost to route packets through the specified interface. The `no` command sets the cost to 10.
`no ip ospf authentication`	Disables authentication for OSPF in the specified interface.
`ip ospf authentication`	Enables text authentication for OSPF in the specified interface.
`ip ospf authentication message-digest`	Enables MD5 authentication for OSPF in the specified interface.
`ip ospf authentication same-as-area`	To exchange OSPF routing information with peer border routers, you must use the same authentication method that they use. This command makes OSPF authentication in the specified interface follow the settings in the corresponding area.
`[no] ip ospf authentication-key` *`password`*	Sets the simple text password for OSPF text authentication in the specified interface. The `no` command clears the text password. *`password`*: 1-8 alphanumeric characters or underscores
`ip ospf message-digest-key <1..255> md5` *`password`*	Sets the ID and password for OSPF MD5 authentication in the specified interface. *`password`*: 1-16 alphanumeric characters or underscores
`no ip ospf message-digest-key`	Clears the ID and password for OSPF MD5 authentication in the specified interface.
`[no] ip ospf hello-interval <1..65535>`	Sets the number of seconds between “hello” messages to peer routers. These messages let peer routers know the Zyxel Device is available. The `no` command sets the number of seconds to 10. See `ip ospf dead-interval` for more information.
`[no] ip ospf dead-interval <1..65535>`	Sets the number of seconds the Zyxel Device waits for “hello” messages from peer routers before it assumes the peer router is not available and deletes associated routing information. The `no` command sets the number of seconds to 40. See `ip ospf hello-interval` for more information.
`[no] ip ospf retransmit-interval <1..65535>`	Sets the number of seconds the Zyxel Device waits for an acknowledgment in response to a link state advertisement before it re-sends the advertisement. Link state advertisements (LSA) are used to share the link state and routing information between routers.

14.2.8 Connectivity Check (Ping-check) Commands

Use these commands to have an interface regularly check the connection to the gateway you specified to make sure it is still available. You specify how often the interface checks the connection, how long to wait for a response before the attempt is a failure, and how many consecutive failures are required before the Zyxel Device stops routing to the gateway. The Zyxel Device resumes routing to the gateway the first time the gateway passes the connectivity check.

This table lists the `ping-check` commands

Table 48 `interface` Commands: Ping Check

COMMAND	DESCRIPTION
`show ping-check [`*`interface_name`*` | status]`	Displays information about ping check settings for the specified interface or for all interfaces. `status`: displays the current connectivity check status for any interfaces upon which it is activated.
`[no] connectivity-check continuous-log activate`	Use this command to have the Zyxel Device log connectivity check result continuously. The `no` command disables the setting.
`show connectivity-check continuous-log status`	Displays the continuous log setting about connectivity check.
`interface` *`interface_name`*	Enters sub-command mode.
`[no] ping-check activate`	Enables ping check for the specified interface. The no command disables ping check for the specified interface.
`ping-check {`*`domain_name`*` | `*`ip`*` | default-gateway}`	Specifies what the Zyxel Device pings for the ping check; you can specify a fully-qualified domain name, IP address, or the default gateway for the interface.
`ping-check {`*`domain_name`*` | `*`ip`*` | default-gateway} period <5..30>`	Specifies what the Zyxel Device pings for the ping check and sets the number of seconds between each ping check.
`ping-check {`*`domain_name`*` | `*`ip`*` | default-gateway} timeout <1..10>`	Specifies what the Zyxel Device pings for the ping check and sets the number of seconds the Zyxel Device waits for a response.
`ping-check {`*`domain_name`*` | `*`ip`*` | default-gateway} fail-tolerance <1..10>`	Specifies what the Zyxel Device pings for the ping check and sets the number of times the Zyxel Device times out before it stops routing through the specified interface.
`ping-check {`*`domain_name`*` | `*`ip`*` | default-gateway} method {icmp | tcp}`	Sets how the Zyxel Device checks the connection to the gateway. `icmp`: ping the gateway you specify to make sure it is still available. `tcp`: perform a TCP handshake with the gateway you specify to make sure it is still available.
`ping-check {`*`domain_name`*` | `*`ip`*` | default-gateway} port <1..65535>`	Specifies the port number to use for a TCP connectivity check.

14.2.8.1 Connectivity Check Command Example

The following commands show you how to set the WAN1 interface to use a TCP handshake on port 8080 to check the connection to IP address 1.1.1.2

```
Router# configure terminal
Router(config)# interface wan1
Router(config-if-wan1)# ping-check 1.1.1.2 method tcp port 8080
Router(config-if-wan1)# exit
Router(config)# show ping-check
Interface: wan1
Check Method: tcp
IP Address: 1.1.1.2
Period: 30
Timeout: 5
Fail Tolerance: 5
Activate: yes
Port: 8080
Router(config)#
```

14.3 Ethernet Interface Specific Commands

This section covers commands that are specific to Ethernet interfaces.

The following table identifies the values required for many of these commands. Other input values are discussed with the corresponding commands.

Table 49 Input Values for Ethernet Interface Commands

LABEL	DESCRIPTION
interface_name	The name of the Ethernet interface. This depends on the Zyxel Device model. For some Zyxel Device models, use gex, *x* = 1~N, where N equals the highest numbered Ethernet interface for your Zyxel Device model. For other Zyxel Device models use a name such as wan1, wan2, opt, lan1, ext-wlan, or dmz.

14.3.1 MAC Address Setting Commands

This table lists the commands you can use to set the MAC address of an interface. On some Zyxel Device models, these commands only apply to a WAN or OPT interface.

Table 50 `interface` Commands: MAC Setting

COMMAND	DESCRIPTION
`interface` *interface_name*	Enters sub-command mode.
`no mac`	Has the interface use its default MAC address.
`mac` *mac*	Specifies the MAC address the interface is to use.

Table 50 `interface` Commands: MAC Setting (continued)

COMMAND	DESCRIPTION
`type {internal | external | general}`	Sets which type of network you will connect this interface. The Zyxel Device automatically adds default route and SNAT settings for traffic it routes from internal interfaces to external interfaces; for example LAN to WAN traffic. `internal`: Set this to connect to a local network. Other corresponding configuration options: DHCP server and DHCP relay. The Zyxel Device automatically adds default SNAT settings for traffic flowing from this interface to an external interface. `external`: Set this to connect to an external network (like the Internet). The Zyxel Device automatically adds this interface to the default WAN trunk. `general`: Set this if you want to manually configure a policy route to add routing and SNAT settings for the interface.
`no use-defined-mac`	Has the interface use its default MAC address.
`use-defined-mac`	Has the interface use a MAC address that you specify.

14.3.2 Port Grouping Commands

This section covers commands that are specific to port grouping.

Note: In CLI, representative interfaces are also called representative ports.

Table 51 Basic Interface Setting Commands

COMMAND	DESCRIPTION
`show port-grouping`	Displays which physical ports are assigned to each representative interface.
`port status Port<1..x>`	Enters a sub-command mode to configure the specified port's settings.
`[no] duplex <full | half>`	Sets the port's duplex mode. The no command returns the default setting.
`exit`	Leaves the sub-command mode.
`[no] speed <100,10>`	Sets the Ethernet port's connection speed in Mbps. The no command returns the default setting.
`show port setting`	Displays the Ethernet port negotiation, duplex, and speed settings.
`show port status`	Displays statistics for the Ethernet ports.
`show port statistic portx interval <5..3600>`	Displays the specified port's statistics and updates them according to the interval you set.

14.3.2.1 Port Grouping Command Examples

The following commands add physical port 7 to representative interface lan2.

```
Router# configure terminal
Router(config)# show port-grouping
No. Representative Name  Port1 Port2 Port3 Port4 Port5 Port6 Port7
===============================================================================
1   wan1                 yes   no    no    no    no    no    no
2   wan2                 no    yes   no    no    no    no    no
3   opt                  no    no    yes   no    no    no    no
4   lan1                 no    no    no    yes   yes   yes   no
5   lan2                 no    no    no    no    no    no    no
6   reserved             no    no    no    no    no    no    no
7   dmz                  no    no    no    no    no    no    yes
Router(config)#
Router(config)# port-grouping lan2
Router(config-port-grouping)# port 7
Router(config-port-grouping)# exit
Router(config)# show port-grouping
No. Representative Name  Port1 Port2 Port3 Port4 Port5 Port6 Port7
===============================================================================
1   wan1                 yes   no    no    no    no    no    no
2   wan2                 no    yes   no    no    no    no    no
3   opt                  no    no    yes   no    no    no    no
4   lan1                 no    no    no    yes   yes   yes   no
5   lan2                 no    no    no    no    no    no    yes
6   reserved             no    no    no    no    no    no    no
7   dmz                  no    no    no    no    no    no    no
Router(config)#
```

The following commands set port 1 to use auto-negotiation auto and port 2 to use a 10 Mbps connection speed and half duplex.

```
Router(config)# port status Port1
Router(config-port-status)# negotiation auto
Router(config-port-status)# exit
Router(config)# port status Port2
Router(config-port-status)# duplex half
Router(config-port-status)# speed 10
Router(config-port-status)# exit
Router(config)# exit
```

14.4 Virtual Interface Specific Commands

Virtual interfaces use many of the general interface commands discussed at the beginning of Section 14.2 on page 100. There are no additional commands for virtual interfaces.

14.4.1 Virtual Interface Command Examples

The following commands set up a virtual interface on top of Ethernet interface ge1. The virtual interface is named ge1:1 with the following parameters: IP 1.2.3.4, subnet 255.255.255.0, gateway 4.6.7.8, upstream bandwidth 345, downstream bandwidth 123, and description “I am vir interface”.

```
Router# configure terminal
Router(config)# interface ge1:1
Router(config-if-vir)# ip address 1.2.3.4 255.255.255.0
Router(config-if-vir)# ip gateway 4.6.7.8
Router(config-if-vir)# upstream 345
Router(config-if-vir)# downstream 123
Router(config-if-vir)# description I am vir interface
Router(config-if-vir)# exit
```

14.5 PPPoE/PPTP Specific Commands

This section covers commands that are specific to PPPoE/PPTP interfaces. PPPoE/PPTP interfaces also use many of the general interface commands discussed at the beginning of Section 14.2 on page 100.

The following table identifies the values required for many of these commands. Other input values are discussed with the corresponding commands.

Table 52 Input Values for PPPoE/PPTP Interface Commands

LABEL	DESCRIPTION
interface_name	PPPoE/PPTP interface: ppp*x*, *x* = 0 - N, where N depends on the number of PPPoE/PPTP interfaces your Zyxel Device model supports.
profile_name	The name of the ISP account. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.

This table lists the PPPoE/PPTP interface commands.

Table 53 `interface` Commands: PPPoE/PPTP Interfaces

COMMAND	DESCRIPTION
`interface dial` *interface_name*	Connects the specified PPPoE/PPTP interface.
`interface disconnect` *interface_name*	Disconnects the specified PPPoE/PPTP interface.
`interface` *interface_name*	Creates the specified interface if necessary and enters sub-command mode.
`[no] account` *profile_name*	Specifies the ISP account for the specified PPPoE/PPTP interface. The `no` command clears the ISP account field.
`[no] bind` *interface_name*	Specifies the base interface for the PPPoE/PPTP interface. The `no` command removes the base interface.
`[no] connectivity {nail-up | dial-on-demand}`	Specifies whether the specified PPPoE/PPTP interface is always connected (nail-up) or connected only when used (dial-on-demand). The `no` command sets it to dial-on-demand.
`[no] local-address` *ip*	Specifies a static IP address for the specified PPPoE/PPTP interface. The `no` command makes the PPPoE/PPTP interface a DHCP client; the other computer assigns the IP address.

Table 53 `interface` Commands: PPPoE/PPTP Interfaces (continued)

COMMAND	DESCRIPTION
`[no] remote-address` *`ip`*	Specifies the IP address of the PPPoE/PPTP server. If the PPPoE/PPTP server is not available at this IP address, no connection is made. The `no` command lets the Zyxel Device get the IP address of the PPPoE/PPTP server automatically when it establishes the connection.
`[no] mss <536..1452>`	Specifies the maximum segment size (MSS) the interface can use. MSS is the largest amount of data, specified in bytes, that the interface can handle in a single, unfragmented piece. The `no` command has the Zyxel Device use its default MSS setting.
`mtu <576..1492>`	Sets the Maximum Transmission Unit in bytes.
`[no] ipv6 enable`	Turns on the IPv6 interface. The `no` command turns it off.
`[no] ipv6 nd ra accept`	Sets the IPv6 interface to accept IPv6 neighbor discovery router advertisement messages. The `no` command sets the IPv6 interface to discard IPv6 neighbor discovery router advertisement messages.
`[no] ipv6 metric <0..15>`	Sets the interface's metric for IPv6 traffic. The `no` command clears it.
`[no] ipv6 address` *`dhcp6_profile dhcp6_suffix_128`*	Has the Zyxel Device obtain an IPv6 prefix from the ISP or a connected uplink router for an internal network, such as the LAN or DMZ. The `no` command removes the specified setting for using a delegated prefix as the beginning part of the network prefix. *`dhcp6_profile`*: Specify the DHCPv6 request object to use. *`dhcp6_suffix_128`*: Specify the ending part of the IPv6 address, a slash (/), and the prefix length. The Zyxel Device appends it to the delegated prefix. For example, you got a delegated prefix of 2003:1234:5678/48. You want to configure an IP address of 2003:1234:5678:1111::1/128 for this interface, then enter ::1111:0:0:0:1/128 for the *`dhcp6_suffix_128`*.
`ipv6 dhcp6 [client]`	Sets the IPv6 interface to be a DHCPv6 client.
`[no] ipv6 dhcp6 rapid-commit`	Shortens the DHCPv6 message exchange process from four to two steps to help reduce network traffic. The `no` command sets the full four-step DHCPv6 message exchange process.
`[no] ipv6 dhcp6 address-request`	Get this interface's IPv6 address from the DHCPv6 server. The `no` command has the Zyxel Device not get this interface's IPv6 address from the DHCPv6 server.
`ipv6 dhcp6 duid {` *`duid`* `| mac }`	Specify the DHCP Unique IDentifier (DUID) of the interface or have it generated from the interface's default MAC address.
`[no] ipv6 dhcp6-request-object` *`dhcp6_profile`*	For a DHCPv6 client interface, specify the profile of DHCPv6 request settings that determine what additional information to get from the DHCPv6 server. The `no` command removes the DHCPv6 request settings profile.
`show interface ppp system-default`	Displays system default PPP interfaces (non-deletable) that come with the Zyxel Device.
`show interface ppp user-define`	Displays all PPP interfaces that were manually configured on the Zyxel Device.

14.5.1 PPPoE/PPTP Interface Command Examples

The following commands show you how to configure PPPoE/PPTP interface ppp0 with the following characteristics: base interface ge1, ISP account **Hinet**, local address 1.1.1.1, remote address 2.2.2.2, MTU

1200, upstream bandwidth 345, downstream bandwidth 123, description “I am ppp0”, and dialed only when used.

```
Router# configure terminal
Router(config)# interface ppp0
Router(config-if-ppp)# account Hinet
Router(config-if-ppp)# bind ge1
Router(config-if-ppp)# local-address 1.1.1.1
Router(config-if-ppp)# remote-address 2.2.2.2
Router(config-if-ppp)# mtu 1200
Router(config-if-ppp)# upstream 345
Router(config-if-ppp)# downstream 123
Router(config-if-ppp)# connectivity dial-on-demand
Router(config-if-ppp)# description I am ppp0
Router(config-if-ppp)# exit
```

The following commands show you how to connect and disconnect ppp0.

```
Router# interface dial ppp0
Router# interface disconnect ppp0
```

14.6 Cellular Interface Specific Commands

Use a 3G (Third Generation) cellular device with the Zyxel Device for wireless broadband Internet access.

Use these commands to add, edit, dial, disconnect, or delete cellular interfaces. When you add a new cellular interface, make sure you enter the account. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 54 `Interface` Cellular Commands

COMMAND	DESCRIPTION
`[no] interface` *`interface_name`*	Creates the specified interface if necessary and enters sub-command mode. The `no` command deletes the specified interface.
`account` *`profile_name`*	Specifies the ISP account for the specified cellular interface.
`[no] band {auto|wcdma|gsm|lte}`	Sets (or clears) the cellular band that the cellular interface uses. `auto` has the Zyxel Device always use the fastest network that is in range. `gsm` has this interface only use a 2.5G or 2.75G network (respectively). If you only have a GSM network available to you, you may want to use this so the Zyxel Device does not spend time looking for a WCDMA network. `wcdma` has this interface only use a 3G or 3.5G network (respectively). You may want to use this if you want to make sure the interface does not use the GSM network. `lte` has this interface only use a 4G LTE network. This option only appears when a USG dongle for 4G technology is inserted.

Table 54 Interface Cellular Commands (continued)

COMMAND	DESCRIPTION
`[no] network-selection {auto|home}`	Home network is the network to which you are originally subscribed. Home has the 3G device connect only to the home network. If the home network is down, the Zyxel Device's 3G Internet connection is also unavailable. Auto is the default setting and allows the 3G device to connect to a network to which you are not subscribed when necessary, for example when the home network is down or another 3G base station's signal is stronger. This is recommended if you need continuous Internet connectivity. If you select this, you may be charged using the rate of a different network.
`[no] budget active`	Sets a monthly limit for the user account of the installed 3G card. You can set a limit on the total traffic and/or call time. The Zyxel Device takes the actions you specified when a limit is exceeded during the month. Use the no command to disable budget control.
`[no] budget time active <1..672>`	Sets the amount of time (in hours) that the 3G connection can be used within one month. If you change the value, the Zyxel Device resets the statistics. Use the no command to disable time budget control.
`[no] budget data active {download-upload|download|upload} <1..100000>`	Sets how much downstream and/or upstream data (in Mega bytes) can be transmitted via the 3G connection within one month. download: set a limit on the downstream traffic (from the ISP to the Zyxel Device). upload: set a limit on the upstream traffic (from the Zyxel Device to the ISP). download-upload: set a limit on the total traffic in both directions. If you change the value, the Zyxel Device resets the statistics. Use the no command to disable data budget control.
`budget reset-day <0..31>`	Sets the date on which the Zyxel Device resets the budget every month. If the date you selected is not available in a month, such as 30th or 31st, the Zyxel Device resets the budget on the last day of the month.
`budget reset-counters`	Resets the time and data budgets immediately. The count starts over with the 3G connection's full configured monthly time and data budgets. This does not affect the normal monthly budget restart.
`budget {log|log-alert}[recursive <1..65535>]`	Sets the Zyxel Device to create a log (log) or an alert log (log-alert) when the time or data limit is exceeded. You can also specify how often (from 1 to 65535 minutes) to generate a log or an alert.
`no budget log`	Sets the Zyxel Device to not create a log when the time or data limit is exceeded.
`budget new-connection {allow|disallow}`	Sets to permit (allow) or drop/block (disallow) new 3G connections when the time or data limit is exceeded.
`budget current-connection {keep|drop}`	Sets to maintain the existing 3G connection (keep) or disconnect it (drop) when the time or data limit is exceeded. You cannot set budget new-connection to allow and budget current-connection to drop at the same time. If you set budget new-connection to disallow and budget current-connection to keep, the Zyxel Device allows you to transmit data using the current connection, but you cannot build a new connection if the existing connection is disconnected.

Table 54 Interface Cellular Commands (continued)

COMMAND	DESCRIPTION
budget percentage {ptime|pdata} <0..99>	Sets a percentage (0~99) of time budget (ptime) or data (pdata) limit. When the specified limit is exceeded, the Zyxel Device takes the action configured using the budget {log-percentage|log-percentage-alert} command.
budget {log-percentage|log-percentage-alert} [recursive <1..65535>]	Sets to have the Zyxel Device create a log (log-percentage) or an alert log (log-percentage-alert) when the set percentage of time budget or data limit is exceeded. You can configure the percentage using the budget percentage command. You can also set how often (from 1 to 65535 minutes) to send the log or alert.
no budget log-percentage	Sets the Zyxel Device to not create a log when the set percentage of time budget or data limit is exceeded. You can configure the percentage using the budget percentage command.
connectivity {nail-up | dial-on-demand}	Sets the connection to be always on or only when there is traffic.
[no] local-address *<ip>*	Sets (or clears) the cellular interface's local (own) IP address.
mtu <576..1492>	Sets the Maximum Transmission Unit in bytes.
[no] pin *<pin code>*	Sets (or clears) the PIN code for the cellular device's 3G card. Use 1-4 alphanumeric characters, underscores(_), or dashes (-).
[no] remote-address *<ip>*	Sets (or clears) the IP address of the cellular interface's peer (like a gateway or PPPoE server).
interface cellular budget-auto-save <5..1440>	Sets how often (in minutes) the Zyxel Device saves time and data usage records for a connection using the 3G card.
show interface cellular [corresponding-slot|device-status|support-device]	Shows the status of the specified cellular interface.
show interface cellular corresponding-slot	Shows which cellular interface is on which slot and whether which cellular interface has been configured.
show interface cellular device-status	Displays the installed SIM card and 3G card status.
show interface cellular support-device	Displays all 3G card models the Zyxel Device can support.
show interface cellular budget-auto-save	Displays how often (in minutes) the Zyxel Device records time and data usage of your 3G budgets.
show interface cellular status	Displays the traffic statistics and connection status for your cellular interfaces. See Section 14.6.1 on page 125 for all possible cellular status descriptions.
show interface *interface_name* [budget]	Displays the budget control settings for the specified cellular interface.
show interface *interface_name* device status	Displays the 3G card and SIM card information for the specified cellular interface.
show interface *interface_name* device profile	Displays the 3G connection profile settings of the specified cellular interface.

14.6.1 Cellular Status

The following table describes the different kinds of cellular connection status on the Zyxel Device.

Table 55 Cellular Status

STATUS	DESCRIPTION
No device	no 3G device is connected to the Zyxel Device.
No service	no 3G network is available in the area; you cannot connect to the Internet.
Limited service	returned by the service provider in cases where the SIM card is expired, the user failed to pay for the service and so on; you cannot connect to the Internet.
Device detected	displays when you connect a 3G device.
Device error	a 3G device is connected but there is an error.
Probe device fail	the Zyxel Device's test of the 3G device failed.
Probe device ok	the Zyxel Device's test of the 3G device failed.
Init device fail	the Zyxel Device was not able to initialize the 3G device.
Init device ok	the Zyxel Device initialized the 3G card.
Check lock fail	the Zyxel Device's check of whether or not the 3G device is locked failed.
Device locked	the 3G device is locked.
SIM error	there is a SIM card error on the 3G device.
SIM locked-PUK	the PUK is locked on the 3G device's SIM card.
SIM locked-PIN	the PIN is locked on the 3G device's SIM card.
Unlock PUK fail	Your attempt to unlock a WCDMA 3G device's PUK failed because you entered an incorrect PUK.
Unlock PIN fail	Your attempt to unlock a WCDMA 3G device's PIN failed because you entered an incorrect PIN.
Unlock device fail	Your attempt to unlock a CDMA2000 3G device failed because you entered an incorrect device code.
Device unlocked	You entered the correct device code and unlocked a CDMA2000 3G device.
Get dev-info fail	The Zyxel Device cannot get cellular device information.
Get dev-info ok	The Zyxel Device succeeded in retrieving 3G device information.
Searching network	The 3G device is searching for a network.
Get signal fail	The 3G device cannot get a signal from a network.
Network found	The 3G device found a network.
Apply config	The Zyxel Device is applying your configuration to the 3G device.
Device unready	The 3G interface is disabled.
Active	The 3G interface is enabled.
Incorrect device	The connected 3G device is not compatible with the Zyxel Device.
Correct device	The Zyxel Device detected a compatible 3G device.
Set band fail	Applying your band selection was not successful.
Set band ok	The Zyxel Device successfully applied your band selection.
Set profile fail	Applying your ISP settings was not successful.
Set profile ok	The Zyxel Device successfully applied your ISP settings.
PPP fail	The Zyxel Device failed to create a PPP connection for the cellular interface.

Table 55   Cellular Status

STATUS	DESCRIPTION
Need auth-password	You need to enter the password for the 3G card in the cellular edit screen.
Device ready	The Zyxel Device successfully applied all of your configuration and you can use the 3G connection.

14.6.2 Cellular Interface Command Examples

This example shows the configuration of a cellular interface named cellular2 for use with a Sierra Wireless AC850 3G card. It uses only a 3G (or 3.5G) connection, PIN code 1234, an MTU of 1200 bytes, a description of "This is cellular2" and sets the connection to be nailed-up.

```
Router(config)# interface cellular2
Router(config-if-cellular)# device AC850
Router(config-if-cellular)# band wcdma
Router(config-if-cellular)# pin 1234
Router(config-if-cellular)# connectivity nail-up
Router(config-if-cellular)# description This is cellular2
Router(config-if-cellular)# mtu 1200
Router(config-if-cellular)# exit
```

This second example shows specifying a new PIN code of 4567.

```
Router(config)# interface cellular2
Router(config-if-cellular)# pin 4567
Router(config-if-cellular)# exit
```

This example shows the 3G and SIM card information for interface cellular2 on the Zyxel Device.

```
Router(config)# show interface cellular2 device status
interface name: cellular2
extension slot: USB 1
service provider: Chunghwa Telecom
cellular system: WCDMA
signal strength: -95 dBm
signal quality: Poor
device type: WCDMA
device manufacturer: Huawei
device model: E220/E270/E800A
device firmware: 076.11.07.106
device IMEI/ESN: 351827019784694
SIM card IMSI: 466923100565274
```

This example shows the 3G connection profile settings for interface cellular2 on the Zyxel Device. You have to dial *99***1# to use profile 1, but authentication is not required. Dial *99***2# to use profile 2 and authentication is required.

```
Router(config)# show interface cellular2 device profile
profile: 1
apn: internet
dial-string: *99***1#
authentication: none
user: n/a
password: n/a
profile: 2
apn: internet
dial-string: *99***2#
authentication: chap
user:
password: ***
----------------------SNIP!---------------------------------------------------
```

14.7 Tunnel Interface Specific Commands

The Zyxel Device uses tunnel interfaces in Generic Routing Encapsulation (GRE), IPv6 in IPv4, and 6to4 tunnels. This section covers commands specific to tunnel interfaces. Tunnel interfaces also use many of the general interface commands discussed at the beginning of Section 14.2 on page 100.

Use these commands to add, edit, activate, deactivate, or delete tunnel interfaces. You must use the `configure terminal` command to enter the configuration mode before you can use these commands. GRE mode tunnels support ping check. See Section 14.2.8 on page 116 for more on ping check.

Table 56 `interface` Tunnel Commands

COMMAND	DESCRIPTION
`[no] interface` *`tunnel_iface`*	Creates the specified interface if necessary and enters sub-command mode. The `no` command deletes the specified interface. *`tunnel_iface`*: Name of tunnel interface. tunnel([0-3]).
`[no] shutdown`	Deactivates the specified interface. The `no` command activates it.
`tunnel source [`*`ipv4`*`|`*`tunnel_bind_interface`*`|_any ]`	Configures the outer source IP address of the tunneled packets. Specify an IPv4 address or use the IP address of an interface. `_any`: Have automatically select the outer source IP. Not available for ipv6ip mode tunnels.
`tunnel destination` *`ipv4`*	Configures the outer destination IP address of the tunneled IPv4 packets.
`ip address` *`ipv4 ipv4`*	Sets the inner source IP of packets sent through the tunnel interface.
`tunnel mode ip gre`	Sets this interface to use GRE tunnel mode.

Table 56 `interface` Tunnel Commands (continued)

COMMAND	DESCRIPTION
`[no] mtu <576..1480>`	Specifies the Maximum Transmission Unit, which is the maximum number of bytes in each packet moving through this interface. The Zyxel Device divides larger packets into smaller fragments. The `no` command resets the MTU to 1480.
`[no] downstream <0..1048576>`	Specifies the downstream bandwidth for the specified interface. The `no` command sets the downstream bandwidth to 1048576.
`tunnel mode [ipv6ip [manual | 6to4]]]`	Sets the interface to be an IPv6 over IPv4 tunnel. `manual`: Use for a point-to-point manual tunnel for IPv6 transition. You must also configure a policy route for the tunnel. 6to4: Use for a 6to4/6RD automatic tunnel.
`ipv6 address` *`ipv6_addr_prefix`*	Sets an IPv6 address with prefix for the interface.
`ipv6 6to4 [prefix` *`ipv6_addr_prefix`* `| destination-prefix` *`ipv4_cidr`* `| relay` *`ipv4`*`]`	For a 6to4 tunnel, sets the IPv6 address with prefix, remote gateway prefix, or relay router IPv4 address.
`traffic-prioritize {tcp-ack|content-filter|dns} bandwidth <0..1048576> priority <1..7> [maximize-bandwidth-usage];`	Applies traffic priority when the interface sends TCP-ACK traffic, traffic for querying the content filter, or traffic for resolving domain names. It also sets how much bandwidth the traffic can use and can turn on maximize bandwidth usage.
`traffic-prioritize {tcp-ack|content-filter|dns} priority-code <0..7> deactivate`	Turns off traffic priority settings for when the interface sends the specified type of traffic.
`exit`	Leaves the sub-command mode.
`show interface` *`tunnel_iface`*	Displays the specified tunnel's settings.
`show interface tunnel status`	Displays the status of the tunnel interfaces.

14.7.1 Tunnel Interface Command Examples

This example creates a tunnel interface called tunnel0 that uses wan1 as the source, 168.168.168.168 as the destination, and 10.0.0.100 and 255.255.0.0 as the inner source IP.

```
Router> configure terminal
Router(config)# interface tunnel0
Router(config-if-tunnel)# tunnel source wan1
Router(config-if-tunnel)# tunnel destination 168.168.168.168
Router(config-if-tunnel)# ip address 10.0.0.100 255.255.0.0
Router(config-if-tunnel)# exit

Router(config)# show interface tunnel
tunnel interface: 1
  interface name: tunnel0
  local address: ge2
  local address type: bind
  remote address: 168.168.168.168
  mode: gre
  IP address: 10.0.0.100
  netmask: 255.255.0.0
  status: Inactive
  active: no
```

14.8 USB Storage Specific Commands

The Zyxel Device can use a connected USB device to store system logs, diagnostic information and firmware.

Note: The USB device must allow writing (it cannot be read-only) and use the FAT16, FAT32, EXT2, or EXT3 file system.

For Zyxel Devices that have more than one USB port, these commands only apply to the first USB storage device that is attached to the Zyxel Device.

Use these commands to configure settings that apply to the USB storage device connected to the Zyxel Device.

You must be in configuration mode (`configure terminal`) to use the indented commands shown below.

Table 57 USB Storage General Commands

COMMAND	DESCRIPTION
`show usb-storage`	Displays the status of the connected USB storage device.
`[no] usb-storage activate`	Enables or disables the connected USB storage service.
`usb-storage warn` *`number`* `<`*`percentage`*`|megabyte>`	Sets a number and the unit (`percentage` or `megabyte`) to have the Zyxel Device send a warning message when the remaining USB storage space is less than the set value.
`usb-storage mount`	Mounts the connected USB storage device.
`usb-storage umount`	Unmounts the connected USB storage device.

Table 57 USB Storage General Commands (continued)

COMMAND	DESCRIPTION
`[no] logging usb-storage`	Sets to have the Zyxel Device log or not log any information about the connected USB storage device(s) for the system log.
`show logging status usb-storage`	Displays the logging settings for the connected USB storage device.
`logging usb-storage category` *`category`* `level <all|normal>`	Configures the logging settings for the specified category for the connected USB storage device.
`logging usb-storage category` *`category`* `disable`	Stops logging for the specified category to the connected USB storage device.
`logging usb-storage flushThreshold <1..100>`	Configures the maximum storage space (in percentage) for storing system logs on the connected USB storage device.
`[no] diag-info copy usb-storage`	Sets to have the Zyxel Device save or stop saving the current system diagnostics information to the connected USB storage device. You may need to send this file to customer support for troubleshooting.
`show diag-info copy usb-storage`	Displays whether (enable or disable) the Zyxel Device saves the current system diagnostics information to the connected USB storage device.
`[no] corefile copy usb-storage`	Sets to have the Zyxel Device save or not save a process's core dump to the connected USB storage device if the process terminates abnormally (crashes). You may need to send this file to customer support for troubleshooting.
`show corefile copy usb-storage`	Displays whether (enable or disable) the Zyxel Device saves core dump files to the connected USB storage device.

14.8.1 Firmware Upgrade via USB Stick

In addition to uploading firmware via the web configurator (see the User's Guide) or console port, you can also upload firmware directly from a USB stick connected to the Zyxel Device.

1 Create a folder on the USB stick called '/[ProductName_dir]/firmware'. For example, if your Zyxel Device is USG110, then create a '/usg110_dir/firmware/' folder on the stick.

2 Put one firmware 'bin' file into the firmware folder. Make sure the firmware ID and version number are correct for your model (the firmware ID is in brackets after the firmware version number - for USG100 it is AAPH).

Note: Do not put more than one firmware 'bin' file into the firmware folder.

The firmware version in the USB stick must be different to the currently running firmware. If the firmware on the USB stick is older, then the Zyxel Device will 'upgrade' to the older version. It is recommended that the firmware on the USB stick be the latest firmware version.

3 Insert the USB stick into the Zyxel Device. The firmware uploads to the standby system space.

4 The **SYS** LED blinks when the Zyxel Device automatically reboots making the upgraded firmware in standby become the running firmware.

Note: If the **startup-config.conf** configuration file has problems and you are upgrading to 4.25 or later firmware, then the Zyxel Device will revert (failover) to the previously running firmware.

If the **startup-config.conf** configuration file has problems and you are upgrading to earlier than 4.25 firmware, then the Zyxel Device uses the new earlier firmware, but generates a log and tries the existing **lastgood.conf** configuration file. If there isn't a **lastgood.conf** configuration file or it also has an error, the Zyxel Device applies the **system-default.conf** configuration file.

You must be in configuration mode (`configure terminal`) to use the indented commands shown below.

Table 58 USB Firmware Upgrade and Space Commands

COMMAND	DESCRIPTION
`show usb-storage update-firmware status`	Displays if updating firmware from USB storage is allowed.
`show usb-storage space`	Displays USB storage space details. `Criterion Number` is 10~99/100~9999 depending on whether you chose `percentage/megabyte` as the `Criterion Unit` for available USB storage. `Status` displays whether the USB device connected to the Zyxel Device is `none` (no USB device connected) / `Ready` / `Unused` (USB device connected but not in use). `Detail` displays whether the USB device connected to the Zyxel Device is `none` (no USB device connected) / `Removing` (USB device is being unmounted) / `Mounting` (USB device is being mounted / `Deactivated` (USB device is disabled) / `OutOfSpace` ((USB device is full). If both `Status` and `Detail` are `none`, then no USB device is connected. If `Status` is `Ready` and `Detail` is `none`, then a USB device is available.
`show usb-storage space ftp`	Displays total and available FTP space on the RAM memory of the Zyxel Device in /tmp (in bytes). RAM is cleared when the Zyxel Device restarts.
`show usb-storage space tmp`	Displays total and available space on the Flash memory of the Zyxel Device in /db/etc/zyxel/ftp/tmp/ (in bytes).
`show usb-storage space usb`	Displays total size of the system link file and available space of the USB device connected to the Zyxel Device in /mnt/usb.
`[no] usb-storage update-firmware enable`	Enables updating firmware from USB storage. The `no` command disables updating firmware from USB storage.
`usb-storage warn <10..99> percentage`	Sets a warning to display when available USB storage falls below the specified percentage.
`usb-storage warn <100..9999> megabyte`	Sets a warning to display when available USB storage falls below the specified number of megabytes.

14.8.2 USB Storage Commands Example

This example shows how to display the status of the connected USB storage device.

```
Router(config)# usb-storage activate
Router(config)# usb-storage mount
Router(config)# usb-storage update-firmware enable
Router(config)# usb-storage warn 50 percentage
Router# show usb-storage
USBStorage Configuration:
Activation: enable
Criterion Number: 50
Criterion Unit: percentage
USB Storage Status:
Device description: UFD 3.0 Silicon-Power32G
Usage: 28.9GB
Filesystem: unknown
Speed: USB 2.0 480Mbps
Status: Unused
Detail: OutOfSpace

Router# show usb-storage space ftp
Total space: 91384832
Remaining space: 42306560
Router# show usb-storage space tmp
Total space: 516079616
Remaining space: 502071296
Router# show usb-storage space usb
Total space: 5
Remaining space: 0
Router#
```

14.9 VLAN Interface Specific Commands

This section covers commands that are specific to VLAN interfaces. VLAN interfaces also use many of the general interface commands discussed at the beginning of Section 14.2 on page 100.

The following table identifies the values required for many of these commands. Other input values are discussed with the corresponding commands.

Table 59 Input Values for VLAN Interface Commands

LABEL	DESCRIPTION
interface_name	VLAN interface: vlan*x*, *x* = 0 - 4094 Ethernet interface: For some Zyxel Device models, use ge*x*, *x* = 1 - N, where N equals the highest numbered Ethernet interface for your Zyxel Device model. For other Zyxel Devicemodels use a name such as wan1, wan2, opt, lan1, ext-wlan, or dmz.

This table lists the VLAN interface commands.

Table 60 `interface` Commands: VLAN Interfaces

COMMAND	DESCRIPTION
`interface` *`interface_name`*	Creates the specified interface if necessary and enters sub-command mode.
`[no] port` *`interface_name`*	Specifies the Ethernet interface on which the VLAN interface runs. The `no` command clears the port.
`[no] vlan-id <1..4094>`	Specifies the VLAN ID used to identify the VLAN. The `no` command clears the VLAN ID.
`[no] priority-code <0..7.`	Sets the 802.1p priority for vlan outgoing traffic from 0 to 7 where 0 is the lowest priority (lowest, background traffic) and 7 the highest (network control traffic).
`show port vlan-id`	Displays the Ethernet interface VLAN settings.

14.9.1 VLAN Interface Command Examples

The following commands show you how to set up VLAN vlan100 with the following parameters: VLAN ID 100, interface ge1, IP 1.2.3.4, subnet 255.255.255.0, MTU 598, gateway 2.2.2.2, description "I am vlan100", upstream bandwidth 345, and downstream bandwidth 123.

```
Router# configure terminal
Router(config)# interface vlan100
Router(config-if-vlan)# vlan-id 100
Router(config-if-vlan)# port ge1
Router(config-if-vlan)# ip address 1.2.3.4 255.255.255.0
Router(config-if-vlan)# ip gateway 2.2.2.2
Router(config-if-vlan)# mtu 598
Router(config-if-vlan)# upstream 345
Router(config-if-vlan)# downstream 123
Router(config-if-vlan)# description I am vlan100
Router(config-if-vlan)# exit
```

14.10 Bridge Specific Commands

This section covers commands that are specific to bridge interfaces. Bridge interfaces also use many of the general interface commands discussed at the beginning of Section 14.2 on page 100.

The following table identifies the values required for many of these commands. Other input values are discussed with the corresponding commands.

Table 61 Input Values for Bridge Interface Commands

LABEL	DESCRIPTION
`interface_name`	The name of the interface. Ethernet interface: For some Zyxel Device models use ge*x*, *x* = 1 - N, where N equals the highest numbered Ethernet interface for your Zyxel Device model. For other Zyxel Device models use a name such as wan1, wan2, opt, lan1, ext-wlan, or dmz. VLAN interface: vlan*x*, *x* = 0 - 4094 bridge interface: br*x*, *x* = 0 - N, where N depends on the number of bridge interfaces your Zyxel Device model supports.

This table lists the bridge interface commands.

Table 62 `interface` Commands: Bridge Interfaces

COMMAND	DESCRIPTION
`interface` *`interface_name`*	Creates the specified interface if necessary and enters sub-command mode.
`[no] join` *`interface_name`*	Adds the specified Ethernet interface or VLAN interface to the specified bridge. The `no` command removes the specified interface from the specified bridge.
`show bridge available member`	Displays the available interfaces that could be added to a bridge.

14.10.1 Bridge Interface Command Examples

The following commands show you how to set up a bridge interface named br0 with the following parameters: member ge1, IP 1.2.3.4, subnet 255.255.255.0, MTU 598, gateway 2.2.2.2, upstream bandwidth 345, downstream bandwidth 123, and description “I am br0”.

```
Router# configure terminal
Router(config)# interface br0
Router(config-if-brg)# join ge1
Router(config-if-brg)# ip address 1.2.3.4 255.255.255.0
Router(config-if-brg)# ip gateway 2.2.2.2
Router(config-if-brg)# mtu 598
Router(config-if-brg)# upstream 345
Router(config-if-brg)# downstream 123
Router(config-if-brg)# description I am br0
Router(config-if-brg)# exit
```

14.11 LAG Commands

This section covers commands that are specific to Link Aggregation Group (LAG) interfaces. LAG is a way to combine multiple physical Ethernet interfaces into a single logical interface. This increases uplink bandwidth. It also increases availability as even if a member link goes down, LAG can continue to transmit and receive traffic over the remaining links.

To configure LAG, configure a link number and specify the member ports in the link. All ports must have the same speed and be in full-duplex mode. You must configure the LAG on both sides of the link and you must set the interfaces on either side of the link to be the same speed.

Note: At the time of writing, up to 4 ports can be grouped into a LAG and up to 4 LAGs can be configured on a Zyxel Device.

The following table identifies the values required for many of these commands. Other input values are discussed with the corresponding commands.

Table 63 Input Values for LAG Interface Commands

LABEL	DESCRIPTION
interface_name	LAG interface: lag*x*, *x* = 0 - 4 (at the time of writing). Ethernet interface: For some Zyxel Device models use ge*x*, *x* = 1 - N, where N equals the highest numbered Ethernet interface for your Zyxel Device model. For other Zyxel Device models use a name such as wan1, wan2, opt, lan1, ext-wlan, or dmz. VLAN interface: vlan*x*, *x* = 0 - 4094

This table lists the LAG-specific interface commands. See Table 41 on page 100 for common `interface` commands.

Table 64 `interface` Commands: LAG Interfaces

COMMAND	DESCRIPTION
`interface` *interface_name*	Creates the specified LAG interface (`lag0` for example) and enters sub-command mode.
`traffic-prioritize {tcp-ack|content-filter|dns} bandwidth <0..1048576>];`	Applies traffic priority when the interface sends TCP-ACK traffic, traffic for querying the content filter, or traffic for resolving domain names. It also sets how much bandwidth the traffic can use.
`traffic-prioritize {tcp-ack|content-filter|dns} priority-code <0..7> deactivate`	Turns off traffic priority settings for when the interface sends the specified type of traffic.
`mode {802_3ad	active-backup	balance-alb	mode 802_3ad}`	Sets the LAG mode. Mode refers to whether the LAG is acting as follows: • **`active-backup`** where only one slave in the LAG interface is active and another slave becomes active only if the active slave fails. • **`802.3ad`** (IEEE 802.3ad Dynamic link aggregation) where Link Aggregation Control Protocol (LACP) negotiates automatic combining of links and balances the traffic load across the LAG link by sending LACP packets to the directly connected device that also implements LACP. The slaves must have the same speed and duplex settings. • **`balance-alb`** (adaptive load balancing) where traffic is distributed according to the current load on each slave by ARP negotiation. Incoming traffic is received by the current slave. If the receiving slave fails, another slave takes over the MAC address of the failed receiving slave.
`[no] slave` *interface_name*	Specifies the member ports in the link. A slave is a physical Ethernet interface that is a member of a LAG. Slaves do not have an IP Address and in some cases share the same MAC address. The `no` command removed the member ports from the link.
`link-monitoring {arp	mii	none}`	Sets link monitoring to be `arp`, `mii` or `none`. • `arp` monitoring sends ARP queries and uses the reply to know if the link is up and that traffic is flowing over the link • `mii` monitoring monitors the state of the local interface; it can't tell if the link can transmit or receive packets. • `none` means no link monitoring is done.
`arp {arp-interval <1..1000>	arp-ip-target <W.X.Y.Z>}`	Configure for `arp` Link Monitoring. `arp-interval:` Specifies the frequency of ARP requests sent to confirm a that slave interface is up. `arp-ip-target <W.X.Y.Z>:` Specifies the IP address of the link to send ARP queries.

Table 64 `interface` Commands: LAG Interfaces (continued)

COMMAND	DESCRIPTION
`miimon <1..1000>`	Configure for `mii` Link Monitoring. Specifies the link check interval in milliseconds that the system polls the Media Independent Interface (MII) to get status.
`xmit-hash-policy {layer2 | layer2_3}`	Configure for `802.3ad` Mode. Specifies the algorithm for slave selection according to the selected TCP/IP layer.
`lacp-rate {fast | slow}`	Configure for `802.3ad` Mode. Specifies the preferred LACPDU packet transmission rate (`fast | slow`) to request from 802.3ad partner.
`updelay <0..1000>`	Configure for `mii` Link Monitoring. Specifies the waiting time in milliseconds to confirm the slave interface status is up.
`downdelay <0..1000>`	Configure for `mii` Link Monitoring. Specifies the waiting time in milliseconds to confirm the slave interface status is down.
`igmp {activate | direction {downstream | upstream} | version <1..3>}`	See Table 42 on page 107 for these command descriptions.
`ping-check`	See Table 48 on page 116 for these command descriptions.
`type {external | general | internal}`	Specifies one of the following option depending on the type of network to which the Zyxel Device is connected or if you want to additionally manually configure some related settings. **`internal`** is for connecting to a local network. Other corresponding configuration options: DHCP server and DHCP relay. The Zyxel Device automatically adds default SNAT settings for traffic flowing from this interface to an external interface. **`external`** is for connecting to an external network (like the Internet). The Zyxel Device automatically adds this interface to the default WAN trunk. For **`general`**, the rest of the screen's options do not automatically adjust and you must manually configure a policy route to add routing and SNAT settings for the interface.
`show lag available slaves`	Displays the available slaves that could be added to a LAG.
`show interface lag`	Displays interface details for all LAG interfaces.
`show interface lagx`	Displays interface details for LAG x.

14.11.1 LAG Interface Command Example

The following commands set up a LAG with slaves ge3, ge5 and ge6.

```
Router# configure terminal
Router(config)# interface lag1
Router(config-if-lag)# mode 802_3ad
Router(config-if-lag)# slave ge3
Router(config-if-lag)# slave ge5
Router(config-if-lag)# slave ge6
Router(config-if-lag)# link-monitoring mii
Router(config-if-lag)# miimon 1000
Router(config-if-lag)# xmit-hash-policy layer2
Router(config-if-lag)# lacp-rate fast
Router(config-if-lag)# updelay 500
Router(config-if-lag)# downdelay 500
Router(config-if-lag)# igmp activate
Router(config-if-lag)# type external
Router(config-if-lag)# exit
Router(config)# show lag available slaves
available slave count: 5
available slave: ge1,ge2,ge4,ge7,ge8
Router(config)# show interface lag1
active: yes
interface name: lag1
modifiable: yes
mode: 802.3ad
primary: none
slaves count: 3
slaves: ge3,ge5,ge6
description:
type: external
link monitoring: mii
miimon: 1000
updelay: 500
downdelay: 500
ARP interval: 20
ARP IP target: 0.0.0.0
LACP rate: fast
xmit hash policy: layer2
IP type: static
IP address: 0.0.0.0
netmask: 0.0.0.0
gateway:
metric: 0
igmp active: yes
igmp direction: upstream
igmp version: IGMPv3
upstream: 1048576
downstream: 1048576
MTU: 1500
MSS: 0
tcp-ack traffic prioritize:
    active                       : yes
    bandwidth                    : 1048576
    priority                     : 1
    maximize-bandwidth-usage     : yes
```

```
Router(config)# show interface lag
No. Name             Address type IP address      Mode            Active Slaves
================================================================================
1   lag0             static       0.0.0.0         active-backup   yes
2   lag1            static       0.0.0.0         802.3ad         yes    ge3, ge5, ge6
```

14.12 VTI Commands

IPsec VPN Tunnel Interface (VTI) encrypts or decrypts IPv4 traffic from or to the interface according to the IP routing table.

VTI allows static routes to send traffic over the VPN. The IPsec tunnel endpoint is associated with an actual (virtual) interface. Therefore many interface capabilities such as Policy Route, Static Route, Trunk, and BWM can be applied to the IPsec tunnel as soon as the tunnel is active

Create a trunk using VPN tunnel interfaces for load balancing.

14.12.1 Restrictions for IPsec Virtual Tunnel Interface

- IPv4 traffic only
- IPSec tunnel mode only. A shared keyword must not be configured when using tunnel mode.
- With a VTI VPN you do not add local or remote LANs to your VPN configuration.
- For a VTI VPN you should only have one local and one remote WAN.
- A dynamic peer is not supported
- The IPsec VTI is limited to IP unicast and multicast traffic only.

The following table identifies the values required for many of these commands. Other input values are discussed with the corresponding commands.

Table 65 Input Values for VTI Interface Commands

LABEL	DESCRIPTION
interface_name	VTO interface: lag*x*, where x is a number from 0 to the maximum number of VPN connections allowed for your Zyxel Device model. Ethernet interface: For some Zyxel Device models use ge*x*, *x* = 1 - N, where N equals the highest numbered Ethernet interface for your Zyxel Device model. For other Zyxel Device models use a name such as wan1, wan2, opt, lan1, ext-wlan, or dmz. VLAN interface: vlan*x*, *x* = 0 - 4094

This table lists the LAG-specific interface commands. See Table 41 on page 100 for common `interface` commands.

Table 66 `interface` Commands: VTI Interfaces

COMMAND	DESCRIPTION
`interface` *`interface_name`*	Creates the specified VTI interface (`vti1` for example) and enters sub-command mode. Note: You should have created a VPN tunnel for a Vpn Tunnel Interface scenario first.
`[no] downstream <0..1048576>`	Specifies the downstream bandwidth for the specified interface. The `no` command sets the downstream bandwidth to 1048576.
`[no] ip address` *`ip subnet_mask`*	Assigns the specified IP address and subnet mask to the specified interface. The `no` command clears the IP address and the subnet mask.
`[no] metric <0..15>`	Sets the VTI interface's priority relative to other interfaces. The lower the number, the higher the priority.
`[no] ping-check activate`	Enables ping check for the specified interface. The `no` command disables ping check for the specified interface.
`ping-check {`*`domain_name`*` | `*`ip`*`}`	Specifies what the Zyxel Device pings for the ping check; you can specify a fully-qualified domain name or IP address for the interface.
`ping-check {`*`domain_name`*` | `*`ip`*`} period <5..30>`	Specifies what the Zyxel Device pings for the ping check and sets the number of seconds between each ping check.
`ping-check {`*`domain_name`*` | `*`ip`*`} timeout <1..10>`	Specifies what the Zyxel Device pings for the ping check and sets the number of seconds the Zyxel Device waits for a response.
`ping-check {`*`domain_name`*` | `*`ip`*`} fail-tolerance <1..10>`	Specifies what the Zyxel Device pings for the ping check and sets the number of times the Zyxel Device times out before it stops routing through the specified interface.
`ping-check {`*`domain_name`*` | `*`ip`*`} method {icmp | tcp}`	Sets how the Zyxel Device checks the connection to the gateway. `icmp`: ping the domain name or IP address you specify to make sure it is still available. `tcp`: perform a TCP handshake with the domain name or IP address you specify to make sure it is still available.
`ping-check {`*`domain_name`*` | `*`ip`*`} port <1..65535>`	Specifies the port number to use for a TCP connectivity check.
`[no] shutdown`	Deactivates the specified interface. The `no` command activates it.
`[no] upstream <0..1048576>`	Specifies the upstream bandwidth for the specified interface. The `no` command sets the upstream bandwidth to 1048576
`[no] ip ospf priority` *`priority`*	Sets the priority (between 0 and 255) of this interface when the OSPF autonomous area is looking for a Designated Router (DR) or Backup Designated Router (BDR). The highest-priority interface identifies the DR, and the second-highest-priority interface identifies the BDR. Set the priority to zero if the interface can not be the DR or BDR. The `no` command sets the priority to 1.
`ip ospf cost <1..65535>`	Sets the cost (between 1 and 65,535) to route packets through this interface. The `no` command sets the priority to 10
`ip ospf dead-interval <1..65535>`	Sets how long to wait for hello packets before declaring that the neighbor is dead. The `no` command resets the interval.

Table 66 `interface` Commands: VTI Interfaces (continued)

COMMAND	DESCRIPTION
`ip ospf hello-interval <1..65535>`	Sets how often to send a hello packet to check if a neighbor is still alive. The `no` command resets the interval.
`ip ospf retransmit-interval <1..65535>`	Sets the time between Link-State Advertisement (LSA) retransmissions to adjacent routers for a given interface. The `no` command resets the interval.
`[no] ip ospf {authentication-key` *`key8`* `| encrypted-authentication-key` *`encrypted_str`*`}`	Sets an authentication method. To exchange OSPF routing information with peer border routers, you must use the same authentication method that they use. The `no` command disables the configured authentication. *`encrypted_str`*: string used for encryption *`key8`*: key used for authentication and can contain1-8 alphanumeric characters, underscores, and dashes.
`[no] ip ospf message-digest-key <1..255> {md5` *`dr_authkey_16`* `| encrypted-md5` *`encrypted_str`*`}`	Sets the ID (between 1 and 255) for MD5 authentication and the password (up to 16 alphanumeric characters and the underscore) for text authentication or MD5 authentication of the Designated Router (DR). The `no` command disables the configured authentication. *`dr_authkey_16`*: password for authentication and can contain1-16 alphanumeric characters, underscores, and dashes. *`encrypted_str`*: string used for encryption
`[no] ip ospf authentication [message-digest | same-as-area]`	Uses the default authentication method in the area. disables authentication. The `no` command disables using the default authentication method in the area.
`[no] ip rip {send | receive} version <1..2> [1.2]`	Sets the RIP version(s) used for sending or receiving RIP packets. Choices are 1, 2, and 1 and 2.
`[no] ip v2-broadcast`	Sends RIP-2 packets using subnet broadcasting; otherwise, the Zyxel Device uses multicasting.
`[no] igmp direction {upstream | downstream}`	Sets the RIP direction `downstream:` This interface receives routing information. `upstream:` This interface sends routing information.
`[no] igmp activate`	Allows the Zyxel Device to act as an IGMP proxy for hosts connected on the IGMP downstream interface.
`binding interface` *`interface_name`* `crypto-map` *`map_name`*	Binds the VTI interface to an IPSec SA that uses the VPN Tunnel Interface scenario `vpn-tunnel-interface`)
`vpn-interface-restriction activate`	Turns on interface restrictions for IPSec VPN traffic. When the remote IPSec VPN device initiates a VPN tunnel to one of the Zyxel Device's WAN interface, outgoing VPN traffic can only be sent through the WAN interface on which the incoming VPN traffic was received. If the original WAN interface is down or disabled, the Zyxel Device will discard the outgoing VPN traffic instead of forwarding it through another active WAN interface. Note: The command takes effect after you restart the Zyxel Device.

Table 66 `interface` Commands: VTI Interfaces (continued)

COMMAND	DESCRIPTION
`vpn-interface-restriction deactivate`	Turns off interface restrictions for IPSec VPN traffic. When the WAN interface on which incoming VPN traffic was received has failed or the VPN client is connected to the LAN, the Zyxel Device can forward outgoing VPN traffic via a different interface. Note: The command takes effect after you restart the Zyxel Device.
`show interface vti`	Displays interface details for all VTI interfaces.
`show interface vtix`	Displays interface details for VTI x.
`show vpn-interface-restriction status`	Displays whether interface restrictions for IPSec VPN traffic is enabled or not.

14.12.2 VTI Interface Command Example

The following commands set up a VTI interface with the shown parameters and binds it to an IPSec SA using a VPN Tunnel Interface scenario.

```
Router# configure terminal
Router(config)# interface vti0
Router(config-if-vti)# downstream 10000
Router(config-if-vti)# upstream 10000
Router(config-if-vti)# ip address 1.1.1.1 255.255.255.0
Router(config-if-vti)# metric 5
Router(config-if-vti)# traffic-prioritize content-filter deactivate
Router(config-if-vti)# exit
Router(config)# show interface vti0
interface name: vti0
active: no
vpn rule:
connection: no
IP address: 1.1.1.1
netmask: 255.255.255.0
upstream: 10000
downstream: 10000
metric: 5
Router(config)#
Router(config)# crypto map test
Router(config-crypto test)# scenario vpn-tunnel-interface
Router(config-crypto test)# exit
Router(config)# binding interface vti0 crypto-map test
Router(config)#
```

CHAPTER 15
Trunks

This chapter shows you how to configure trunks on your Zyxel Device.

15.1 Trunks Overview

You can group multiple interfaces together into trunks to have multiple connections share the traffic load to increase overall network throughput and enhance network reliability. If one interface’s connection goes down, the Zyxel Device sends traffic through another member of the trunk. For example, you can use two interfaces for WAN connections. You can connect one interface to one ISP (or network) and connect the another to a second ISP (or network). The Zyxel Device can balance the load between multiple connections. If one interface's connection goes down, the Zyxel Device can automatically send its traffic through another interface.

You can use policy routing to specify through which interface to send specific traffic types. You can use trunks in combination with policy routing. You can also define multiple trunks for the same physical interfaces. This allows you to send specific traffic types through the interface that works best for that type of traffic, and if that interface’s connection goes down, the Zyxel Device can still send its traffic through another interface.

15.2 Trunk Scenario Examples

Suppose one of the Zyxel Device's interfaces is connected to an ISP that is also your Voice over IP (VoIP) service provider. You may want to set that interface as active and set another interface (connected to another ISP) to passive. This way VoIP traffic goes through the interface connected to the VoIP service provider whenever the interface’s connection is up.

Another example would be if you use multiple ISPs that provide different levels of service to different places. Suppose ISP A has better connections to Europe while ISP B has better connections to Australia. You could use policy routing and trunks to send traffic for your European branch offices primarily through ISP A and traffic for your Australian branch offices primarily through ISP B.

15.3 Trunk Commands Input Values

The following table explains the values you can input with the `interface-group` commands.

Table 67 interface-group Command Input Values

LABEL	DESCRIPTION
group-name	A descriptive name for the trunk. Zyxel Device uses up to 31 characters (a-zA-Z0-9_-). The name cannot start with a number. This value is case-sensitive.
interface-name	The name of an interface, it could be an Ethernet, PPP, VLAN or bridge interface. The possible number of each interface type and the abbreviation to use are as follows. Ethernet interface: For some Zyxel Device models, use gex, *x* = 1 - N, where N equals the highest numbered Ethernet interface for your Zyxel Device model. Other Zyxel Device models use a name such as wan1, wan2, opt, lan1, or dmz. PPPoE/PPTP interface: ppp*x*, *x* = 0 - N, where N depends on the number of PPPoE/PPTP interfaces your Zyxel Device model supports. VLAN interface: vlan*x*, *x* = 0 - 4094 bridge interface: br*x*, *x* = 0 - N, where N depends on the number of bridge interfaces your Zyxel Device model supports.
num	The interface's position in the trunk's list of members `<1..8>`.
`<CR>`	Carriage Return (the "enter" key).

15.4 Trunk Commands Summary

The following table lists the `interface-group` commands. You must use the `configure terminal` command to enter the configuration mode before you can use these commands. See Table 67 on page 143 for details about the values you can input with these commands.

Table 68 interface-group Commands Summary

COMMAND	DESCRIPTION
`show interface-group {system-default|user-define|`*group-name*`}`	Displays pre-configured system default trunks, your own user configuration trunks or a specified trunk's settings.
`[no] interface-group` *group-name*	Creates a trunk name and enters the trunk sub-command mode where you can configure the trunk. The `no` command removes the trunk.
`algorithm {wrr|llf|spill-over}`	Sets the trunk's load balancing algorithm.
`exit`	Leaves the trunk sub-command mode.
`flush`	Deletes a trunk's interface settings.
`interface {`*num*`|append|insert` *num*`}` *interface-name* `[weight <1..10>|limit <1..2097152>|passive]`	This subcommand adds an interface to a trunk. Sets the interface's number. It also sets the interface's weight and spillover limit or sets it to be passive.

Table 68 interface-group Commands Summary (continued)

COMMAND	DESCRIPTION
loadbalancing-index <inbound|outbound|total>	Use this command only if you use least load first or spill-over as the trunk's load balancing algorithm. Set either inbound, outbound, or total (outbound and inbound) traffic to which the Zyxel Device will apply the specified algorithm. Outbound traffic means the traffic travelling from an internal interface (ex. LAN) to an external interface (ex. WAN). Inbound traffic means the opposite.
mode {normal|trunk}	Sets the mode for a trunk. Do this first in the trunk's sub-command mode.
move <1..8> to <1..8>	Changes the interface order in a trunk.
[no] interface {*num*|*interface-name*}	Removes an interface from the trunk.
system default-interface-group *group-name*	Sets the Zyxel Device to first attempt to use the the specified WAN trunk.
[no] system default-snat	Enables or disables Source NAT (SNAT). When SNAT is enabled, the Zyxel Device uses the IP address of the outgoing interface as the source IP address of the packets it sends out through the WAN interfaces.
show system default-snat	Displays whether the Zyxel Device enable SNAT or not. The Zyxel Device performs SNAT by default for traffic going to or from the WAN interfaces.
show system default-interface-group	Displays the WAN trunk the Zyxel Device first attempts to use.

15.5 Trunk Command Examples

The following example creates a weighted round robin trunk for Ethernet interfaces ge1 and ge2. The Zyxel Device sends twice as much traffic through ge1.

```
Router# configure terminal
Router(config)# interface-group wrr-example
Router(if-group)# mode trunk
Router(if-group)# algorithm wrr
Router(if-group)# interface 1 ge1 weight 2
Router(if-group)# interface 2 ge2 weight 1
Router(if-group)# exit
Router(config)#
```

The following example creates a least load first trunk for Ethernet interface ge3 and VLAN 5, which will only apply to outgoing traffic through the trunk. The Zyxel Device sends new session traffic through the least utilized of these interfaces.

```
Router# configure terminal
Router(config)# interface-group llf-example
Router(if-group)# mode trunk
Router(if-group)# algorithm llf
Router(if-group)# interface 1 ge3
Router(if-group)# interface 2 vlan5
Router(if-group)# loadbalancing-index outbound
Router(if-group)# exit
Router(config)#
```

The following example creates a spill-over trunk for Ethernet interfaces ge1 and ge3, which will apply to both incoming and outgoing traffic through the trunk. The Zyxel Device sends traffic through ge1 until it hits the limit of 1000 kbps. The Zyxel Device sends anything over 1000 kbps through ge3.

```
Router# configure terminal
Router(config)# interface-group spill-example
Router(if-group)# mode trunk
Router(if-group)# algorithm spill-over
Router(if-group)# interface 1 ge1 limit 1000
Router(if-group)# interface 2 ge3 limit 1000
Router(if-group)# loadbalancing-index total
Router(if-group)# exit
Router(config)#
```

CHAPTER 16
Route

This chapter shows you how to configure policies for IP routing and static routes on your Zyxel Device.

16.1 Policy Route

Traditionally, routing is based on the destination address only and the Zyxel Device takes the shortest path to forward a packet. IP Policy Routing (IPPR) provides a mechanism to override the default routing behavior and alter the packet forwarding based on the policy defined by the network administrator. Policy-based routing is applied to incoming packets on a per interface basis, prior to the normal routing.

16.2 Policy Route Commands

The following table identifies the values required for many of these commands. Other input values are discussed with the corresponding commands.

Table 69 Input Values for General Policy Route Commands

LABEL	DESCRIPTION
address_object	The name of the IP address (group) object. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
address6_object	The name of the IPv6 address (group) object. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
interface_name	The name of the interface. Ethernet interface: Some Zyxel Device models use ge*x*, *x* = 1 - N, where N equals the highest numbered Ethernet interface for your Zyxel Device model. Other Zyxel Device models use a name such as wan1, wan2, opt, lan1, ext-wlan, or dmz. virtual interface on top of Ethernet interface: add a colon (:) and the number of the virtual interface. For example: ge*x*:*y*, *x* = 1 - N, *y* = 1 - 4 VLAN interface: vlan*x*, *x* = 0 - 4094 virtual interface on top of VLAN interface: vlan*x*:*y*, *x* = 0 - 4094, *y* = 1 - 12 bridge interface: br*x*, *x* = 0 - N, where N depends on the number of bridge interfaces your Zyxel Device model supports. virtual interface on top of bridge interface: br*x*:*y*, *x* = the number of the bridge interface, *y* = 1 - 4 PPPoE/PPTP interface: ppp*x*, *x* = 0 - N, where N depends on the number of PPPoE/PPTP interfaces your Zyxel Device model supports.

Table 69 Input Values for General Policy Route Commands (continued)

LABEL	DESCRIPTION
policy_number	The number of a policy route. 1 - *X* where *X* is the highest number of policy routes the Zyxel Device model supports. See the Zyxel Device's User's Guide for details.
schedule_object	The name of the schedule. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
service_name	The name of the service (group). You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
user_name	The name of a user (group). You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
destv6	The IPv6 route prefix (subnet address) for the destination.
prefix	The IPv6 prefix length, 0 - 128.
gatewayv6	The IPv6 address of the specified gateway.
ipv6_addr	An IPv6 address.
ipv6_global_address	An IPv6 address excluding the link-local address (fe80::).
ipv6_link_local	An fe80:: IPv6 address.

The following table describes the commands available for policy route. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 70 Command Summary: Policy Route

COMMAND	DESCRIPTION
`[no] bwm activate`	Globally enables bandwidth management. You must globally activate bandwidth management to have individual policy routes or application patrol policies apply bandwidth management. The `no` command globally disables bandwidth management.
`policy {`*policy_number*`	append	insert `*policy_number*`}`	Enters the policy-route sub-command mode to configure, add or insert a policy.
`[no] auto-destination`	When you set `tunnel` as the next-hop type (using the `next-hop tunnel` command) for this route, you can use this command to have the Zyxel Device use the local network of the peer router that initiated an incoming dynamic IPSec tunnel as the destination address of the policy instead of what you configure by using the `destination` command. The no command disables the setting.
`[no] auto-disable`	When you set `interface` or `trunk` as the next-hop type (using the `next-hop interface` or `next-hop trunk` command) for this route, you can use this command to have the Zyxel Device automatically disable this policy route when the next-hop's connection is down. The `no` command disables the setting.
`conn-check {FQDN	addr	activate}`	Turns on the connection check to the gateway identified by its FQDN or IP address.
`[no] deactivate`	Disables the specified policy. The `no` command enables the specified policy.
`[no] description `*description*	Sets a descriptive name for the policy. The `no` command removes the name for the policy.
`[no] destination {`*address_object*`|any}`	Sets the destination IP address the matched packets must have. The no command resets the destination IP address to the default (`any`). `any` means all IP addresses.

Table 70   Command Summary: Policy Route (continued)

COMMAND	DESCRIPTION
[no] dscp {any | <0..63>}	Sets a custom DSCP code point (0~63). This is the DSCP value of incoming packets to which this policy route applies. any means all DSCP value or no DSCP marker.
[no] dscp class {default | *dscp_class*}	Sets a DSCP class. Use default to apply this policy route to incoming packets that are marked with DSCP value 0. Use one of the pre-defined AF classes (including af11~af13, af21~af23, af31~af33, and af41~af43) to apply this policy route to incoming packets that are marked with the DSCP AF class. The "af" entries stand for Assured Forwarding. The number following the "af" identifies one of four classes and one of three drop preferences. See Assured Forwarding (AF) PHB for DiffServ on page 151 for more details. *dscp_class* can set cs0~cs7 too.
dscp-marking <0..63>	Sets a DSCP value to have the Zyxel Device apply that DSCP value to the route's outgoing packets.
dscp-marking class {default | *dscp_class*}	Sets how the Zyxel Device handles the DSCP value of the outgoing packets that match this route. Set this to default to have the Zyxel Device set the DSCP value of the packets to 0. Set this to an "af" class (including af11~af13, af21~af23, af31~af33, and af41~af43) which stands for Assured Forwarding. The number following the "af" identifies one of four classes and one of three drop preferences. See Assured Forwarding (AF) PHB for DiffServ on page 151 for more details. *dscp_class* can set cs0~cs7 too.
no dscp-marking	Use this command to have the Zyxel Device not modify the DSCP value of the route's outgoing packets.
exit	Leaves the sub-command mode.
[no] interface *interface_name*	Sets the interface on which the incoming packets are received. The no command resets the incoming interface to the default (any). any means all interfaces.
[no] next-hop {auto|gateway *address object* |interface *interface_name* |trunk *trunk_name*|tunnel *tunnel_name*}	Sets the next-hop to which the matched packets are routed. The no command resets next-hop settings to the default (auto).
[no] schedule *schedule_object*	Sets the schedule. The no command removes the schedule setting to the default (none). none means any time.
[no] service {*service_name*|any}	Sets the IP protocol. The no command resets service settings to the default (any). any means all services.
[no] snat {outgoing-interface|{*address_object*}}	Sets the source IP address of the matched packets that use SNAT. The no command removes source NAT settings from the rule.
[no] source {*address_object*|any}	Sets the source IP address that the matched packets must have. The no command resets the source IP address to the default (any). any means all IP addresses.
[no] srcport {*profile_name*|any}	Sets the source port that the matched packets must have. The no command resets the source port to the default (any). any means all ports.
[no] sslvpn *tunnel_name*	Sets the incoming interface to an SSL VPN tunnel. The no command removes the SSL VPN tunnel through which the incoming packets are received.
[no] tunnel *tunnel_name*	Sets the incoming interface to an IPSec VPN tunnel. The no command removes the IPSec VPN tunnel through which the incoming packets are received.

Table 70 Command Summary: Policy Route (continued)

COMMAND	DESCRIPTION
[no] user *user_name*	Sets the user name. The no command resets the user name to the default (any). any means all users.
policy6 {*policy_number* | append | insert *policy_number*}	Enters the IPv6 policy-route sub-command mode to configure, add or insert a policy.
[no] deactivate	Disables the specified policy. The no command enables the specified policy.
[no] description *description*	Sets a descriptive name for the IPv6 policy. The no command removes the name for the policy.
[no] destination {*address6_object*|any}	Sets the destination IPv6 IP address the matched packets must have. The no command resets the destination IP address to the default (any). any means all IP addresses.
[no] dscp {any | <0..63>}	Sets a custom DSCP code point (0~63). This is the DSCP value of incoming packets to which this policy route applies. any means all DSCP value or no DSCP marker.
[no] dscp class {default | *dscp_class*}	Sets a DSCP class. Use default to apply this policy route to incoming packets that are marked with DSCP value 0. Use one of the pre-defined AF classes (including af11~af13, af21~af23, af31~af33, and af41~af43) to apply this policy route to incoming packets that are marked with the DSCP AF class. The “af” entries stand for Assured Forwarding. The number following the “af” identifies one of four classes and one of three drop preferences. See Assured Forwarding (AF) PHB for DiffServ on page 151 for more details. *dscp_class* can set cs0~cs7 too.
dscp-marking <0..63>	Sets a DSCP value to have the Zyxel Device apply that DSCP value to the route’s outgoing packets.
dscp-marking class {default | *dscp_class*}	Sets how the Zyxel Device handles the DSCP value of the outgoing packets that match this route. Set this to default to have the Zyxel Device set the DSCP value of the packets to 0. Set this to an “af” class (including af11~af13, af21~af23, af31~af33, and af41~af43) which stands for Assured Forwarding. The number following the “af” identifies one of four classes and one of three drop preferences. See Assured Forwarding (AF) PHB for DiffServ on page 151 for more details. *dscp_class* can set cs0~cs7 too.
no dscp-marking	Use this command to have the Zyxel Device not modify the DSCP value of the route’s outgoing packets.
exit	Leaves the sub-command mode.
[no] interface *interface_name*	Sets the interface on which the matched packets are received. The no command resets the incoming interface to the default (any). any means all interfaces.
[no] next-hop {auto|gateway *address_object* |interface *interface_name* |trunk *trunk_name*|tunnel *tunnel_name*}	Sets the next-hop to which the matched packets are routed. The no command resets next-hop settings to the default (auto).
[no] schedule *schedule_object*	Sets the schedule. The no command removes the schedule setting to the default (none). none means any time.
[no] service {*service_name*|any}	Sets the IP protocol. The no command resets service settings to the default (any). any means all services.
[no] source {*address6_object*|any}	Sets the source IPv6 IP address that the matched packets must have. The no command resets the source IP address to the default (any). any means all IP addresses.

Table 70 Command Summary: Policy Route (continued)

COMMAND	DESCRIPTION
[no] srcport {*profile_name*|any}	Sets the source port that the matched packets must have. The no command resets the source port to the default (any). any means all ports.
[no] tunnel *tunnel_name*	Sets the incoming interface to an IPSec VPN tunnel. The no command removes the IPSec VPN tunnel through which the incoming packets are received.
[no] user *user_name*	Sets the user name. The no command resets the user name to the default (any). any means all users.
[no] policy controll-ipsec-dynamic-rules activate	Enables the Zyxel Device to use policy routes to manually specify the destination addresses of dynamic IPSec rules. You must manually create these policy routes. The Zyxel Device automatically obtains source and destination addresses for dynamic IPSec rules that do not match any of the policy routes. The no command has the Zyxel Device automatically obtain source and destination addresses for all dynamic IPSec rules.
policy default-route	Enters the policy-route sub-command mode to set a route with the name "default-route".
policy delete *policy_number*	Removes a routing policy.
policy flush	Clears the policy routing table.
policy list table	Displays all policy route settings.
policy move *policy_number* to *policy_number*	Moves a routing policy to the number that you specified.
[no] policy override-direct-route activate	Has the Zyxel Device forward packets that match a policy route according to the policy route instead of sending the packets to a directly connected network. Use the no command to disable it.
[no] policy controll-virtual-server-rules activate	Gives policy routes priority over NAT virtual server rules (1-1 SNAT). Use the no command to give NAT virtual server rules priority over policy routes.
[no] policy6 override-direct-route activate	Has the Zyxel Device forward IPv6 packets that match a policy route according to the policy route instead of sending the packets to a directly connected network. Use the no command to disable it.
show bwm activation	Displays whether or not the global setting for bandwidth management on the Zyxel Device is enabled.
show bwm-usage < [policy-route *policy_number*] | [interface *interface_name*]	Displays the specified policy route or interface's bandwidth allotment, current bandwidth usage, and bandwidth usage statistics.
show policy-route [*policy_number*]	Displays all or specified policy route settings.
show policy-route begin <1..200> end <1..200>	Displays the specified range of policy route settings.
show policy-route conn-check	Displays the policy route for the connection check.
show policy-route conn-check [*policy_number*]	Displays the specified policy route for the connection check.
show policy-route conn-check status [*policy_number*]	Displays the connection check status for the specified policy route.
show policy-route controll-ipsec-dynamic-rules	Displays whether the Zyxel Device checks policy routes first before IPSec dynamic rules.
show policy-route override-direct-route	Displays whether or not the Zyxel Device forwards packets that match a policy route according to the policy route instead of sending the packets to a directly connected network.

Table 70 Command Summary: Policy Route (continued)

COMMAND	DESCRIPTION
`show policy-route controll-virtual-server-rules`	Displays whether or not policy routes have priority over NAT virtual server rules (1-1 SNAT).
`show policy-route6 override-direct-route`	Displays whether or not the Zyxel Device forwards IPv6 packets that match a policy route according to the policy route instead of sending the packets to a directly connected network.
`show policy-route rule_count`	Displays the number of policy routes that have been configured on the Zyxel Device.
`show policy-route underlayer-rules`	Displays all policy route rule details for advanced debugging.
`show policy-route6 [`*`policy_number`*`]`	Displays all or specified IPv6 policy route settings.
`show policy-route6 begin <1..200> end <1..200>`	Displays the specified range of IPv6 policy route settings.
`show policy-route6 controll-ipsec-dynamic-rules`	Displays whether the Zyxel Device checks IPv6 policy routes first before IPSec dynamic rules.
`show policy-route6 rule_count`	Displays the number of IPv6 policy routes that have been configured on the Zyxel Device.

16.2.1 Assured Forwarding (AF) PHB for DiffServ

Assured Forwarding (AF) behavior is defined in RFC 2597. The AF behavior group defines four AF classes. Inside each class, packets are given a high, medium or low drop precedence. The drop precedence determines the probability that routers in the network will drop packets when congestion occurs. If congestion occurs between classes, the traffic in the higher class (smaller numbered class) is generally given priority. Combining the classes and drop precedence produces the following twelve DSCP encodings from AF11 through AF43. The decimal equivalent is listed in brackets.

Table 71 Assured Forwarding (AF) Behavior Group

	CLASS 1	CLASS 2	CLASS 3	CLASS 4
Low Drop Precedence	AF11 (10)	AF21 (18)	AF31 (26)	AF41 (34)
Medium Drop Precedence	AF12 (12)	AF22 (20)	AF32 (28)	AF42 (36)
High Drop Precedence	AF13 (14)	AF23 (22)	AF33 (30)	AF43 (38)

16.2.2 Policy Route Command Example

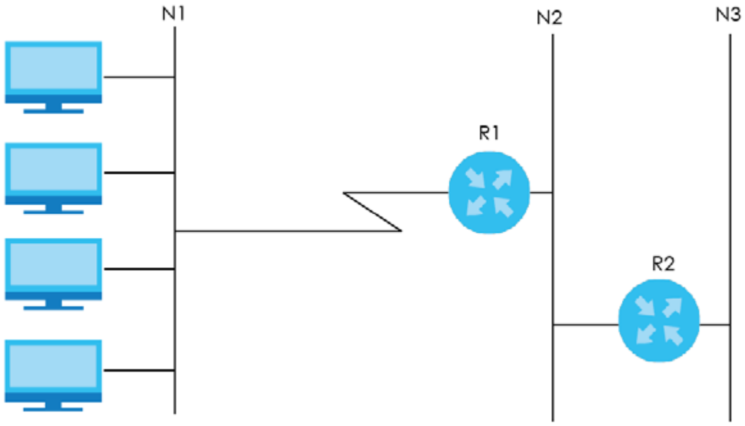
The following commands create two address objects (TW_SUBNET and GW_1) and insert a policy that routes the packets (with the source IP address TW_SUBNET and any destination IP address) through the interface ge1 to the next-hop router GW_1. This route uses the IP address of the outgoing interface as the matched packets' source IP address.

```
Router(config)# address-object TW_SUBNET 192.168.2.0 255.255.255.0
Router(config)# address-object GW_1 192.168.2.250
Router(config)# policy insert 1
Router(policy-route)# description example
Router(policy-route)# destination any
Router(policy-route)# interface ge1
Router(policy-route)# next-hop gateway GW_1
Router(policy-route)# snat outgoing-interface
Router(policy-route)# source TW_SUBNET
Router(policy-route)# exit
Router(config)# show policy-route 1
index: 1
  active: yes
  auto-disable: no
  description: example
  user: any
  schedule: none
  interface: ge1
  tunnel: none
  sslvpn: none
  source: TW_SUBNET
  destination: any
  DSCP code: any
  service: any
  srcport: any
  nexthop type: Gateway
  nexthop: GW_1
  nexthop state: Not support
  auto destination: no
  SNAT: outgoing-interface
  DSCP marking: preserve
  connectivity-check: no
Router(config)#
```

16.3 IP Static Route

The Zyxel Device has no knowledge of the networks beyond the network that is directly connected to the Zyxel Device. For instance, the Zyxel Device knows about network **N2** in the following figure through gateway **R1**. However, the Zyxel Device is unable to route a packet to network **N3** because it doesn't know that there is a route through the same gateway **R1** (via gateway **R2**). The static routes are for you to tell the Zyxel Device about the networks beyond the network connected to the Zyxel Device directly.

Figure 15 Example of Static Routing Topology



16.4 Static Route Commands

The following table describes the commands available for static route. You must use the `configure terminal` command to enter the configuration mode before you can use these commands. See Section Table 69 on page 146 for information on input values.

Table 72 Command Summary: Static Route

COMMAND	DESCRIPTION
`[no] ip route {w.x.y.z} {w.x.y.z} {interface|w.x.y.z} <0..127>`	Sets a static route. The `no` command deletes a static route.
`ip route replace {w.x.y.z} {w.x.y.z} {interface|w.x.y.z} <0..127> with {w.x.y.z} {w.x.y.z} {interface|w.x.y.z} <0..127>`	Changes an existing route's settings.
`show ip route-settings`	Displays static route information. Use `show ip route` to see learned route information. See Section 17.2.5 on page 158.
`ip6 route destv6/prefix { ipv6_global_address | ipv6_link_local | interface} [<0..127>]`	Sets an IPv6 static route.
`ip6 route destv6/prefix { ipv6_link_local interface} [<0..127>]`	Sets an IPv6 link local static route.
`no ip6 route destv6/prefix { gatewayv6 | interface} [<0..127>]`	Deletes the specified IPv6 static route.
`ip6 route replace destv6/prefix { gatewayv6 | interface} [<0..127>] with destv6/prefix { gatewayv6 | interface} [<0..127>]`	Changes an existing IPv6 route's settings.
`[no] ip route control-virtual-server-rules activate`	Gives static routes priority over NAT virtual server rules (1-1 SNAT). It also automatically gives policy routes priority over NAT virtual server rules. Use the `no` command to give NAT virtual server rules priority over static routes.
`show ip route control-virtual-server-rules`	Displays whether or not static routes have priority over NAT virtual server rules (1-1 SNAT).

16.4.1 Static Route Commands Examples

The following command sets a static route with IP address 10.10.10.0 and subnet mask 255.255.255.0 and with the next-hop interface ge1. Then use the `show` command to display the setting.

```
Router(config)# ip route 10.10.10.0 255.255.255.0 ge1
Router(config)#
Router(config)# show ip route-settings
Route           Netmask         Nexthop         Metric
===========================================================================
10.10.10.0      255.255.255.0   ge1             0
```

The following commands set and show three examples of static IPv6 routes for traffic destined for IPv6 addresses with prefix 2002:22:22:34::. The first route sends the traffic out through interface ge2 and uses metric 1. The second sends the traffic to gateway 2001:12::12 and uses metric 2. The third sends the traffic to the fe80::1:2 link local gateway on interface ge2 and uses metric 2.

```
Router(config)# ip6 route 2002:22:22:34::/64 ge2 1
Router(config)# ip6 route 2002:22:22:34::/64 2001:12::12 2
/* link-local gateway bind on interface */
Router(config)# ip6 route 2002:22:22:34::/64 fe80::1:2 ge2 2
Router(config)# show ip6 route-settings
No.  Route                                            Prefix Length
     Nexthop                                          Metric
========================================================================
1    2002:22:22:34::                                  64
     2001:12::12                                      2
     2002:22:22:34::                                  64
     ge2                                              1
2    2002:22:22:34::                                  64
     2001:12::12                                      2
3    2002:22:22:34::                                  64
     Fe80::1:2                                        2
```

The following command deletes a specific static IPv6 route.

```
Router(config)# no ip6 route 2002:22:22:34::/64 2001:12::12
```

The following command deletes all static IPv6 routes with the same prefix.

```
Router(config)# no ip6 route 2002:22:22:34::/64
```

CHAPTER 17
Routing Protocol

This chapter describes how to set up RIP and OSPF routing protocols for the Zyxel Device.

17.1 Routing Protocol Overview

Routing protocols give the Zyxel Device routing information about the network from other routers. The Zyxel Device then stores this routing information in the routing table, which it uses when it makes routing decisions. In turn, the Zyxel Device can also provide routing information via routing protocols to other routers.

The Zyxel Device supports two standards, RIP and OSPF, for routing protocols. RIP and OSPF are compared in Table 73 on page 155, and they are discussed further in the next two sections.

Table 73 OSPF vs. RIP

	OSPF	RIP
Network Size	Large	Small (with up to 15 routers)
Metric	Bandwidth, hop count, throughput, round trip time and reliability.	Hop count
Convergence	Fast	Slow

17.2 Routing Protocol Commands Summary

The following table describes the values required for many routing protocol commands. Other values are discussed with the corresponding commands.

Table 74 Input Values for Routing Protocol Commands

LABEL	DESCRIPTION
ip	The 32-bit name of the area or virtual link in IP address format.
authkey	The password for text or MD5 authentication. You may use alphanumeric characters or underscores(_). text password: 1-8 characters long MD5 password: 1-16 characters long

The following sections list the routing protocol commands.

17.2.1 RIP Commands

This table lists the commands for RIP.

Table 75 router Commands: RIP

COMMAND	DESCRIPTION
`router rip`	Enters sub-command mode.
`[no] network interface_name`	Enables RIP on the specified Ethernet interface. The `no` command disables RIP on the specified interface.
`[no] redistribute {static | ospf}`	Enables redistribution of routing information learned from the specified source. The `no` command disables redistribution from the specified source.
`redistribute {static | ospf} metric <0..16>`	Sets the metric when redistributing routing information learned from the specified source.
`[no] version <1..2>`	Sets the default RIP version for all interfaces with RIP enabled. If the interface RIP version is blank, the interface uses the default version. This is not available in the GUI. The `no` command sets the default RIP version to 2.
`[no] passive-interface interface_name`	Sets the direction to "In-Only" for the specified interface. The `no` command sets the direction to bi-directional.
`[no] authentication mode {md5 | text}`	Sets the authentication mode for RIP. The `no` command sets the authentication mode to "none".
`[no] authentication string authkey`	Sets the password for text authentication. The `no` command clears the password.
`authentication key <1..255> key-string authkey`	Sets the MD5 ID and password for MD5 authentication.
`no authentication key`	Clears the MD5 ID and password.
`[no] outonly-interface interface_name`	Sets the direction to "Out-Only" for the specified interface. The `no` command sets the direction to "BiDir".
`encrypted-string ciphertext`	Sets the cipher to encrypt the string.

17.2.2 General OSPF Commands

This table lists the commands for general OSPF configuration.

Table 76 router Commands: General OSPF Configuration

COMMAND	DESCRIPTION
`router ospf`	Enters sub-command mode.
`[no] redistribute {static | rip}`	Enables redistribution of routing information learned from the specified non-OSPF source. The `no` command disables redistribution from the specified non-OSPF source.
`[no] redistribute {static | rip} metric-type <1..2> metric <0..16777214>`	Sets the metric for routing information learned from the specified non-OSPF source. The `no` command clears the metric.
`[no] passive-interface interface_name`	Sets the direction to "In-Only" for the specified interface. The `no` command sets the direction to "BiDir".
`[no] router-id IP`	Sets the 32-bit ID (in IP address format) of the Zyxel Device. The `no` command resets it to "default", or the highest available IP address.

17.2.3 OSPF Area Commands

This table lists the commands for OSPF areas.

Table 77 router Commands: OSPF Areas

COMMAND	DESCRIPTION
`router ospf`	Enters sub-command mode.
`[no] network` *`interface`* `area IP`	Adds the specified interface to the specified area. The `no` command removes the specified interface from the specified area.
`[no] area IP [{stub | nssa}]`	Creates the specified area and sets it to the indicated type. The `no` command removes the area.
`[no] area IP authentication`	Enables text authentication in the specified area. The `no` command disables authentication in the specified area.
`[no] area IP authentication message-digest`	Enables MD5 authentication in the specified area. The `no` command disables authentication in the specified area.
`[no] area IP authentication authentication-key` *`authkey`*	Sets the password for text authentication in the specified area. The `no` command clears the password.
`[no] area IP authentication message-digest-key <1..255> md5` *`authkey`*	Sets the MD5 ID and password for MD5 authentication in the specified area. The `no` command clears the MD5 ID and password.

17.2.4 Virtual Link Commands

This table lists the commands for virtual links in OSPF areas.

Table 78 router Commands: Virtual Links in OSPF Areas

COMMAND	DESCRIPTION
`show ospf area IP virtual-link`	Displays information about virtual links for the specified area.
`router ospf`	
`[no] area IP virtual-link IP`	Creates the specified virtual link in the specified area. The `no` command removes the specified virtual link.
`[no] area IP virtual-link IP authentication`	Enables text authentication in the specified virtual link. The `no` command disables authentication in the specified virtual link.
`[no] area IP virtual-link IP authentication message-digest`	Enables MD5 authentication in the specified virtual link. The `no` command disables authentication in the specified virtual link.
`[no] area IP virtual-link IP authentication authentication-key` *`authkey`*	Sets the password for text authentication in the specified virtual link. The `no` command clears the password in the specified virtual link.
`[no] area IP virtual-link IP authentication message-digest-key <1..255> md5` *`authkey`*	Sets the MD5 ID and password for MD5 authentication in the specified virtual link. The `no` command clears the MD5 ID and password in the specified virtual link.
`[no] area IP virtual-link IP authentication same-as-area`	Sets the virtual link's authentication method to the area's default authentication.
`[no] area IP virtual-link IP authentication-key` *`authkey`*	Sets the password for text authentication in the specified virtual link. The `no` command clears the password.
`[no] area IP virtual-link IP encrypted-authentication-key <`*`ciphertext`*`>`	Sets the ciphertext for text encryption in the specified virtual link. The `no` command clears the ciphertext.

Table 78 router Commands: Virtual Links in OSPF Areas (continued)

COMMAND	DESCRIPTION
`area IP virtual-link IP message-digest-key <1..255> md5 authkey`	Sets the MD5 ID and password for MD5 authentication in the specified virtual link.
`area IP virtual-link IP message-digest-key <1..255> encrypted-authentication-key`	Sets the MD5 ID in the specified virtual link
`no area IP virtual-link IP message-digest-key <1..255>`	Clears the MD5 ID in the specified virtual link.

17.2.5 Learned Routing Information Commands

This table lists the commands to look at learned routing information.

Table 79 ip route Commands: Learned Routing Information

COMMAND	DESCRIPTION
`show ip route [kernel | connected | static | ospf | rip | bgp]`	Displays learned routing and other routing information.

17.2.6 show ip route Command Example

The following example shows learned routing information on the Zyxel Device.

```
Router> show ip route
Flags: A - Activated route, S - Static route, C - directly Connected
       O - OSPF derived, R - RIP derived, G - selected Gateway
       ! - reject, B - Black hole, L - Loop

IP Address/Netmask    Gateway          IFace           Metric    Flags
Persist
===========================================================================
0.0.0.0/0             172.16.1.254     wan1            0         ASG      -
10.59.0.0/24          0.0.0.0          ext-wlan        0         ACG      -
127.0.0.0/8           0.0.0.0          lo              0         ACG      -
172.16.1.0/24         0.0.0.0          wan1            0         ACG      -
192.168.1.0/24        0.0.0.0          lan1            0         ACG      -
192.168.2.0/24        0.0.0.0          lan2            0         ACG      -
192.168.3.0/24        0.0.0.0          dmz             0         ACG      -
```

17.3 BGP (Border Gateway Protocol)

The Zyxel Device supports eBGP (exterior Border Gate Protocol) to route IPv4 traffic between routers in different Autonomous Systems (AS). An AS number is a number from 1 to 4294967295), that identifies an autonomous system. 4200000000 – 4294967294 are private AS numbers.

You must first allow BGP packets to enter the Zyxel Device from the WAN using the following commands.

```
Router(config)# object-group service  Default_Allow_WAN_To_ZyWALL
Router(group-service)# description System Default Allow From WAN To ZyWALL
Router(group-service)# service-object BGP
Router(group-service)# exit
Router(config)# show object-group
Router(config)# show object-group service
Group name                      Reference            Family
Description
===============================================================================
CU-SEEME                        0                    Common

DNS                             3                    Common

IRC                             0                    Common

NetBIOS                         2                    Common

ROADRUNNER                      0                    Common

RTSP                            0                    Common

SNMP                            0                    Common

SNMP-TRAPS                      0                    Common

SSH                             0                    Common

Default_Allow_ICMPv6_Group      1                    V6
Default Allow icmpv6 to ZyWALL
Default_Allow_WAN_To_ZyWALL     1                    Common
System Default Allow From WAN To ZyWALL
Default_Allow_DMZ_To_ZyWALL     1                    Common
System Default Allow From DMZ To ZyWALL
Default_Allow_v6_WAN_To_ZyWALL  1                    Common
System Default Allow IPv6 Form WAN To ZyWALL
Default_Allow_v6_DMZ_To_ZyWALL  1                    Common
System Default Allow IPv6 From DMZ to ZyWALL
DHCPv6                          0                    Common

Default_Allow_v6_any_to_ZyWALL  1                    V6
System Default Allow IPv6 From any To ZyWALL
Router(config)#
```

17.3.1 BGP Commands

This table lists the commands for BGP configuration.

Table 80 bgp Commands

COMMAND	DESCRIPTION
`router bgp`	Enters router sub-command mode.
`[no] as-number <1..4294967295>`	Sets the AS number from 1 to 4294967295 in this field. Get the number from your service provider. The Zyxel Device can only belong to one AS at a time. The `no` command clears the AS number.
`[no] network` *`ipv4_cidr`*	Add routes that will be announced to all BGP neighbors. You may configure up to 16 network routes. *`ipv4_cidr:`* IPv4 subnet in CIDR format, i.e. 192.168.1.0/32 <W.X.Y.Z>/<1..32> The `no` command clears the network.
`[no] redistribute connected`	Redistributes routes of directly attached devices to the Zyxel Device into the BGP Routing Information Base (RIB) The `no` command clears the RIB.
`[no] router-id` *`router-id`*	Sets the IP address of the interface on the Zyxel Device. This field is optional. The `no` command clears the router ID.
`quit`	Leaves sub-command mode.
`exit`	Leaves sub-command mode.
`[no] neighbor` *`ipv4`*	Sets the IPv4 address of the peer BGP router in a neighboring AS. *`ipv4`*: IPv4 address <W.X.Y.Z> The `no` command clears the IPv4 address of the peer BGP router.
`[no] neighbor` *`ipv4`* `description` *`description`*	Sets a neighbor description to identify the neighbor. The `no` command clears the neighbor description.
`[no] neighbor` *`ipv4`* `remote-as <1..4294967295>`	Sets the AS number of the neighboring AS. The `no` command clears the neighbor AS number.
`[no] neighbor` *`ipv4`* `weight <1..65535>`	Specifies a weight value for all routes learned from this peer BGP router in the specified network. The route with the highest weight gets preference. The `no` command clears the weight.
`[no] neighbor` *`ipv4`* `ebgp-multihop hops <1..255>`	Sets the maximum hop count that the Zyxel Device can attempt for BGP connections to external peers on indirectly connected networks. eBGP neighbors must also perform multihop. Multihop is not established if the only route to the multihop peer is a default route. This avoids loop formation. The `no` command forbids the Zyxel Device from attempting BGP connections to external peers on indirectly connected networks.
`[no] maximum-paths <1..255>`	Sets the maximum number of paths allowed to a peer BGP router in a neighboring AS. The `no` command clears the maximum paths.

Table 80 bgp Commands (continued)

COMMAND	DESCRIPTION
`[no] neighbor ipv4 timers < 0..65535> < 0..65535>`	Sets the interval between each Keepalive message sent by the Zyxel Device and the maximum time the Zyxel Device waits to receive a Keepalive message from a peer BGP router before it declares that the peer BGP router is dead. The interval should be less than the wait time. The no command clears the timers.
`[no] neighbor ipv4 connect-retry`	Sets the number of times the Zyxel Device tries to connect to a peer BGP router before it declares that the peer BGP router is dead. The no command clears the setting.
`[no] neighbor ipv4 maximum-prefix < 1..4294967295 >`	Sets the maximum number of prefixes, from 1 to 4294967295, of prefixes that can be received from a neighbor. A prefix is a network address (IP/subnet mask) that a BGP router can reach and that it shares with its neighbors. This limits the number of prefixes that the Zyxel Device is allowed to receive from a neighbor. If extra prefixes are received, the Zyxel Device ends the connection with the peer BGP router. You need to edit the peer BGP router configuration to bring the connection back. The no command clears the maximum number of prefixes.
`[no] neighbor ipv4 ttl-security [hops] <1..254>`	Sets the maximum number of hops (1 to 254) between the Zyxel Device and a peer BGP router. The Zyxel Device will only accept incoming IP packets with a TTL value that is equal to or greater than the expected value. If the hop count is 3, then the expected incoming TTL value is at least 252, which is 255 minus the TTL value of 3. The Zyxel Device will only accept incoming IP packets from a peer BGP router if it is up to 3 hops away. The no command clears the hop count.
`[no] neighbor ipv4 default-originate`	Allows the Zyxel Device to send the default route 0.0.0.0 to peer BGP router for use as a default route. The no command sends no route as a default.
`[no] neighbor ipv4 password password`	Sets a default password for MD5 authentication of communication between the Zyxel Device and the peer BGP router. The password can consist of alphanumeric characters and the underscore, and it can be up to 16 characters long. The no command clears the password.
`[no] neighbor ipv4 update-source [ipv4|interface_name]`	Allows BGP sessions to use the specified Zyxel Device gateway IP address or Zyxel Device interface for TCP connections. The no command clears the interface.
`show bgp [global |neighbor]`	Displays configured BGP Zyxel Device and peer router settings.
`show bgp [summary | route | mem]`	Displays BGP run time route and memory status.
`show ip bgp neighbor ipv4 [advertised-routes | prefix-counts | routes]`	Displays route information to the specified peer BGP router.
`show ip route bgp`	Displays IP Address/Netmask, gateway, interface, metric, flags and persist information.

CHAPTER 18
Zones

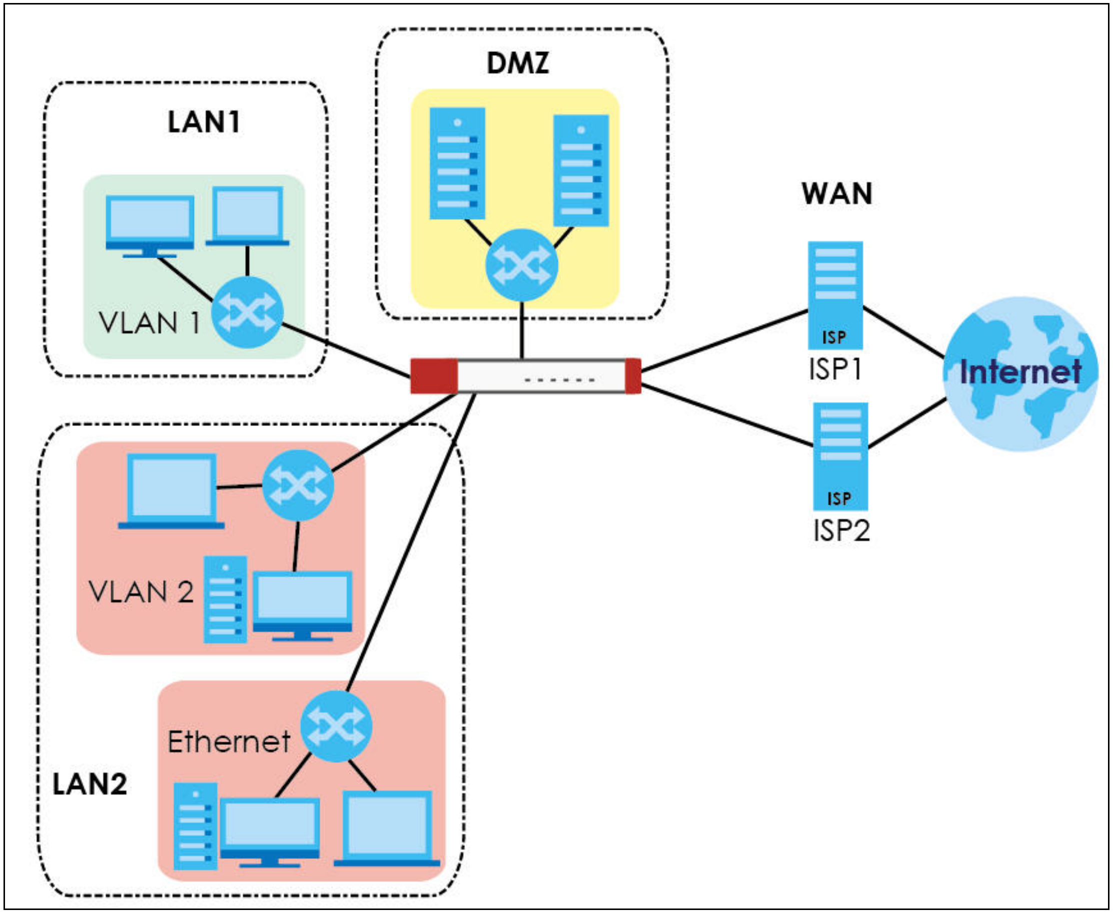
Set up zones to configure network security and network policies in the Zyxel Device.

18.1 Zones Overview

A zone is a group of interfaces and VPN tunnels. The Zyxel Device uses zones, not interfaces, in many security and policy settings, such as firewall rules and remote management.

Zones cannot overlap. Each Ethernet interface, VLAN interface, bridge interface, PPPoE/PPTP interface, and VPN tunnel can be assigned to at most one zone. Virtual interfaces are automatically assigned to the same zone as the interface on which they run.

Figure 16 Example: Zones



18.2 Zone Commands Summary

The following table describes the values required for many zone commands. Other values are discussed with the corresponding commands.

Table 81 Input Values for Zone Commands

LABEL	DESCRIPTION
profile_name	The name of a zone, or the name of a VPN tunnel. For some Zyxel Device models, use up to 31 characters (a-zA-Z0-9_-). The name cannot start with a number. This value is case-sensitive. For other Zyxel Devicemodels: • The lan1 interface always belongs to the LAN1 zone. • The lan2 interface always belongs to the LAN2 zone. • The dmz interface always belongs to the DMZ zone. • The wan1, wan2, wan1_ppp, or wan2_ppp interfaces always belong to the WAN zone. • An opt_ppp interface can be added to the WAN or OPT zone.

This table lists the zone commands.

Table 82 zone Commands

COMMAND	DESCRIPTION
`show zone [`*`profile_name`*`]`	Displays information about the specified zone or about all zones.
`show zone binding-iface`	Displays each interface and zone mappings.
`show zone default-binding`	Displays the pre-configured interface and zone mappings that come with the Zyxel Device.
`show zone none-binding`	Displays the interfaces, tunnels and SSL VPNs that are not associated with a zone yet.
`show zone system-default`	Displays the pre-configured default zones that you cannot delete from the Zyxel Device.
`show zone user-define`	Displays all customized zones.
`[no] zone `*`profile_name`*	Creates the zone if necessary and enters sub-command mode. The `no` command deletes the zone.
`zone `*`profile_name`*	Enter the sub-command mode.
`[no] interface `*`interface_name`*	Adds the specified interface to the specified zone. The `no` command removes the specified interface from the specified zone. See Section 14.2 on page 100 for information about interface names.
`[no] crypto `*`profile_name`*	Adds the specified IPSec VPN tunnel to the specified zone. The `no` command removes the specified IPSec VPN tunnel from the specified zone.
`[no] sslvpn `*`profile_name`*	Adds the specified SSL VPN tunnel to the specified zone. The `no` command removes the specified SSL VPN tunnel from the specified zone.

18.2.1 Zone Command Examples

The following commands add Ethernet interfaces ge1 and ge2 to zone A.

```
Router# configure terminal
Router(config)# zone A
Router(zone)# interface ge1
Router(zone)# interface ge2
Router(zone)# exit
Router(config)# show zone
No. Name                             Member
===========================================================================
1   A                                ge1,ge2
Router(config)# show zone A
No. Type                           Member
===========================================================================
1   interface                      ge1
2   interface                      ge2
```

CHAPTER 19
DDNS

This chapter describes how to configure dynamic DNS (DDNS) services for the Zyxel Device.

19.1 DDNS Overview

DNS maps a domain name to a corresponding IP address and vice versa. Similarly, dynamic DNS maps a domain name to a dynamic IP address. As a result, anyone can use the domain name to contact you (in NetMeeting, CU-SeeMe, etc.) or to access your FTP server or Web site, regardless of the current IP address.

Note: You must have a public WAN IP address to use Dynamic DNS.

Set up a dynamic DNS account with a supported DNS service provider to be able to use Dynamic DNS services with the Zyxel Device. When registration is complete, the DNS service provider gives you a password or key. At the time of writing, the Zyxel Device supports the following DNS service providers. See the listed websites for details about the DNS services offered by each.

Table 83 Network > DDNS

DDNS SERVICE PROVIDER	SERVICE TYPES SUPPORTED	WEBSITE	NOTES
DynDNS	Dynamic DNS, Static DNS, and Custom DNS	www.dyndns.com)	
Dynu	Basic, Premium	www.dynu.com	
No-IP	No-IP	www.no-ip.com	
Peanut Hull	Peanut Hull	www.oray.cn	Chinese website
3322	DynamicDNS, StaticDNS	www.3322.org	Chinese website
Selfhost	Selfhost	selfhoost.de	German website

Note: Record your DDNS account’s user name, password, and domain name to use to configure the Zyxel Device.

After, you configure the Zyxel Device, it automatically sends updated IP addresses to the DDNS service provider, which helps redirect traffic accordingly.

19.2 DDNS Commands Summary

The following table describes the values required for many DDNS commands. Other values are discussed with the corresponding commands.

Table 84 Input Values for DDNS Commands

LABEL	DESCRIPTION
profile_name	The name of the DDNS profile. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.

The following table lists the DDNS commands.

Table 85 ip ddns Commands

COMMAND	DESCRIPTION
`show ddns [`*profile_name*`]`	Displays information about the specified DDNS profile or about all DDNS profiles.
`show ddns-status`	Shows which DDNS profiles are active, inactive or have failed.
`[no] ip ddns profile` *profile_name*	Creates or edits the specified DDNS profile and enters sub-command mode if necessary. The `no` command deletes this profile.
`[no]https activate`	Encrypts traffic using SSL (port 443) to the DDNS server. Not all DDNS providers support this option. The `no` command disables HTTPS.
`[no] service-type {dyndns | dyndns_static | dyndns_custom | dynu-basic | dynu-premium | no-ip | peanut-hull | 3322-dyn | 3322-static | Selfhost | User custom}`	Sets the service type in the specified DDNS profile. The `no` command clears it.
`[no] username` *username* `password` *password*	Sets the username and password in the specified DDNS profile. The `no` command clears these fields. *username*: You can use up to 31 alphanumeric characters and the underscore (_). *password*: You can use up to 64 alphanumeric characters and the underscore (_).
`[no] host` *hostname*	Sets the domain name in the specified DDNS profile. The `no` command clears the domain name. *hostname*: You may up to 254 alphanumeric characters, dashes (-), or periods (.), but the first character must be alphanumeric.
`[no] ip-select {iface | auto | custom}`	Sets the IP address update policy in the specified DDNS profile. The `no` command clears the policy.
`[no] ip-select-backup {iface | auto | custom}`	Sets the alternate IP address update policy in the specified DDNS profile. The `no` command clears the policy.
`[no] custom` *ip*	Sets the static IP address in the specified DDNS profile. The `no` command clears it.
`[no] backup-custom` *ip*	Sets the static IP address for the backup interface in the specified DDNS profile. The `no` command clears it.

Table 85 ip ddns Commands (continued)

COMMAND	DESCRIPTION
[no] mx {*ip* | *domain_name*}	Enables the mail exchanger and sets the fully-qualified domain name of the mail server to which mail from this domain name is forwarded. The no command disables the mail exchanger. *domain_name*: You may up to 254 alphanumeric characters, dashes (-), or periods (.), but the first character must be alphanumeric.
[no] wan-iface *interface_name*	Sets the WAN interface in the specified DDNS profile. The no command clears it.
[no] backup-iface *interface_name*	Sets the backup WAN interface in the specified DDNS profile. The no command clears it.
[no] ha-iface *interface_name*	Sets the HA interface in the specified DDNS profile. The no command clears it.
[no] backmx	Enables the backup mail exchanger. The no command disables it.
[no] wildcard	Enables the wildcard feature. The no command disables it.
[no] url {URL TEXT}	Type the URL that can be used to access the server that will host the DDSN service. For example, # url /api/dynamic/update.php?hostname=home.example.com& ip=10.1.1.1 The no command disables it.
[no] ddns-server {FQDN DNS}	Type the IP address of the server that will host the DDSN service. For example, # ddns-server www.dnspark.net The no command disables it.
[no] additional-ddns-options	Avaialable for User custom. Enter one ofg the following. • --ip_server_name which should be the URL to get the server's public IP address - for example, http://myip.easylife.tw/ • --dyndns_system to specify the DYNDNS Server type - for example, dyndns@dyndns.org

19.3 DDNS Commands Example

The following example sets up a DDNS profile where the interface is wan1 and uses HTTP..

```
Router# configure terminal
Router(config)# ip ddns profile bbb
# activate
# service-type user-custom
# username yjyeh001 password xxxxxx
# host yjye007.dyndns.org
# wan-iface wan1
# url /nic/update?
# ddns-server members.dyndns.org
# additional-ddns-options --dyndns_system dyndns@dyndns.org
```

CHAPTER 20
Virtual Servers

This chapter describes how to set up, manage, and remove virtual servers. Virtual server commands configure NAT.

20.1 Virtual Server Overview

Virtual server is also known as port forwarding or port translation.

Virtual servers are computers on a private network behind the Zyxel Device that you want to make available outside the private network. If the Zyxel Device has only one public IP address, you can make the computers in the private network available by using ports to forward packets to the appropriate private IP address.

20.1.1 1:1 NAT and Many 1:1 NAT

1:1 NAT - If the private network server will initiate sessions to the outside clients, use 1:1 NAT to have the Zyxel Device translate the source IP address of the server's outgoing traffic to the same public IP address that the outside clients use to access the server.

Many 1:1 NAT - If you have a range of private network servers that will initiate sessions to the outside clients and a range of public IP addresses, use many 1:1 NAT to have the Zyxel Device translate the source IP address of each server's outgoing traffic to the same one of the public IP addresses that the outside clients use to access the server. The private and public ranges must have the same number of IP addresses.

One many 1:1 NAT rule works like multiple 1:1 NAT rules, but it eases the configuration effort since you only create one rule.

20.2 Virtual Server Commands Summary

The following table describes the values required for many virtual server commands. Other values are discussed with the corresponding commands.

Table 86 Input Values for Virtual Server Commands

LABEL	DESCRIPTION
service_object	The name of a service. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
profile_name	The name of the virtual server. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.

The following table lists the virtual server commands.

Table 87   ip virtual-server Commands

COMMAND	DESCRIPTION
show ip virtual-server [profile_name]	Displays information about the specified virtual server or about all the virtual servers.
no ip virtual-server profile_name	Deletes the specified virtual server.
ip virtual-server profile_name interface interface_name original-ip {any | ip | address_object} map-to {address_object | ip} map-type any [nat-loopback [nat-1-1-map] [deactivate] | nat-1-1-map [deactivate] | deactivate]	Creates or modifies the specified virtual server and maps the specified destination IP address (for all destination ports) to the specified destination address object or IP address. The original destination IP is defined by the specified interface (any), the specified IP address (IP), or the specified address object (address-object). NAT loopback allows local users to use a domain name to access this virtual server. Select what kind of NAT this rule is to perform. nat-1-1-map: means the NAT type is either 1:1 NAT or many 1:1 NAT. See Section 20.1.1 on page 168 for more information. Using this command without nat-1-1-map means the NAT type is Virtual Server. This makes computers on a private network behind the Zyxel Device available to a public network outside the Zyxel Device (like the Internet). The deactivate command disables the virtual server rule.
ip virtual-server profile_name interface interface_name original-ip {any | IP | address_object} map-to {address_object | ip} map-type port protocol {any | tcp | udp} original-port <1..65535> mapped-port <1..65535> [nat-loopback [nat-1-1-map] [deactivate] | nat-1-1-map [deactivate] | deactivate]	Creates or modifies the specified virtual server and maps the specified (destination IP address, protocol, and destination port) to the specified (destination IP address and destination port). The original destination IP is defined by the specified interface (any), the specified IP address (IP), or the specified address object (address-object). NAT loopback allows local users to use a domain name to access this virtual server. nat-1-1-map: means the NAT type is either 1:1 NAT or many 1:1 NAT. See Section 20.1.1 on page 168 for more information. Using this command without nat-1-1-map means the NAT type is Virtual Server. This makes computers on a private network behind the Zyxel Device available to a public network outside the Zyxel Device (like the Internet). The deactivate command disables the virtual server rule.
ip virtual-server profile_name interface interface_name original-ip {any | IP | address_object} map-to {address_object | ip} map-type ports protocol {any | tcp | udp} original-port-begin <1..65535> original-port-end <1..65535> mapped-port-begin <1..65535> [nat-loopback [nat-1-1-map] [deactivate] | nat-1-1-map [deactivate] | deactivate]	Creates or modifies the specified virtual server and maps the specified (destination IP address, protocol, and range of destination ports) to the specified (destination IP address and range of destination ports). The original destination IP is defined by the specified interface (any), the specified IP address (IP), or the specified address object (address-object). NAT loopback allows local users to use a domain name to access this virtual server. nat-1-1-map: means the NAT type is either 1:1 NAT or many 1:1 NAT. See Section 20.1.1 on page 168 for more information. Using this command without nat-1-1-map means the NAT type is Virtual Server. This makes computers on a private network behind the Zyxel Device available to a public network outside the Zyxel Device (like the Internet). The deactivate command disables the virtual server rule.

Table 87 ip virtual-server Commands (continued)

COMMAND	DESCRIPTION
ip virtual-server *profile_name* interface *interface_name* original-ip {any | IP | *address_object*} map-to {*address_object* | *ip*} map-type original-service *service_object* mapped-service *service_object* [nat-loopback [nat-1-1-map] [deactivate] | nat-1-1-map [deactivate] | deactivate]	Creates or modifies the specified virtual server and maps the specified (destination IP address, protocol, and service object) to the specified (destination IP address and service object). The original destination IP is defined by the specified interface (any), the specified IP address (IP), or the specified address object (*address-object*). NAT loopback allows local users to use a domain name to access this virtual server. nat-1-1-map: means the NAT type is either 1:1 NAT or many 1:1 NAT. See Section 20.1.1 on page 168 for more information. Using this command without nat-1-1-map means the NAT type is Virtual Server. This makes computers on a private network behind the Zyxel Device available to a public network outside the Zyxel Device (like the Internet). The deactivate command disables the virtual server rule.
ip virtual-server {activate | deactivate} *profile_name*	Activates or deactivates the specified virtual server.
ip virtual-server delete *profile_name*	Deletes the specified virtual server.
ip virtual-server flush	Deletes all virtual servers.
ip virtual-server rename *profile_name profile_name*	Renames the specified virtual server from the first *profile_name* to the second *profile_name*.

20.2.1 Virtual Server Command Examples

The following command creates virtual server WAN-LAN_H323 on the wan1 interface that maps IP addresses 10.0.0.8 to 192.168.1.56. for TCP protocol traffic on port 1720. It also adds a NAT loopback entry.

```
Router# configure terminal
Router(config)# ip virtual-server WAN-LAN_H323 interface wan1 original-ip
10.0.0.8 map-to 192.168.1.56 map-type port protocol tcp original-port 1720
mapped-port 1720 nat-loopback
Router(config)#
```

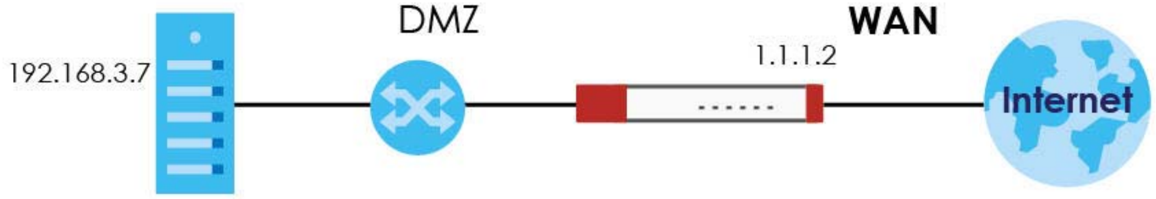
The following command shows information about all the virtual servers in the Zyxel Device.

```
Router(config)# show ip virtual-server
virtual server: WAN-LAN_H323
  Index: 1
  active: yes
  interface: wan1
  NAT-loopback active: yes
  NAT 1-1: no
  original IP: 10.0.0.8
  mapped IP: 192.168.1.56
  mapping type: port
  protocol type: tcp
  original service:
  mapped service:
  original start port: 1720
  original end port:
  mapped start port: 1720
  mapped end port:
Router(config)#
```

20.2.2 Tutorial - How to Allow Public Access to a Server

This is an example of making an HTTP (web) server in the DMZ zone accessible from the Internet (the WAN zone). You will use a public IP address of 1.1.1.2 on the ge2 (or wan1 on some models) interface and map it to the HTTP server's private IP address of 192.168.3.7.

Figure 17 Public Server Example Network Topology



Follow the following steps for the setting.

1 Configure Address object

Create two address objects. One is named DMZ_HTTP for the HTTP server's private IP address of 192.168.3.7. The other one is named ge2_HTTP for the ge2 (wan1) public IP address of 1.1.1.2.

```
Router# configure terminal
Router(config)# address-object DMZ_HTTP 192.168.3.7
Router(config)# address-object ge2_HTTP 1.1.1.2
Router(config)#
```

2 Configure NAT

You need a NAT rule to send HTTP traffic coming to IP address 1.1.1.2 on ge2 (wan1) to the HTTP server's private IP address of 192.168.3.7. Use the following settings:

- This NAT rule is for any HTTP traffic coming in on ge2 (wan1) to IP address 1.1.1.2.

- The NAT rule sends this traffic to the HTTP server's private IP address of 192.168.3.7 (defined in the DMZ_HTTP object).
- HTTP traffic and the HTTP server in this example both use TCP port 80. So you set the port mapping type to "port", the protocol type to "TCP", and the original and mapped ports to "80".

```
Router(config)# ip virtual-server To-VirtualServer-WWW interface ge2
original-ip ge2_HTTP map-to DMZ_HTTP map-type port protocol tcp original-
port 80 mapped-port 80
Router(config)#
```

3 Configure secure policy rule.

Create a firewall rule to allow HTTP traffic from the WAN zone to the DMZ web server.

```
Router(config)# secure-policy  insert 1
Router(secure-policy)# description To-VirtualServer-WWW
Router(secure-policy)# from WAN
Router(secure-policy)# to DMZ
Router(secure-policy)# destinationip DMZ_HTTP
Router(secure-policy)# service HTTP
Router(secure-policy)# exit
Router(config)# write
Router(config)#
```

Now the public can go to IP address 1.1.1.2 to access the HTTP server.

CHAPTER 21 HTTP Redirect

This chapter shows you how to configure HTTP redirection on your Zyxel Device.

21.1 HTTP Redirect Overview

HTTP redirect forwards the client's HTTP request (except HTTP traffic destined for the Zyxel Device) to a web proxy server.

21.1.1 Web Proxy Server

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

21.2 HTTP Redirect Commands

The following table identifies the values required for many of these commands. Other input values are discussed with the corresponding commands.

Table 88 Input Values for HTTP Redirect Commands

LABEL	DESCRIPTION
description	The name to identify the rule. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
interface_name	The name of the interface. Ethernet interface: For some Zyxel Device models, use ge*x*, *x* = 1 - N, where N equals the highest numbered Ethernet interface for your Zyxel Device model. For other Zyxel Device models use a name such as wan1, wan2, opt, lan1, or dmz. virtual interface on top of Ethernet interface: add a colon (:) and the number of the virtual interface. For example: ge*x*:*y*, *x* = 1 - N, *y* = 1 - 4 VLAN interface: vlan*x*, *x* = 0 - 4094 virtual interface on top of VLAN interface: vlan*x*:*y*, *x* = 0 - 4094, *y* = 1 - 4 bridge interface: br*x*, *x* = 0 - N, where N depends on the number of bridge interfaces your Zyxel Device model supports. virtual interface on top of bridge interface: br*x*:*y*, *x* = the number of the bridge interface, *y* = 1 - 4 PPPoE/PPTP interface: ppp*x*, *x* = 0 - N, where N depends on the number of PPPoE/PPTP interfaces your Zyxel Device model supports.

The following table describes the commands available for HTTP redirection. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 89 Command Summary: HTTP Redirect

COMMAND	DESCRIPTION
ip http-redirect *description* interface *interface_name* redirect-to *w.x.y.z* <1..65535>	Sets a HTTP redirect rule.
ip http-redirect *description* interface *interface_name* redirect-to *w.x.y.z* <1..65535> deactivate	Disables a HTTP redirect rule.
ip http-redirect activate *description*	Enables a rule with the specified rule name.
ip http-redirect deactivate *description*	Disables a rule with the specified rule name.
no ip http-redirect *description*	Removes a rule with the specified rule name.
ip http-redirect flush	Clears all HTTP redirect rules.
show ip http-redirect [*description*]	Displays HTTP redirect settings.

21.2.1 HTTP Redirect Command Examples

The following commands create a HTTP redirect rule, disable it and display the settings.

```
Router# configure terminal
Router(config)# ip http-redirect example1 interface ge1 redirect-to
10.10.2.3 80
Router(config)# ip http-redirect example1 interface ge1 redirect-to
10.10.2.3 80 deactivate
Router(config)# show ip http-redirect
Name                            Interface    Proxy Server    Port    Active
===========================================================================
example1                         ge1          10.10.2.3       80      no
```

CHAPTER 22
Redirect Service

This chapter shows you how to configure HTTP and SMTP redirection on your Zyxel Device.

22.1 HTTP Redirect

HTTP redirect forwards the client’s HTTP request (except HTTP traffic destined for the Zyxel Device) to a web proxy server. A proxy server helps client devices make indirect requests to access the Internet or outside network resources/services. The web proxy provides caching service to allow quick access and reduce network usage. The proxy checks its local cache for the requested web resource first. If it is not found, the proxy gets it from the specified server and forwards the response to the client.

22.2 SMTP Redirect

SMTP redirect forwards the authenticated client’s SMTP message to a SMTP server, that handles all outgoing e-mail messages. The Zyxel Device forwards SMTP traffic using TCP port 25.

22.3 Redirect Commands

The following table identifies the values required for many of these commands. Other input values are discussed with the corresponding commands.

Table 90 Input Values for HTTP Redirect Commands

LABEL	DESCRIPTION
profile_name	The name to identify the rule. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
interface_name	The name of the interface. Ethernet interface: For some Zyxel Device models, use ge*x*, *x* = 1 - N, where N equals the highest numbered Ethernet interface for your Zyxel Device model. For other Zyxel Device models use a name such as wan1, wan2, opt, lan1, or dmz. virtual interface on top of Ethernet interface: add a colon (:) and the number of the virtual interface. For example: ge*x*:*y*, *x* = 1 - N, *y* = 1 - 4 VLAN interface: vlan*x*, *x* = 0 - 4094 virtual interface on top of VLAN interface: vlan*x*:*y*, *x* = 0 - 4094, *y* = 1 - 4 bridge interface: br*x*, *x* = 0 - N, where N depends on the number of bridge interfaces your Zyxel Device model supports. virtual interface on top of bridge interface: br*x*:*y*, *x* = the number of the bridge interface, *y* = 1 - 4 PPPoE/PPTP interface: ppp*x*, *x* = 0 - N, where N depends on the number of PPPoE/PPTP interfaces your Zyxel Device model supports.
user_name	This is the user account or user group name to which this rule is applied.

The following table describes the commands available for HTTP redirection. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 91 Command Summary: Redirect

COMMAND	DESCRIPTION
`redirect-service append <1..20>`	Adds a new Redirect rule and enters sub-command mode.
`redirect-service <1..20>`	Edits an existing Redirect rule and enters sub-command mode.
`[no] activate`	Enables the Redirect rule. The `no` command disables the Redirect rule.
`exit`	Leaves sub-command mode
`[no] interface interface_name`	Names the interface for the Redirect rule. The *no* command restores the interface to `any`.
`[no] name profile_name`	Names the Redirect rule to identify it. The *no* command restores the name to `default`.
`[no] port <1..65535>`	Sets the service port for the Redirect rule. The *no* command restores the `http-redirect` port to `80`, and the `smtp-redirect` port to `25`.

Table 91 Command Summary: Redirect (continued)

COMMAND	DESCRIPTION
`[no] server <fqdn> <w.x.y.z>`	Sets the fully-qualified domain name or IPv4 address for the Redirect rule. The *no* command clears the server.
`[no] service {http-redirect | smtp-redirect}`	Configures HTTP-redirect or SMTP-redirect as the Redirect rule. The *no* command restores the service to `http-redirect`.
`[no] source profile_name`	Configures the address or address group object. The *no* command restores the source to `any`.
`[no] user user_name`	Configures the user account or user group to which this rule is applied. The *no* command restores the user to `any`.
`redirect-service flush`	Clears all Redirect rules.
`redirect-service insert <1..20>`	Inserts a new Redirect rule at the specified location and enters sub-command mode.
`redirect-service move <1..20> to <1..20>`	Moves a Redirect rule to the specified location.
`show redirect-service <1..20>`	Displays details of the specified Redirect rule.

22.3.1 Redirect Command Example

The following commands show how to create and display Redirect service rules on the Zyxel Device.

```
Router(config)# redirect-service append
Router(redirect-service)# interface ge4
Router(redirect-service)# name test
Router(redirect-service)# port 11111
Router(redirect-service)# service smtp-redirect
Router(redirect-service)# server 1.1.1.1
Router(redirect-service)# user admin
Router(redirect-service)# activate
Router(redirect-service)# exit
Router(config)# show redirect-service
redirect service rule: 1
  active: yes
  name: default
  service: http-redirect
  user: any
  incoming interface: any
  source address: any
  server:
  port: 80
  id: 1
redirect service rule: 2
  active: yes
  name: default
  service: http-redirect
  user: any
  incoming interface: any
  source address: any
  server:
  port: 80
  id: 0
redirect service rule: 3
  active: yes
  name: default
  service: append
  user: any
  incoming interface: any
  source address: any
  server:
  port: 80
  id: 2
redirect service rule: 4
  active: yes
  name: test
  service: smtp-redirect
  user: admin
  incoming interface: ge4
  source address: any
  server: 1.1.1.1
  port: 11111
  id: 3
Router(config)#
```

CHAPTER 23
ALG

This chapter covers how to use the Zyxel Device's ALG feature to allow certain applications to pass through the Zyxel Device.

23.1 ALG Introduction

The Zyxel Device can function as an Application Layer Gateway (ALG) to allow certain NAT un-friendly applications (such as SIP) to operate properly through the Zyxel Device's NAT.

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

The Zyxel Device only needs to use the ALG feature for traffic that goes through the Zyxel Device's NAT. The firewall allows related sessions for VoIP applications that register with a server. The firewall allows or blocks peer to peer VoIP traffic based on the firewall rules.

You do not need to use a TURN (Traversal Using Relay NAT) server for VoIP devices behind the Zyxel Device when you enable the SIP ALG.

23.2 ALG Commands

The following table lists the `alg` commands. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 92 alg Commands

COMMAND	DESCRIPTION
`[no] alg sip [direct-media | direct-signalling | inactivity-timeout | | media-timeout <1..86400> | signal-timeout <1..86400> | transformation]`	Turns on or configures the ALG. Use `direct-media to` to set the Zyxel Device to allow SIP audio session. Use `direct-signalling` to set the Zyxel Device to allow SIP signaling sessions. Use `inactivity-timeout` to have the Zyxel Device apply SIP media and signaling inactivity time out limits. Use `media-timeout` and a number of seconds (1~86400) for how long to allow a voice session to remain idle (without voice traffic) before dropping it. Use `signal-timeout` and a number of seconds (1~86400) for how long to allow a SIP signaling session to remain idle (without SIP packets) before dropping it. Use `transformation` to have the Zyxel Device modify IP addresses and port numbers embedded in the SIP data payload. You do not need to use this if you have a SIP device or server that will modify IP addresses and port numbers embedded in the SIP data payload. The `no` command turns off the SIP ALG or removes the settings that you specify.
`alg sip defaultport`	Enters ALG SIP default port sub-command
`Router(SIP Signaling Port)# [no] port <1025..65535>`	Enter the custom UDP port number for SIP traffic. The `no` command removes the custom UDP port number for SIP traffic.
`[no] alg <h323 | ftp> [signal-port <1025..65535> | signal-extra-port <1025..65535> | transformation]`	Turns on or configures the H.323 or FTP ALG. Use `signal-port` with a listening port number (1025 to 65535) if you are using H.323 on a TCP port other than 1720 or FTP on a TCP port other than 21. Use `signal-extra-port` with a listening port number (1025 to 65535) if you are also using H.323 or FTP on an additional TCP port number, enter it here. Use `transformation` to have the Zyxel Device modify IP addresses and port numbers embedded in the H.323 or FTP data payload. You do not need to use this if you have an H.323 or FTP device or server that will modify IP addresses and port numbers embedded in the H.323 or FTP data payload. The `no` command turns off the H.323 or FTP ALG or removes the settings that you specify.
`show alg <sip | h323 | ftp>`	Displays the specified ALG's configuration.

23.3 ALG Commands Example

The following example turns on pass through for SIP and turns it off for H.323.

```
Router# configure terminal
Router(config)# alg sip
Router(config)# no alg h323
```

CHAPTER 24 UPnP

24.1 UPnP and NAT-PMP Overview

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

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

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

24.2 UPnP and NAT-PMP Commands

The following table lists the `ip upnp` commands. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 93 ip upnp Commands

COMMAND	DESCRIPTION
`ip upnp`	Enters the `config-upnp` sub-command mode to configure the UPnP or NAT-PMP settings.
`[no] bypass-firewall activate`	Allows traffic from UPnP-enabled or NAT-PMP-enabled applications to bypass the firewall. The `no` command has the firewall block all UPnP or NAT-PMP application packets (for example, MSN packets).
`link-sticking outgoing interface {`*`interface_name`*` | all}`	Specifies through which WAN interface(s) you want to send out traffic from UPnP-enabled or NAT-PMP-enabled applications. If the WAN interface you specified loses its connection, the Zyxel Device attempts to use the other WAN interface. If the other WAN interface also does not work, the Zyxel Device drops outgoing packets from UPnP-enabled or NAT-PMP-enabled applications.
`[no] listen-interface `*`interface_name`*	Enables UPnP and/or NAT-PMP on an internal interface. The `no` command disables UPnP and/or NAT-PMP on the interface.

Table 93 ip upnp Commands (continued)

COMMAND	DESCRIPTION
[no] nat-pmp activate	Enables NAT-PMP on the Zyxel Device. The no command disables NAT-PMP on the Zyxel Device.
[no] upnp-igd activate	Enables UPnP on the Zyxel Device. The no command disables UPnP on the Zyxel Device.
no ip upnp port-mapping port {<1..65535> type <tcp|udp> | all}	Removes all or a specific port mapping rule.
show ip upnp listen-interface	Displays the name(s) of the internal interface(s) on which the Zyxel Device supports UPnP and/or NAT-PMP.
show ip upnp port-mapping	Displays the UPnP and/or NAT-PMP port mapping rules on the Zyxel Device.
show ip upnp status	Displays the UPnP and/or NAT-PMP configuration.

24.3 UPnP & NAT-PMP Commands Example

The following example turns on UPnP and NAT-PMP on the Zyxel Device and it's two LAN interfaces. It also shows the UPnP and NAT-PMP settings.

```
Router# configure terminal
Router(config)# ip upnp
Router(config-upnp)# nat-pmp activate
Router(config-upnp)# upnp-igd activate
Router(config-upnp)# listen-interface lan1
Router(config-upnp)# listen-interface lan2
Router(config-upnp)# exit
Router(config)# show ip upnp status
upnp active: yes
nat-pmp active: yes
bypass-firewall active: no
link-sticking outgoing: all
Router(config)# show ip upnp listen-interface
interface
================================================================================
lan1
lan2
Router(config)#
```

The following example displays the Zyxel Device’s port mapping entries and removes the entry with the specified port number and protocol type.

```
Router# configure terminal
Router(config) # show ip upnp port-mapping
No: 0
  Remote Host: (null)
  Client Type: upnp
  External Port: 1122
  Protocol: tcp
  Internal Port: 1122
  Internal Client: 172.16.1.2
  Description: test1
No: 1
  Remote Host: (null)
  Client Type: upnp
  External Port: 5566
  Protocol: tcp
  Internal Port: 5566
  Internal Client: 172.16.1.2
  Description: test2
Router(config)# no ip upnp port-mapping port 5566 type tcp
Router(config)# show ip upnp port-mapping
No: 0
  Remote Host: (null)
  Client Type: upnp
  External Port: 1122
  Protocol: tcp
  Internal Port: 1122
  Internal Client: 172.16.1.2
  Description: test1
Router(config)#
```

CHAPTER 25
IP/MAC Binding

25.1 IP/MAC Binding Overview

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

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

25.2 IP/MAC Binding Commands

The following table lists the `ip-mac-binding` commands. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 94 ip-mac-binding Commands

COMMAND	DESCRIPTION
`[no] ip ip-mac-binding` *`interface_name`* `activate`	Turns on IP/MAC binding for the specified interface. The `no` command turns IP/MAC binding off for the specified interface.
`[no] ip ip-mac-binding` *`interface_name`* `log`	Turns on the IP/MAC binding logs for the specified interface. The `no` command turns IP/MAC binding logs off for the specified interface.
`ip ip-mac-binding exempt` *`name start-ip end-ip`*	Adds a named IP range as being exempt from IP/MAC binding.
`no ip ip-mac-binding exempt` *`name`*	Deletes the named IP range from the list of addresses that are exempt from IP/MAC binding.
`show ip ip-mac-binding` *`interface_name`*	Shows whether IP/MAC binding is enabled or disabled for the specified interface.
`show ip ip-mac-binding all`	Shows whether IP/MAC binding is enabled or disabled for all interfaces.
`show ip ip-mac-binding status` *`interface_name`*	Displays the current IP/MAC bindings for the specified interface.
`show ip ip-mac-binding status all`	Displays the current IP/MAC bindings for all interfaces.
`show ip ip-mac-binding exempt`	Shows the current IP/MAC binding exempt list.
`ip ip-mac-binding clear-drop-count` *`interface_name`*	Resets the packet drop counter for the specified interface.
`debug ip ip-mac-binding activate`	Turns on the IP/MAC binding debug logs.
`no debug ip ip-mac-binding activate`	Turns off the IP/MAC binding debug logs.

25.3 IP/MAC Binding Commands Example

The following example enables IP/MAC binding on the LAN1 interface and displays the interface's IP/MAC binding status.

```
Router# configure terminal
Router(config)# ip ip-mac-binding lan1 activate
Router(config)# show ip ip-mac-binding lan1
Name: lan1
Status: Enable
Log: No
Binding Count: 0
Drop Count: 0
Router(config)#
```

CHAPTER 26
Layer 2 Isolation

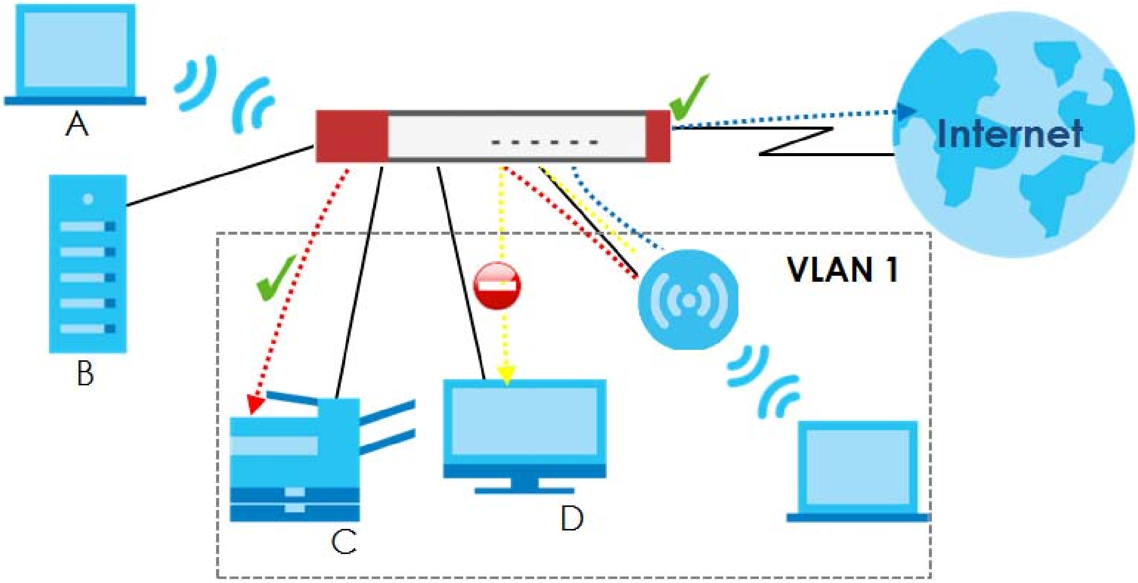
26.1 Layer 2 Isolation Overview

Layer-2 isolation is used to prevent connected devices from communicating with each other in the Zyxel Device's local network(s), on which layer-2 isolation is enabled, except the devices in the white list.

Note: Layer-2 isolation does not check the wireless traffic.

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

Figure 18 Layer-2 Isolation Application



26.2 Layer 2 Isolation Commands

The following table lists the `l2-isolation` commands. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 95 l2-isolation Commands

COMMAND	DESCRIPTION
`l2-isolation`	Enters the layer 2 isolation sub-command mode to enable Layer-2 isolation on the Zyxel Device and specific internal interface(s).
`[no] activate`	Turns on Layer-2 isolation on the Zyxel Device. The `no` command disables Layer-2 isolation on the Zyxel Device.
`[no] interface` *`interface_name`*	Turns on Layer-2 isolation on a specific internal interface. The `no` command disables Layer-2 isolation for the specified interface.
`white-list` *`rule_number`*	Enters the layer 2 isolation white list sub-command mode to set a new rule in the white list. See Table 96 on page 188 for the sub-commands. *`rule_number`*: 1 - N, where N depends on the Zyxel Device model.
`white-list activate`	Turns on the white list on the Zyxel Device. IP addresses that are not listed in the white list are blocked from communicating with other devices in the layer-2-isolation-enabled internal interface(s) except for broadcast packets.
`white-list append`	Enters the layer 2 isolation white list sub-command mode to add a rule to the end of the white list. See Table 96 on page 188 for the sub-commands.
`white-list flush`	Removes all rules in the white list.
`white-list no activate`	Turns the white list off.
`no l2-isolation activate`	Disables Layer-2 isolation on the Zyxel Device.
`no l2-isolation white-list` *`rule_number`*	Disables the specified rule in the white list. *`rule_number`*: 1 - N, where N depends on the Zyxel Device model.
`no l2-isolation white-list activate`	Turns on the white list on the Zyxel Device.
`show l2-isolation`	Displays whether Layer-2 isolation is enabled on an interface.
`show l2-isolation activation`	Displays whether Layer-2 isolation is enabled on the Zyxel Device.
`show l2-isolation white-list [`*`rule_number`*`]`	Displays all or a specified white list rule settings. *`rule_number`*: 1 - N, where N depends on the Zyxel Device model.
`show l2-isolation white-list activation`	Displays whether the white list is enabled.

26.2.1 Layer 2 Isolation White List Sub-Commands

The following table describes the sub-commands for `l2-isolation white-list` commands.

Table 96 l2-isolation white-list Sub-commands

COMMAND	DESCRIPTION
`[no] activate`	Enables the rule. The `no` command disables the rule.

Table 96 l2-isolation white-list Sub-commands (continued)

COMMAND	DESCRIPTION
[no] description *description*	Sets a descriptive name (up to 60 printable ASCII characters) for a rule. The no command removes the descriptive name from the rule.
[no] ip-address *ip*	Sets an IPv4 address associated with this rule. The no command removes the IP address. This is the IP address of device that can be accessed by the devices connected to an internal interface on which layer-2 isolation is enabled.

26.3 Layer 2 Isolation Commands Example

The following example enables Layer-2 isolation on the Zyxel Device and interface lan2. It also creates a rule in the white list to allow access to the device with IP address 172.17.0.66. It then displays the Layer-2 isolation settings.

```
Router# configure terminal
Router(config)# l2-isolation
Router(l2-isolation)# activate
Router(l2-isolation)# interface lan2
Router(l2-isolation)# white-list 1
Router(white-list)# activate
Router(white-list)# description PC
Router(white-list)# ip-address 172.17.0.66
Router(white-list)# exit
Router(config)# show l2-isolation
interface
================================================================================
lan2
Router(config)# show l2-isolation activation
Layer2 Isolation Status: yes
Router(config)# show l2-isolation white-list
layer2 isolation white list rule: 1
  active: yes
  ip address: 172.17.0.66
  description:    PC
Router(config)#
```

CHAPTER 27 Secure Policy

This chapter introduces the Zyxel Device's secure policies and shows you how to configure them.

Note: In the guide Secure Policy commands may also be referred to as Firewall in general descriptions.

27.1 Secure Policy Overview

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

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

The policy can be configured:

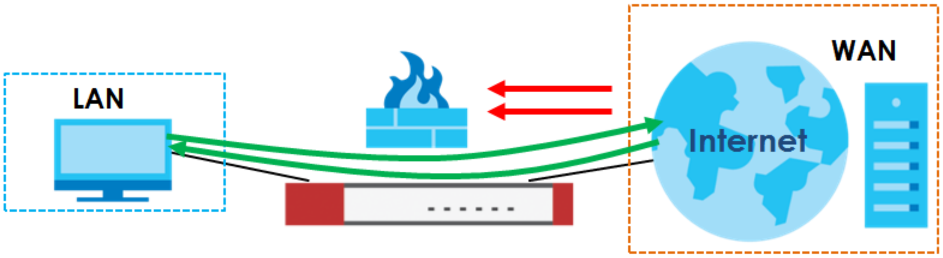
- to allow or deny traffic that matches the criteria above
- send a log or alert for traffic that matches the criteria above
- to apply the actions configured in the UTM profiles (application patrol, content filter, IDP, anti-virus, anti-spam) to traffic that matches the criteria above

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

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

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

Figure 19 Default Directional Policy Example



27.2 Secure Policy Commands

The following table identifies the values required for many of these commands. Other input values are discussed with the corresponding commands.

Table 97 Input Values for Secure Policy Commands

LABEL	DESCRIPTION
address_object	The name of the IP address (or address group) object. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
address6_object	The name of the IPv6 address (or address group) object. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
user_name	The name of a user (group). You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
zone_object	The name of the zone. For some Zyxel Device models, use up to 31 characters (a-zA-Z0-9_-). The name cannot start with a number. This value is case-sensitive. For other Zyxel Devicemodels, use pre-defined zone names like DMZ, LAN1, SSL VPN, IPSec VPN, OPT, and WAN.
rule_number	The priority number of a secure policy. 1 - *X* where *X* is the highest number of rules the Zyxel Device model supports. See the Zyxel Device's User's Guide for details.
schedule_object	The name of the schedule. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
service_name	The name of the service (group). You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.

The following table describes the commands available for the secure policy. You must use the `configure terminal` command to enter the configuration mode before you can use the configuration commands. Commands that do not have IPv6 specified in the description are for IPv4.

Table 98 Command Summary: Secure Policy

COMMAND	DESCRIPTION
`secure-policy activate`	Enables Secure Policy on the Zyxel Device to perform access control.
`secure-policy backup activate`	Backs up all secure policies configured on the Zyxel Device when you make any configuration changes (insert/modify/delete/ append). Type `dir /conf/` to see all configuration files on the Zyxel Device. These files are also visible in **Maintenance > File Manager > Configuration File** in the web configurator. Filenames beginning with autoback are automatic configuration files created when new firmware is uploaded. `backup-yyyy-mm-dd-hh-mm-ss.conf` is the name of the automatic backup when a secure policy is added or changed. Type `appy` *`config-file-name`* to restore secure policy configuration to what it was before that change.
`show secure-policy backup status`	Displays if backing up of secure policies when changes are done is configured on the Zyxel Device.

Table 98 Command Summary: Secure Policy (continued)

COMMAND	DESCRIPTION
show secure-policy filter from *zone_object* to *zone_object* srcip *<ip-address>* dstip *<ip>* service {any | tcp | udp | icmp | gre | esp | user-defined} *port-number* user *user_name* sch *schedule_object*	Applies IPv4 search filters to find specific IPv4 security policies based on direction, application, user, source, destination and/or schedule.
[no] secure-policy asymmetrical-route activate	Allows or disallows asymmetrical route topology.
secure-policy *rule_number*	Enters the secure policy sub-command mode to set a firewall rule. See Table 99 on page 194 for the sub-commands.
secure-policy *zone_object* {*zone_object*|ZyWALL} *rule_number*	Enters the secure policy sub-command mode to set a direction specific through-ZyWALL rule or to-ZyWALL rule. See Table 99 on page 194 for the sub-commands.
secure-policy *zone_object* {*zone_object*|ZyWALL} append	Enters the secure policy sub-command mode to add a direction specific through-ZyWALL rule or to-ZyWALL rule to the end of the global rule list. See Table 99 on page 194 for the sub-commands.
secure-policy *zone_object* {*zone_object*|ZyWALL} delete <1..5000>	Removes a direction specific through-ZyWALL rule or to-ZyWALL rule. <1..5000>: the index number in a direction specific secure policy rule list.
secure-policy *zone_object* {*zone_object*|ZyWALL} flush	Removes all direction specific through-ZyWALL rule or to-ZyWALL rules.
secure-policy *zone_object* {*zone_object*|ZyWALL} insert *rule_number*	Enters the secure policy sub-command mode to add a direction specific through-ZyWALL rule or to-ZyWALL rule before the specified rule number. See Table 99 on page 194 for the sub-commands.
secure-policy *zone_object* {*zone_object*|ZyWALL} move *rule_number* to *rule_number*	Moves a direction specific through-ZyWALL rule or to-ZyWALL rule to the number that you specified.
[no] secure-policy activate	Enables the secure policy on the Zyxel Device. The no command disables the secure policy.
secure-policy append	Enters the secure policy sub-command mode to add a global secure policy rule to the end of the global rule list. See Table 99 on page 194 for the sub-commands.
secure-policy default-rule action {allow | deny | reject} { no log | log [alert] }	Sets how the secure policy handles packets that do not match any other secure policy rule.
secure-policy delete *rule_number*	Removes a secure policy rule.
secure-policy flush	Removes all secure policy rules.
secure-policy insert *rule_number*	Enters the secure policy sub-command mode to add a secure policy rule before the specified rule number. See Table 99 on page 194 for the sub-commands.
secure-policy move *rule_number* to *rule_number*	Moves a secure policy rule to the number that you specified.
firewall icsa {icmp-destroy-session} {enable | disable}	During ICSA certification a connection automatically terminates immediately once ICMP unreachable or ICMP TTL expired is received. Use this command to turn off this behavior.

Table 98   Command Summary: Secure Policy (continued)

COMMAND	DESCRIPTION
`show firewall icsa status`	Displays if a ICSA certification connection is automatically terminated immediately once ICMP unreachable or ICMP TTL expired is received.
`show secure-policy`	Displays all Secure Policy settings.
`show secure-policy rule_number`	Displays a secure policy rule's settings.
`show secure-policy zone_object {zone_object|ZyWALL}`	Displays all secure policy rules settings for the specified packet direction.
`show secure-policy zone_object {zone_object|ZyWALL} rule_number`	Displays a specified secure policy rule's settings for the specified packet direction.
`show secure-policy status`	Displays whether or not the secure policy is active, whether or not asymmetrical route topology is allowed, and the default secure policy rule's configuration.
`show secure-policy block_rules`	Displays all the secure policy rules that deny access.
`show secure-policy any ZyWALL`	Shows all the to-Zyxel Device secure policy rules.
`show secure-policy6 filter from zone_object to zone_object srcip6 <ip-address> dstip6 <ip> service {any | tcp | udp | icmp | gre | esp | user-defined} port-number user user_name sch schedule_object`	Applies IPv6 search filters to find specific IPv6 (if enabled) security policies based on direction, application, user, source, destination and/or schedule.
`secure-policy6 rule_number`	Enters the IPv6 secure policy sub-command mode to set a secure policy rule. See Table 99 on page 194 for the sub-commands.
`secure-policy6 zone_object {zone_object|ZyWALL} rule_number`	Enters the IPv6 firewall sub-command mode to set a direction specific through-ZyWALL rule or to-ZyWALL rule. See Table 99 on page 194 for the sub-commands.
`secure-policy6 zone_object {zone_object|ZyWALL} append`	Enters the IPv6 secure policy sub-command mode to add a direction specific through-ZyWALL rule or to-ZyWALL rule to the end of the global rule list. See Table 99 on page 194 for the sub-commands.
`secure-policy6 zone_object {zone_object|ZyWALL} delete <1..5000>`	Removes a direction specific IPv6 through-ZyWALL rule or to-ZyWALL rule. `<1..5000>`: the index number in a direction specific firewall rule list.
`secure-policy6 zone_object {zone_object|ZyWALL} flush`	Removes all direction specific IPv6 through-ZyWALL rule or to-ZyWALL rules.
`secure-policy6 zone_object {zone_object|ZyWALL} insert rule_number`	Enters the IPv6 secure policy sub-command mode to add a direction specific through-ZyWALL rule or to-ZyWALL rule before the specified rule number. See Table 99 on page 194 for the sub-commands.
`secure-policy6 zone_object {zone_object|ZyWALL} move rule_number to rule_number`	Moves a direction specific IPv6 through-ZyWALL rule or to-ZyWALL rule to the number that you specified.
`[no] secure-policy6 activate`	Enables the IPv6 secure policy on the Zyxel Device. The `no` command disables the IPv6 firewall.
`secure-policy6 append`	Enters the IPv6 secure policy sub-command mode to add a global firewall rule to the end of the global rule list. See Table 99 on page 194 for the sub-commands.

Table 98 Command Summary: Secure Policy (continued)

COMMAND	DESCRIPTION
`secure-policy6 default-rule action {allow | deny | reject} { no log | log [alert] }`	Sets how the IPv6 secure policy handles packets that do not match any other secure policy rule.
`secure-policy6 delete rule_number`	Removes a IPv6 secure policy rule.
`secure-policy6 flush`	Removes all IPv6 secure policy rules.
`secure-policy6 insert rule_number`	Enters the IPv6 secure policy sub-command mode to add a secure policy rule before the specified rule number. See Table 99 on page 194 for the sub-commands.
`secure-policy6 move rule_number to rule_number`	Moves a IPv6 secure policy rule to the number that you specified.
`show secure-policy6`	Displays all IPv6 secure policy settings.
`show secure-policy6 rule_number`	Displays a IPv6 secure policy rule's settings.
`show secure-policy6 zone_object {zone_object|ZyWALL}`	Displays all IPv6 secure policy rules settings for the specified packet direction.
`show secure-policy6 zone_object {zone_object|ZyWALL} rule_number`	Displays a specified IPv6 secure policy rule's settings for the specified packet direction.
`show secure-policy6 status`	Displays whether or not the IPv6 secure policy is active, whether or not IPv6 asymmetrical route topology is allowed, and the default IPv6 secure policy rule's configuration.
`show secure-policy6 block_rules`	Displays all the IPv6 secure policy rules that deny access.
`show secure-policy6 any ZyWALL`	Shows all the IPv6 to-Zyxel Device secure policy rules.
`[no] secure-policy6 asymmetrical-route activate`	Allows or disallows asymmetrical route topology for IPv6 traffic.
`session-status-update reply-time <5..300>`	Set how many seconds the Zyxel Device will allow a session to remain idle (without traffic) before closing it.
`session-status-update alg {active|inactive}`	Enables or Disables ALG session updates
`show session-status-update reply-time`	Displays idle session timeout

27.2.1 Secure Policy Sub-Commands

The following table describes the sub-commands for several `secure-policy` and `secure-policy6` commands.

Table 99 firewall Sub-commands

COMMAND	DESCRIPTION
`action {allow|deny|reject}`	Sets the action the Zyxel Device takes when packets match this rule.
`[no] activate`	Enables a secure policy rule. The `no` command disables the rule.

Table 99 firewall Sub-commands (continued)

COMMAND	DESCRIPTION
[no] ctmatch {dnat | snat}	Use dnat to block packets sent from a computer on the Zyxel Device's WAN network from being forwarded to an internal network according to a virtual server rule. Use snat to block packets sent from a computer on the Zyxel Device's internal network from being forwarded to the WAN network according to a 1:1 NAT or Many 1:1 NAT rule. The no command forwards the matched packets. Subcommands cannot be used with secure-policy6.
[no] description *description*	Sets a descriptive name (up to 60 printable ASCII characters) for a secure policy rule. The no command removes the descriptive name from the rule.
[no] destinationip *address_object*	Sets the destination IP address. The no command resets the destination IP address(es) to the default (any). any means all IP addresses.
[no] destinationip6 *address_object*	Sets the destination IPv6 address. The no command resets the destination IP address(es) to the default (any). any means all IP addresses.
[no] from *zone_object*	Sets the zone on which the packets are received. The no command removes the zone on which the packets are received and resets it to the default (any) meaning all interfaces or VPN tunnels.
[no] log [alert]	Sets the Zyxel Device to create a log (and optionally an alert) when packets match this rule. The no command sets the Zyxel Device not to create a log or alert when packets match this rule.
[no] schedule *schedule_object*	Sets the schedule that the rule uses. The no command removes the schedule settings from the rule.
[no] service *service_name*	Sets the service to which the rule applies. The no command resets the service settings to the default (any). any means all services.
[no] sourceip *address_object*	Sets the source IP address(es). The no command resets the source IP address(es) to the default (any). any means all IP addresses.
[no] sourceip6 *address_object*	Sets the source IP address(es). The no command resets the source IP address(es) to the default (any). any means all IP addresses.
[no] sourceport {tcp|udp} {eq <1..65535>|range <1..65535> <1..65535>}	Sets the source port for a secure policy rule. The no command removes the source port from the rule.
[no] to {*zone_object*|ZyWALL}	Sets the zone to which the packets are sent. The no command removes the zone to which the packets are sent and resets it to the default (any). any means all interfaces or VPN tunnels.
[no] user *user_name*	Sets a user-aware secure policy rule. The rule is activated only when the specified user logs into the system. The no command resets the user name to the default (any). any means all users. Subcommands cannot be used with secure-policy6.
secure-policy <*profile name*>	Creates a secure policy rule. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.

Table 99 firewall Sub-commands (continued)

COMMAND	DESCRIPTION
[no] cf-profile *<profile name>* {[no log]|[log by-profile]} {activate | deactivate}	Applies the (already-created) named anti- x profile to traffic that matches the secure-policy rule. Log by-profile generates a log for all traffic that matches criteria in the anti- x profile. no log does turns off logging and overrides the anti- x profile log setting. The no command does not apply the named anti- x profile to traffic that matches the secure-policy rule.
[no] as-profile *<profile name>* {[no log]|[log by-profile]} {activate | deactivate}	Applies the (already-created) named anti- x profile to traffic that matches the secure-policy rule. Log by-profile generates a log for all traffic that matches criteria in the anti- x profile. no log does turns off logging and overrides the anti- x profile log setting. The no command does not apply the named anti- x profile to traffic that matches the secure-policy rule.
[no] av-profile *<profile name>*{[no log]|[log by-profile]} {activate | deactivate}	Applies the (already-created) named anti- x profile to traffic that matches the secure-policy rule. Log by-profile generates a log for all traffic that matches criteria in the anti- x profile. no log does turns off logging and overrides the anti- x profile log setting. The no command does not apply the named anti- x profile to traffic that matches the secure-policy rule.
[no] idp-profile *<profile name>* {[no log]|[log by-profile]} {activate | deactivate}	Applies the (already-created) named anti- x profile to traffic that matches the secure-policy rule. Log by-profile generates a log for all traffic that matches criteria in the anti- x profile. no log does turns off logging and overrides the anti- x profile log setting. The no command does not apply the named anti- x profile to traffic that matches the secure-policy rule.
[no] ssl-profile *<profile name>* {[no log]|[log by-profile]} {activate | deactivate}	Applies the (already-created) named anti- x profile to traffic that matches the secure-policy rule. Log by-profile generates a log for all traffic that matches criteria in the anti- x profile. no log does turns off logging and overrides the anti- x profile log setting. The no command does not apply the named anti- x profile to traffic that matches the secure-policy rule.
[no] app-profile *<profile name>* {[no log]|[log by-profile]} {activate | deactivate}	Applies the (already-created) named anti- x profile to traffic that matches the secure-policy rule. Log by-profile generates a log for all traffic that matches criteria in the anti- x profile. no log does turns off logging and overrides the anti- x profile log setting. The no command does not apply the named anti- x profile to traffic that matches the secure-policy rule.

27.2.2 Secure Policy Command Examples

These are IPv4 secure policy configuration examples. The IPv6 secure policy commands are similar.

The following example shows you how to add an IPv4 secure policy rule to allow a MyService connection from the WAN zone to the IP addresses Dest_1 in the LAN zone.

- Enter configuration command mode.
- Create an IP address object.
- Create a service object.
- Enter the secure policy sub-command mode to add a secure policy rule.
- Set the direction of travel of packets to which the rule applies.
- Set the destination IP address(es).
- Set the service to which this rule applies.

- Set the action the Zyxel Device is to take on packets which match this rule.

```
Router# configure terminal
Router(config)# service-object MyService tcp eq 1234
Router(config)# address-object Dest_1 10.0.0.10-10.0.0.15
Router(config)# secure-policy insert 3
Router(secure-policy)# from WAN
Router(v)# to LAN
Router(secure-policy)# destinationip Dest_1
Router(secure-policy)# service MyService
Router(secure-policy)# action allow
```

The following command displays the default IPv4 secure policy rule that applies to the WAN to Zyxel Device packet direction. The secure policy rule number is in the rule's priority number in the global rule list.

```
Router(config)# show secure-policy WAN ZyWALL

secure-policy rule: 11
  name: WAN_to_Device
  description:
  user: any, schedule: none
  from: WAN, to: ZyWALL
  source IP: any, source port: any
  destination IP: any, service: Default_Allow_WAN_To_ZyWALL
  log: no, action: allow, status: yes
  connection match: no
  content-filter profile: none
                 enable: no, log: by-profile
  anti-spam      profile: none
                 enable: no, log: by-profile
  anti-virus     profile: none
                 enable: no, log: by-profile
  idp            profile: none
                 enable: no, log: by-profile
  ssl-inspection profile: none
                 enable: no, log: by-profile
  app-patrol     profile: none
                 enable: no, log: by-profile
```

The following command displays the default IPv6 firewall rule that applies to the WAN to Zyxel Device packet direction. The firewall rule number is in the rule’s priority number in the global rule list.

```
Router(config)# show secure-policy6 WAN ZyWALL

secure-policy rule: 1
  name: Device_Default_Allow_Service
  description:
  user: any, schedule: none
  from: any, to: ZyWALL
  source IP: any, source port: any
  destination IP: any, service: Default_Allow_v6_any_to_ZyWALL
  log: no, action: allow, status: yes
  content-filter profile: none
                 enable: no, log: by-profile
  anti-spam      profile: none
                 enable: no, log: by-profile
  anti-virus     profile: none
                 enable: no, log: by-profile
  idp            profile: none
                 enable: no, log: by-profile
  ssl-inspection profile: none
                 enable: no, log: by-profile
  app-patrol     profile: none
                 enable: no, log: by-profile
secure-policy rule: 11
  name: WAN_to_Device
  description:
  user: any, schedule: none
  from: WAN, to: ZyWALL
  source IP: any, source port: any
  destination IP: any, service: Default_Allow_v6_WAN_To_ZyWALL
  log: no, action: allow, status: yes
  content-filter profile: none
                 enable: no, log: by-profile
  anti-spam      profile: none
                 enable: no, log: by-profile
  anti-virus     profile: none
                 enable: no, log: by-profile
  idp            profile: none
                 enable: no, log: by-profile
  ssl-inspection profile: none
                 enable: no, log: by-profile
  app-patrol     profile: none
                 enable: no, log: by-profile
```

The following commands activate secure-policy backup, displays its status and then shows where to fond the configuration files. Filenames beginning with autoback are automatic configuration files created when new firmware is uploaded. `backup-2017-12-13-13-34-49.conf` is the name of the automatic backup when a secure policy was added or changed. Type `apply backup-2017-12-13-13-34-49.conf` to restore secure policy configuration to what it was before that change.

```
Router(config)# secure-policy backup activate
Router(config)# show secure-policy backup status
secure-policy backup status: yes
Router(config)# dir /conf/
File Name                                         Size     Modified Time
================================================
system-default.conf                             70098    2017-11-03 18:02:19
startup-config.conf                             76090    2017-12-13 13:34:49
lastgood.conf                                   74763    2017-11-23 16:24:54
startup-config-bad.conf                         31999    2017-11-03 18:52:14
411AAPH0Preb1-r58726-2015-04-14-06-03-07.conf   22733    2015-04-14 14:03:07
autobackup-0.00.conf                            27782    2016-12-29 10:51:50
420AAPH0b4s2-2016-12-29-02-46-53.conf           27782    2016-12-29 10:46:53
425AAPH0b2-2017-05-22-06-28-12.conf             28815    2017-05-22 14:28:12
autobackup-4.25.conf                            28815    2017-05-22 14:31:16
430AAPH0b1s1-2017-07-20-08-44-45.conf           29538    2017-07-20 16:44:45
autobackup-4.30.conf                            31999    2017-11-03 18:04:22
430AAPH0b2-2017-08-22-06-09-32.conf             30484    2017-08-22 14:09:32
430AAPH0b3-2017-11-03-10-01-27.conf             31999    2017-11-03 18:01:27
backup-2017-12-13-13-34-49.conf                 75733    2017-12-13 13:34:49
```

27.3 Session Limit Commands

The following table identifies the values required for many of these commands. Other input values are discussed with the corresponding commands.

Table 100 Input Values for General Session Limit Commands

LABEL	DESCRIPTION
rule_number	The priority number of a session limit rule, 1 - 1000.
address_object	The name of the IP address (group) object. You may use 1-31 alphanumeric characters, underscores (_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
address6_object	The name of the IPv6 address (group) object. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
user_name	The name of a user (group). You may use 1-31 alphanumeric characters, underscores (_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.

The following table describes the session-limit commands. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 101 Command Summary: Session Limit

COMMAND	DESCRIPTION
`[no] session-limit activate`	Turns the session-limit feature on or off.
`session-limit limit <0..8192>`	Sets the default number of concurrent NAT/firewall sessions per host.
`session-limit` *rule_number*	Enters the session-limit sub-command mode to set a session-limit rule.

Table 101   Command Summary: Session Limit (continued)

COMMAND	DESCRIPTION
[no] activate	Enables the session-limit rule. The no command disables the session limit rule.
[no] address *address_object*	Sets the source IP address. The no command sets this to any, which means all IP addresses.
[no] description *description*	Sets a descriptive name (up to 64 printable ASCII characters) for a session-limit rule. The no command removes the descriptive name from the rule.
exit	Quits the sub-command mode.
[no] limit <0..8192>	Sets the limit for the number of concurrent NAT/firewall sessions this rule's users or addresses can have. 0 means any.
[no] user *user_name*	Sets a session-limit rule for the specified user. The no command resets the user name to the default (any). any means all users.
session-limit append	Enters the session-limit sub-command mode to add a session-limit rule to the end of the session-limit rule list.
session-limit delete *rule_number*	Removes a session-limit rule.
session-limit flush	Removes all session-limit rules.
session-limit insert *rule_number*	Enters the session-limit sub-command mode to add a session-limit rule before the specified rule number.
session-limit move *rule_number* to *rule_number*	Moves a session-limit to the number that you specified.
show session-limit	Shows the session-limit configuration.
show session-limit begin *rule_number* end *rule_number*	Shows the settings for a range of session-limit rules.
show session-limit *rule_number*	Shows the session-limit rule's settings.
show session-limit status	Shows the general session-limit settings.
[no] session-limit6 activate	Turns the IPv6 session-limit feature on or off.
session-limit6 limit <0..8192>	Sets the default number of concurrent NAT/firewall IPv6 sessions per host.
session-limit6 *rule_number*	Enters the IPv6 session-limit sub-command mode to set a session-limit rule.
[no] activate	Enables the IPv6 session-limit rule. The no command disables the session limit rule.
[no] address6 *address6_object*	Sets the IPv6 source IP address. The no command sets this to any, which means all IP addresses.
[no] description *description*	Sets a descriptive name (up to 64 printable ASCII characters) for a session-limit rule. The no command removes the descriptive name from the rule.
exit	Quits the sub-command mode.
[no] limit <0..8192>	Sets the limit for the number of concurrent NAT/firewall IPv6 sessions this rule's users or addresses can have. 0 means any.
[no] user *user_name*	Sets an IPv6 session-limit rule for the specified user. The no command resets the user name to the default (any). any means all users.
session-limit6 append	Enters the IPv6 session-limit sub-command mode to add a session-limit rule to the end of the session-limit rule list.

Table 101 Command Summary: Session Limit (continued)

COMMAND	DESCRIPTION
`session-limit6 delete` *`rule_number`*	Removes an IPv6 session-limit rule.
`session-limit6 flush`	Removes all IPv6 session-limit rules.
`session-limit6 insert` *`rule_number`*	Enters the IPv6 session-limit sub-command mode to add a session-limit rule before the specified rule number.
`session-limit6 move` *`rule_number`* `to` *`rule_number`*	Moves an IPv6 session-limit to the number that you specified.
`show session-limit6`	Shows the IPv6 session-limit configuration.
`show session-limit6 begin` *`rule_number`* `end` *`rule_number`*	Shows the settings for a range of IPv6 session-limit rules.
`show session-limit6` *`rule_number`*	Shows the IPv6 session-limit rule's settings.
`show session-limit6 status`	Shows the general IPv6 session-limit settings.

27.4 ADP Commands Overview

Anomaly Detection and Prevention (ADP) protects against anomalies based on violations of protocol standards (RFCs – Requests for Comments) and abnormal flows such as port scans. This section introduces ADP, anomaly profiles and applying an ADP profile to a traffic direction.

Traffic Anomalies

Traffic anomaly policies look for abnormal behavior or events such as port scanning, sweeping or network flooding. They operate at OSI layer-2 and layer-3. Traffic anomaly policies may be updated when you upload new firmware.

Protocol Anomalies

Protocol anomalies are packets that do not comply with the relevant RFC (Request For Comments). Protocol anomaly detection includes:

- TCP Decoder
- UDP Decoder
- ICMP Decoder
- IP Decoder

Protocol anomaly policies may be updated when you upload new firmware.

27.4.1 ADP Command Input Values

The following table identifies the values required for many of these commands. Other input values are discussed with the corresponding commands.

Table 102 Input Values for ADP Commands

LABEL	DESCRIPTION
zone-rule	The name of a zone. For some Zyxel Device models, use up to 31 characters (a-zA-Z0-9_-). The name cannot start with a number. This value is case- sensitive. For other Zyxel Device models use pre-defined zone names like DMZ, LAN1, SSL VPN, WLAN, IPSec VPN, OPT, and WAN
adp-profile	The name of an ADP profile. It can consist of alphanumeric characters, the underscore, and the dash, and it is 1-31 characters long. Spaces are not allowed.

27.4.2 ADP Activation Commands

Use these commands to activate ADP and see status.

Table 103 ADP Activation Commands

LABEL	DESCRIPTION
[no] idp anomaly activate	Anomaly detection does not require registration. The `no` command disables the specified service.
show idp anomaly activation	Displays anomaly detection service status.

27.4.3 ADP Global Profile Commands

These commands apply to all ADP profiles on the Zyxel Device.

Table 104 ADP Global Profile Commands

LABEL	DESCRIPTION
`idp rename anomaly` *<profile1> <profile2>*	Rename an ADP anomaly profile originally named profile1 to profile2.
`no idp anomaly` *<profile3>*	Delete an ADP profile named profile3.
`show idp anomaly base profile`	Displays all anomaly detection base profiles.
`show idp anomaly profiles`	Displays all ADP anomaly profiles.
`show idp anomaly rules`	Displays all ADP anomaly rules.

27.4.4 ADP Zone-to-Zone Rule Commands

These commands bind ADP profiles to traffic directions.

Table 105 ADP Zone-to-Zone Rule Commands

LABEL	DESCRIPTION
`idp anomaly rule {append	<1..32>	insert <1..32>}`	Creates an ADP anomaly rule and enters the sub-command mode.
`bind profile`	Binds the ADP anomaly profile to the entry's traffic direction.
`no bind`	Removes the ADP anomaly profile's binding.
`from-zone zone_rule`	Specifies the zone the traffic is coming from.
`[no] activate`	Turns on the ADP anomaly profile to traffic direction binding. The no command turns it off.
`idp anomaly rule {delete <1..32>	move <1..32> to <1..32>}`	Removes or moves an ADP anomaly profile to traffic direction entry.
`no idp anomaly rule <1..32>`	Removes an ADP anomaly profile to traffic direction entry.
`show idp anomaly rules`	Displays the ADP anomaly zone to zone rules.

27.4.5 ADP Add/Edit Profile Sub Commands

These commands create or edit ADP profiles.

Table 106 ADP Add/Edit Profile Commands

LABEL	DESCRIPTION
`idp anomaly` *`adp-profile`* `[base {all	everything	none}]`	Creates a new IDP anomaly profile called *`adp-profile`*. *`adp-profile`* uses the base profile you specify. Enters sub-command mode. All the following commands relate to the new profile. Use exit to quit sub-command mode.
`description` *`description`*	*`description:`* Use up to 60 printable ASCII characters
`no description`	The no command removes the descriptive name from the profile.
`base {all	everything	none}`	Use the base profile you specify. You cannot change the base profile after you specify it.
`scan-detection sensitivity {low	medium	high}`	Sets scan-detection sensitivity.
`no scan-detection sensitivity`	Clears scan-detection sensitivity. The default sensitivity is medium.
`scan-detection block-period <1..3600>`	Sets for how many seconds the ZyWALL / USG blocks all packets from being sent to the victim (destination) of a detected anomaly attack.
`[no] scan-detection {tcp-xxx} {activate	log [alert]	block}`	Activates TCP scan detection options where {tcp-xxx} ={tcp-portscan | tcp-portscan-fin | tcp-portscan-syn tcp-portsweep }. Also sets TCP scan-detection logs or alerts and blocking. no deactivates TCP scan detection, its logs, alerts or blocking.
`[no] scan-detection {udp-portscan} {activate	log [alert]	block}`	Activates or deactivates UDP port scan . Also sets UDP scan-detection logs or alerts and blocking. no deactivates UDP scan detection, its logs, alerts or blocking.

Table 106 ADP Add/Edit Profile Commands (continued)

LABEL	DESCRIPTION
`flood-detection block-period <1..3600>`	Sets for how many seconds the ZyWALL / USG blocks all packets from being sent to the victim (destination) of a detected anomaly attack.
`[no] flood-detection {tcp-flood | udp-flood | icmp-flood | igmp-flood} {activate | log [alert] | block}`	Activates or deactivates TCP, UDP,IGMP or ICMP flood detection. Also sets flood detection logs or alerts and blocking. no deactivates flood detection, its logs, alerts or blocking.
`[no] tcp-decoder {tcp-xxx} activate`	Activates or deactivates tcp decoder options where {tcp-xxx} = {bad-tcp-flag | bad-tcp-l4-size | tcp-fragment | tcp-land}
`tcp-decoder {tcp-xxx} log [alert]`	Sets tcp decoder log or alert options.
`no tcp-decoder {tcp-xxx} log`	Deactivates tcp decoder log or alert options.
`[no] tcp-decoder {tcp-xxx} action {drop | reject- sender | reject-receiver | reject-both}}`	Sets tcp decoder action.
`[no] udp-decoder {bad-udp-l4-size | udp-land | udp-smurf} activate`	Activates or deactivates udp decoder options.
`udp-decoder {bad-udp-l4-size | udp-land | udp-smurf} log [alert]`	Sets udp decoder log or alert options.
`no udp-decoder {bad-udp-l4-size | udp-land | udp-smurf} log`	Deactivates udp decoder log options.
`udp-decoder {bad-udp-l4-size | udp-land | udp-smurf} action {drop | reject-sender | reject-receiver | reject-both}`	Sets udp decoder action.
`no udp-decoder {bad-udp-l4-size | udp-land | udp-smurf} action`	Deactivates udp decoder actions.
`[no] icmp-decoder {bad-icmp-l4-size | icmp-fragment | icmp-smurf} activate`	Activates or deactivates icmp decoder options.
`icmp-decoder {bad-icmp-l4-size | icmp-fragment | icmp-smurf} log [alert]`	Sets icmp decoder log or alert options.
`no icmp-decoder {bad-icmp-l4-size  icmp-fragment | icmp-smurf} log`	Deactivates icmp decoder log options.

Table 106 ADP Add/Edit Profile Commands (continued)

LABEL	DESCRIPTION
`icmp-decoder {bad-icmp-l4-size | icmp-fragment | icmp-smurf} action {drop | reject-sender | reject-receiver | reject-both}`	Sets icmp decoder action.
`no icmp-decoder {bad-icmp-l4-size | icmp-fragment | icmp-smurf} action`	Deactivates icmp decoder actions.
`[no] ip-decoder {ip-spoof | ip-teardrop} activate`	Activates or deactivates ip decoder options.
`[no] ip-decoder {ip-spoof | ip-teardrop} log`	Activates or deactivates ip decoder log options.
`[no] ip-decoder {ip-spoof | ip-teardrop} action {drop | reject-sender | reject-receiver | reject-both}`	Activates or deactivates ip decoder actions.
`exit`	Use exit to quit sub-command mode.
`show idp anomaly profile scan-detection [all details]`	Shows all scan-detection settings of the specified ADP profile.
`show idp anomaly profile scan-detection {tcp-portscan | tcp-portscan-syn | tcp-portsweep | tcp-portscan-fin} details`	Shows selected TCP scan-detection settings for the specified ADP profile.
`show idp anomaly profile scan-detection {udp-portscan} details`	Shows UDP scan-detection settings for the specified ADP profile.
`show idp anomaly profile flood-detection [all details]`	Shows all flood-detection settings for the specified ADP profile.
`show idp anomaly profile flood-detection {tcp-flood | udp-flood | icmp-flood | icmp-flood} details`	Shows flood-detection settings for the specified ADP profile.
`show idp anomaly profile tcp-decoder all details`	Shows tcp-decoder settings for the specified ADP profile.
`show idp anomaly profile tcp-decoder {bad-tcp-flag | bad-tcp-l4-size | tcp-land} details`	Shows tcp-decoder settings for the specified ADP profile.
`show idp anomaly profile udp-decoder all details`	Shows udp-decoder settings for the specified ADP profile.

Table 106 ADP Add/Edit Profile Commands (continued)

LABEL	DESCRIPTION
`show idp anomaly profile udp-decoder {bad-udp-l4-size | udp-land | udp-smurf} details`	Shows specific udp-decoder settings for the specified ADP profile.
`show idp anomaly profile icmp-decoder all details`	Shows all icmp-decoder settings for the specified ADP profile.
`show idp anomaly profile icmp-decoder {bad-icmp-l4-size | icmp-smurf} details`	Shows specific icmp-decoder settings for the specified ADP profile.
`show idp anomaly` *`adp-profile`* `ip-decoder all details`	Shows all ip-decoder settings for the specified ADP profile.
`show idp anomaly` *`adp-profile`* `ip-decoder {ip-spoof | ip-teardrop} details`	Shows specific ip-decoder settings for the specified ADP profile.

CHAPTER 28
Cloud CNM

28.1 Cloud CNM Overview

The Cloud CNM product line consists of Cloud CNM SecuManager, Cloud CNM SecuDeployer and Cloud CNM SecuReporter. You need licenses to use them. You need the SecuManager license to get a **CNM ID** with which you can access the SecuManager server. It is independent from the Zyxel Devices. The SecuReporter license must be activated on each Zyxel Device. The SecuDeployer license must be activated on the SecuDeployer Zyxel Device server.

- Use **SecuManager** to enable and configure management of the Zyxel Device by a Central Network Management system.
- Use **SecuReporter** to enable SecuReporter logging on your Zyxel Device, see license status, type, expiration date and access a link to the SecuReporter web portal. The SecuReporter web portal collects and analyzes logs from your Zyxel Device in order to identify anomalies, alert on potential internal / external threats, and report on network usage.
- Use **SecuDeployer** to enable SecuDeployer which allows a Zyxel Device SecuDeployer server to mange and apply profile template settings to remote Zyxel Device clients. Provisioning can include the settings of one to multiple LAN/DMZ interfaces, Hub & Spoke IPSec tunnels, and/or static route settings for VTI IPSec VPNs.

Note: SecuReporter is not available at the time of writing (see the cover page date).

Note: SecuManager and SecuDeployer cannot both be enabled on a Zyxel Device at the same time.

28.2 Cloud CNM SecuManager

Cloud CNM SecuManager is a Virtual Machine-based (VM) management system that uses the TR-069 protocol to encapsulate commands to ZyWALL/USG devices for management and monitoring; these devices must have firmware that supports the TR-069 protocol.

Cloud CNM SecuManager features include:

- Batch import of managed devices at one time using one CSV file
- See an overview of all managed devices and system information in one place
- Monitor and manage devices
- Install firmware to multiple devices of the same model at one time
- Back up and restore device configuration
- View the location of managed devices on a map
- Receive notification for events and alarms, such as when a device goes down
- Graphically monitor individual devices and see related statistics

- Directly access a device for remote configuration
- Create four types of administrators with different privileges
- Perform Site-to-Site, Hub & Spoke, Fully-meshed and Remote Access VPN provisioning.

To allow Cloud CNM SecuManager management of your Zyxel Device:

- You must have a Cloud CNM SecuManager license with CNM ID number or a Cloud CNM SecuManager server URL.
- The Zyxel Device must be able to communicate with the Cloud CNM SecuManager server.

You must configure SecuManager to allow the Zyxel Device to find the Cloud CNM SecuManager server.

28.2.1 Introduction to XMPP

eXtensible Messaging and Presence Protocol (XMPP) allows Zyxel Device to contact managed devices that normally can't be contacted directly due to they are behind a NAT or firewall-enabled gateway.

The managed devices must be able to establish a secure and authenticated connection to an XMPP Server and must be able to maintain a connection to an XMPP Server through which the XMPP Server can send unsolicited messages from a defined set of allowed addresses (Zyxel Device servers. This is defined in RFC 6120.

The general procedure for XMPP to issue a Connection Request to a managed device is as follows:

1 Zyxel Device establishes a connection to an XMPP Server.

2 The device establishes an XMPP connection to the specified XMPP Server.

3 Whenever Zyxel Device wishes to establish a connection to the device, it can send an XMPP Connection Request specifying the ‘to’ address that matches the device where the Connection Request needs to be sent and a ‘from’ address that matches one of the allowed Zyxel Device addresses in the XMPP Server.

4 The XMPP Server sends the request to the appropriate device.

Note: There could be multiple XMPP Servers depending on the deployment.

28.2.1.1 Zyxel Device Requirements for XMPP

Both Zyxel Device and the managed device must meet these requirements:

- They must be able to determine the public IP address of the XMPP Server.
- They must be able to open an XML Stream to the XMPP Server and accept an XML Stream from the XMPP Server. XML Streams are unidirectional and this XMPP Connection Request mechanism requires the use of two XML Streams over a single TCP connection.
- They must be able to use Transport Layer Security (TLS) to establish an encrypted and secure TCP connection with the XMPP Server
- They must be able to use Simple Authentication and Security Layer (SASL) to authenticate with the XMPP Server. A Username and Password are used as the credentials for the SASL authentication procedure.
- They must be able to reestablish the connection to the XMPP Server if the connection is lost.

28.2.1.2 Managed Device Additional Requirements

The managed device must also meet these requirements:

- A managed device must be able to maintain the TCP connection to the XMPP Server using 'whitespace keepalive'.
- A managed device must be able to listen for XMPP Connection Request messages sent from an allowed list, and respond to these messages when they arrive. When it receives an XMPP Connection Request message, it must both validate and authenticate the message. It must also continue to listen for HTTP-based Connection Requests.
- Whenever a managed device receives, successfully validates, and authenticates an XMPP Connection Request with an Zyxel Device server from an allowed IP address, it must establish a connection with Zyxel Device server and will respond with a '6 CONNECTION REQUEST' EventCode.
- The managed device may reply with a 'service- unavailable' error, code 503, if the number of connection requests exceeds a certain threshold (to reduce the possibility of a Denial of Service attack) or if it is already in a session with another Zyxel Device server.

28.2.2 Cloud CNM SecuManager Commands

The CNM agent allows communications between the Zyxel Device and Cloud CNM SecuManager server using TR-069 Remote Procedure Calls (RPCs).

You must be in configuration mode (`configure terminal`) to use the indented commands shown below.

Table 107 Command Summary: Cloud CNM SecuManager

COMMAND	DESCRIPTION
`show cnm-agent configuration`	Displays current Cloud CNM SecuManager network management configuration on the Zyxel Device.
`    [no] cnm-agent activate`	Allows management of the Zyxel Device by a Cloud CNM SecuManager server. The `no` command disallows management of the Zyxel Device by a Cloud CNM SecuManager server.
`    [no] cnm-agent auto-get-acs activate`	Automatically lets the Zyxel Device get the Cloud CNM SecuManager server URL from myZyxel. The Cloud CNM SecuManager server must be able to access myZyxel and you must have a CNM ID from the Cloud CNM license. The `no` command disallows the Zyxel Device getting the Cloud CNM SecuManager server URL from myZyxel, so you must manually configure it.
`    (no) cnm-agent enable-cnm-id`	Allows Cloud CNM SecuManager to get the URL from myZyxel. The `no` command means you must provide a CNM URL using `cnm-agent manager {https_url|http_url}`
`    [no] cnm-agent cnm-id <ID>`	The CNM ID is used by Cloud CNM SecuManager to get the URL from myZyxel.Enter the CNM ID exactly as on the Cloud CNM SecuManager license. The CNM ID can be from 0 to 80 characters long using these characters:[a-zA-Z0-9-][\.a-zA-Z0-9_-]. The `no` command removes the CNM ID.

Table 107 Command Summary: Cloud CNM SecuManager (continued)

COMMAND	DESCRIPTION
`[no] cnm-agent manager {https_url|http_url}`	Sets the URL (HTTP or HTTPs) for theCloud CNM SecuManager server. The string must be less than 255 characters. Enter the IPv4 IP address of the Cloud CNM SecuManager server followed by the port number (default 7547 for HTTPS or 7549 for HTPP) followed by the **CNM ID** from the license in **CNM URL**. For example, if you installed Cloud CNM SecuManager on a server with IP address 1.1.1.1 and **CNM ID** V6ABQNTPYGD, then type `1.1.1.1:7547/V6ABQNTPYG` or `1.1.1.1:7549/V6ABQNTPYG` as the **CNM URL**. The `no` command removes the URL (HTTP or HTTPs) for the Cloud CNM SecuManager server.
`[no] cnm-agent periodic-inform activate`	Enables the Zyxel Device to send Inform messages to the Cloud CNM SecuManager server informing of its presence at regular intervals. The `no` command disables the Zyxel Device from sending Inform messages to the Cloud CNM SecuManager server.
`[no] cnm-agent periodic-inform interval` *<10…86400>*	Sets how often the Zyxel Device should inform the Cloud CNM SecuManager server of its presence. The valid range for the interval is from 10 to 86400 seconds. The `no` command removes the interval.
`[no] cnm-agent acs username` *tr069_acs_username*	Sets the Cloud CNM SecuManager connection request user name. The user name can be from 0 to 254 characters long using these characters: [a-zA-Z0-9-][\.a-zA-Z0-9_-]. The `no` command removes the TR069 account user name.
`[no] cnm-agent acs` password *tr069_acs_password*	Sets the Cloud CNM SecuManager connection request password associated with the user name. The password can be from 0 to 254 characters long using these characters: [a-zA-Z0-9-][\.a-zA-Z0-9_-]. The `no` command removes the password.
`[no] cnm-agent password`	Sets the password to authenticate the Zyxel Device. The `no` command removes the password.
`[no] cnm-agent vantage certificate` *tr069_cert_file_name*	Sets the Cloud CNM SecuManager server's certificate in HTTPS authentication as TR-069 needs to verify this. The certificate name can be from 1 to 127 characters long using these characters: [a-zA-Z0-9_\.-]. The `no` command disables using the server’s certificate in HTTPS authentication.
`[no] cnm-agent authentication enable`	Sets authentication of the Cloud CNM SecuManager server's certificate. The `no` command disables authentication.
`cnm-agent server-type [vantage | tr069]`	Sets the management server to be Vantage or Cloud CNM SecuManager. At the time of writing, Vantage is no longer supported.
`[no] cnm-agent auto-get-acs activate`	Allows the Zyxel Device to get the Cloud CNM SecuManager URL from myZyxel. The `no` command disallows the Zyxel Device from getting the Cloud CNM SecuManager URL from myZyxel.
`[no] cnm-agent trigger-inform` *<0..8640>*	Specifies the time interval for the Zyxel Device to send Inform messages. The valid range for the interval is in 10-second multiples where 0 means 0 to 10 seconds, 1 means 10 to 20 seconds, and so on. The `no` command removes the interval.

Table 107 Command Summary: Cloud CNM SecuManager (continued)

COMMAND	DESCRIPTION
`[no] cnm-agent username`	Creates a Zyxel Device user for Cloud CNM SecuManager authentication. The user name can be from 0 to 254 characters long using these characters: [a-zA-Z0-9-][\.a-zA-Z0-9_-]. The `no` command removes the Zyxel Device user from Cloud CNM SecuManager authentication.
`[no] cnm-agent xmpp-domain` *`xmpp_domain`*	Enter the XMPP domain name of the Cloud CNM SecuManager. The XMPP domain can be from 0 to 80 characters long using these characters:[a-zA-Z0-9-][\.a-zA-Z0-9_-]. The `no` command removes the domain name of the Cloud CNM SecuManager.
`[no] cnm-agent xmpp-host` *`xmpp_host`*	Enter the IP address or FQDN of the Cloud CNM SecuManager. The `no` command removes the IP address or FQDN of the Cloud CNM SecuManager.
`[no] cnm-agent xmpp-password` *`xmpp_password`*	Enter the password of the Cloud CNM SecuManager. The XMPP password can be from 0 to 80 characters long using these characters: [a-zA-Z0-9-][\.a-zA-Z0-9_-]. The `no` command removes the password of the Cloud CNM SecuManager.
`[no] cnm-agent xmpp-resource` *`xmpp_resource`*	Enter the XMPP resource ID of the Cloud CNM SecuManager. The XMPP resource ID can be from 0 to 80 characters long using these characters: [a-zA-Z0-9-][\.a-zA-Z0-9_-]. The `no` command removes the XMPP resource ID of the Cloud CNM SecuManager.
`[no] cnm-agent xmpp-username` *`xmpp_username`*	Enter the XMPP account user name of the Cloud CNM SecuManager. The XMPP account user name can be from 0 to 80 characters long using these characters: [a-zA-Z0-9-][\.a-zA-Z0-9_-] The `no` command removes the XMPP account user name of the Cloud CNM SecuManager.
`[no] cnm-agent encrypted-xmpp-password`	Enter the XMPP account encrypted password of the Cloud CNM SecuManager. The `no` command removes the XMPP account encrypted password of the Cloud CNM SecuManager.

28.2.3 Cloud CNM SecuManager Command Example

The following example shows what Cloud CNM SecuManager configurations you have made.

```
Router# show cnm-agent configuration
Activate: NO
ACS URL:
ACS Username:
ACS Password:
Username:
Password:
Server Type: TR069 ACS
Periodic Inform: DISABLE
Periodic Inform Interval: 3600
HTTPS Authentication: NO
Vantage Certificate:
Auto-get-ACS Activate: NO
CNM-ID:
XMPP Activate: NO
XMPP Username:
XMPP Domain:
XMPP Resource:
XMPP Host:
Router#
```

28.3 Cloud CNM SecuReporter

Cloud CNM SecuReporter is a security analytics portal accessible using a web browser, that collects and analyzes logs from SecuReporter-licensed Zyxel Devices in order to identify anomalies, alert on potential internal / external threats, and report on network usage. You need to buy a SecuReporter license for your Zyxel Device and register it at myZyxel using your myZyxel account. The Zyxel Device must be able to communicate with the myZyxel server.

Cloud CNM SecuReporter can simultaneous support up to 40,000 units at the time of writing. The following table lists the supported ZyXEL device models:

Table 108 SecuReporter Supported ZyXEL device Models

MODEL	VERSION
ZyWALL USG Series	ZLD4.32 and later
ZyWALL ATP series	ZLD4.32 and later

28.3.1 Cloud CNM SecuReporter Commands

SecuReporter stores logs in a temporary file for uploading to the SecuReporter portal for security analysis. How often to upload is determined by the upload interval (default every 300 seconds) or upload file size (default is when the temporary log file reaches 10 MB). More frequent uploads provides better real-time log analysis, but uses more bandwidth and CPU processing power.

You must be in configuration mode (`configure terminal`) to use the indented commands shown below.

Table 109 Command Summary: Cloud CNM SecuReporter

COMMAND	DESCRIPTION
`show service-register status secu-reporter`	Displays current Cloud CNM SecuReporter registration status at myZyxel.
`show secu-reporter status`	Displays current Cloud CNM SecuReporter status on this Zyxel Device.
`secu-reporter activate {no | yes}`	Use `yes` to send security-related logs to the SecuReporter portal. See the General Data Protection Regulation (GDPR) privacy policy first. Use `no` to disable SecuReporter logging. SecuReporter must be enabled to collect and analyze logs from this Zyxel Device. • It's enabled by default if you have activated a SecuReporter Standard license, • You need to enable this if you have a SecuReporter Trial license. • You cannot enable it if you do not have a SecuReporter license.
`secu-reporter traffic-log {activate | deactivate}`	Use `activate` to send traffic logs to the SecuReporter portal for application usage analysis via this Zyxel Device. This may cause an increase in traffic to SecuReporter from this Zyxel Device. Use `deactivate` to disable sending traffic logs if it impacts Zyxel Device performance.
`secu-reporter upload-filesize` *`<1..10>`*	A temporary log file is uploaded to the SecuReporter security analytics portal when it meets the size set here (in megabytes) or the interval defined in the following field. 10 MB is the default. Set it to a smaller number for more frequent uploads.
`secu-reporter upload-interval` *`<60..600>`*	A temporary log file is uploaded to the SecuReporter security analytics portal at the interval defined here or when it meets the size setin the previous field. 300 seconds is the default. Set it to a smaller number for more frequent uploads.

28.3.2 Cloud CNM SecuReporter Commands Example

The following example shows Cloud CNM SecuReporter registration, configurations and configuration status.

```
Router# show service-register status secu-reporter
Service                                 Status          Type               Count
Expiration Grace Purchasable Activatable
===============================================================================
SecuReporter                       Activated      Standard         N/A   295
0     N/A         0
Router# configure terminal
Router(config)# secu-reporter activate yes
Router(config)# secu-reporter traffic-log activate
Router(config)# secu-reporter upload-filesize 5
Router(config)# secu-reporter upload-interval 100
Router(config)# exit
Router# show secu-reporter status
activate: yes
send-reporter: yes
upload-interval: 100
upload-filesize: 5
traffic-log: activate
Router#
```

CHAPTER 29
Web Authentication

29.1 Web Authentication Overview

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

As soon as a user attempt to open a web page, the Zyxel Device reroutes his/her browser to a web portal page that prompts he/she to log in.

29.2 Web Authentication Commands

This table lists the commands for forcing user authentication. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 110 web-auth Commands

COMMAND	DESCRIPTION
`[no] web-auth activate`	Enables force user authentication that force users to log in to the Zyxel Device before the Zyxel Device routes traffic for them. The no command means the user authentication is not required.
`web-auth default-rule authentication {required | unnecessary} {no log | log [alert]}`	Sets the default authentication policy that the Zyxel Device uses on traffic that does not match any exceptional service or other authentication policy. `required`: Users need to be authenticated. They must manually go to the Zyxel Device's login screen. The Zyxel Device will not redirect them to the login screen. `unnecessary`: Users do not need to be authenticated. `no log | log [alert]`: Select whether to have the Zyxel Device generate a log (`log`), log and alert (`log alert`) or not (`no log`) for packets that match this default policy.
`web-auth [no] exceptional-service` *`service_name`*	Sets a service which you want users to be able to access without user authentication. The `no` command removes the specified service from the exceptional list.
`web-auth login setting`	Sets the login web page through which the user authenticates his or her connection before he or she can then connect to the rest of the network or Internet. See Table 112 on page 218 for the sub-commands.
`web-auth method portal`	Sets a client to authenticate with the Zyxel Device through the specifically designated web portal.
`web-auth policy <1..1024>`	Creates the specified condition for forcing user authentication, if necessary, and enters sub-command mode. The conditions are checked in sequence, starting at 1. See Table 112 on page 218 for the sub-commands.

Table 110   web-auth Commands (continued)

COMMAND	DESCRIPTION
`web-auth policy append`	Creates a new condition for forcing user authentication at the end of the current list and enters sub-command mode. See Table 112 on page 218 for the sub-commands.
`web-auth policy insert <1..1024>`	Creates a new condition for forcing user authentication at the specified location, renumbers the other conditions accordingly, and enters sub-command mode. See Table 112 on page 218 for the sub-commands.
`web-auth policy delete <1..1024>`	Deletes the specified condition. To modify a condition, you can insert a new condition (N) and then delete the one (N+1) that you want to modify.
`web-auth policy flush`	Deletes every condition.
`web-auth policy move <1..1024> to <1..1024>`	Moves the specified condition to the specified location and renumbers the other conditions accordingly.
`[no] web-auth redirect-fqdn` *`host_str`*	Set the Fully-Qualified Domain Name (FQDN) of the Zyxel Device interface to which the clients connect. The `no` command removes the specified FQDN. *`host_str`*: the fully qualified domain name for the host.
`show web-auth redirect-fqdn`	Displays the FQDN of the Zyxel Device interface to which the clients connect to authenticate through the internal web portal page
`web-auth web-portal`	Enters web portal subcommand mode.
`session-page {activate | deactivate}`	Redirects to a ‘Welcome page’ after login when activated.
`show web-auth activation`	Displays whether forcing user authentication is enabled or not.
`show web-auth default-rule`	Displays settings of the default web authentication policy.
`show web-auth exceptional-service`	Displays services that users can access without user authentication.
`show web-auth method`	Displays whether a client is to authenticate with the Zyxel Device through the specifically designated web portal when web authentication is enabled.
`show web-auth policy {<1..1024> | all}`	Displays details about the policies for forcing user authentication.
`show web-auth portal status`	Displays the web portal page settings.
`show web-auth status`	Displays the web portal page settings.

29.2.1 web-auth login setting Sub-commands

The following table describes the sub-commands for the web-auth login setting command.

Table 111 web-auth login setting Sub-commands

COMMAND	DESCRIPTION
`exit`	Leaves the sub-command mode.
`type {external | internal}`	Sets the login page appears whenever the web portal intercepts network traffic, preventing unauthorized users from gaining access to the network. `internal`: Use the default login page built into the Zyxel Device. `external`: Use a custom login page from an external web portal instead of the default one built into the Zyxel Device. You can configure the look and feel of the web portal page. Note: If you select the external option, you cannot use endpoint security to make sure that users' computers meet specific security requirements before they can access the network.
`[no] error-url` *`url`*	Sets the error page's URL; for example, http://IIS server IP Address/error.html. You can use up to 255 characters (0-9a-zA-Z;/?:@&=+$\.-_!~'()%,) in quotes. The `no` command removes the URL. The Internet Information Server (IIS) is the web server on which the web portal files are installed.
`[no] internal-welcome-url` *`url`*	Sets the welcome page's URL when you select to use the default login page built into the Zyxel Device; for example, http://IIS server IP Address/welcome.html. You can use up to 255 characters (0-9a-zA-Z;/?:@&=+$\.-_!~'()%,) in quotes. The `no` command removes the URL. The Internet Information Server (IIS) is the web server on which the web portal files are installed.
`[no] login-url` *`url`*	Sets the login page's URL; for example, http://IIS server IP Address/login.html. You can use up to 255 characters (0-9a-zA-Z;/?:@&=+$\.-_!~'()%,) in quotes. The `no` command removes the URL. The Internet Information Server (IIS) is the web server on which the web portal files are installed.
`[no] logout-ip` *`ipv4_address`*	Sets an IP address that users can use to terminate their sessions manually by entering the IP address in the address bar of the web browser. The `no` command removes the IP address.
`[no] logout-url` *`url`*	Sets the logout page's URL; for example, http://IIS server IP Address/logout.html. You can use up to 255 characters (0-9a-zA-Z;/?:@&=+$\.-_!~'()%,) in quotes. The `no` command removes the URL. The Internet Information Server (IIS) is the web server on which the web portal files are installed.

Table 111 web-auth login setting Sub-commands (continued)

COMMAND	DESCRIPTION
`[no] session-url` *`url`*	Sets the session page's URL; for example, http://IIS server IP Address/ session.html. You can use up to 255 characters (0-9a-zA-Z;/?:@&=+$\.-_!~'()%,) in quotes. The `no` command removes the URL. The Internet Information Server (IIS) is the web server on which the web portal files are installed.
`[no] terms-of-service`	Forces users to agree to the terms before they can use the service. An agreement checkbox will display in the login page. The `no` command allows users to use the service without agreeing to the terms.
`[no] welcome-url` *`url`*	Sets the welcome page's URL; for example, http://IIS server IP Address/ welcome.html. You can use up to 255 characters (0-9a-zA-Z;/ ?:@&=+$\.-_!~'()%,) in quotes. The `no` command removes the URL. The Internet Information Server (IIS) is the web server on which the web portal files are installed.

29.2.2 web-auth policy Sub-commands

The following table describes the sub-commands for an web-auth policy (`web-auth policy 1-1024`). Note that not all rule commands use all the sub-commands listed here.

Table 112 web-auth policy Sub-commands

COMMAND	DESCRIPTION
`[no] activate`	Activates the specified condition. The `no` command deactivates the specified condition.
`[no] authentication {force | required}`	Selects the authentication requirement for users when their traffic matches this policy. The `no` command means user authentication is not required. `force`: Users need to be authenticated and the Zyxel Device automatically display the login screen when users who have not logged in yet try to send HTTP traffic. `required`: Users need to be authenticated. They must manually go to the login screen. The Zyxel Device will not redirect them to the login screen.
`authentication-type {<`*`profile name`*`> | default-user-agreement | default-web-portal | facebook-wifi}`	Select the authentication type profile you want to use in this policy. facebook-wifi is available when you enable Facebook Wi-Fi on the Zyxel Device. Note: If you set the authentication type to `facebook-wifi`, the destination address must be `any`. Note: You can configure the web-portal and user-agreement profile using the `web-auth type profile` commands.
`[no] description` *`description`*	Sets the description for the specified condition. The `no` command clears the description. *`description`*: You can use alphanumeric and `()+/:=?!*#@$_%-` characters, and it can be up to 60 printable ASCII characters long.

Table 112 web-auth policy Sub-commands (continued)

COMMAND	DESCRIPTION
`[no] destination {address_object | group_name}`	Sets the destination criteria for the specified condition. The no command removes the destination criteria, making the condition effective for all destinations.
`[no] force`	Forces users to log in to the Zyxel Device if the specified condition is satisfied. The no command means that users do not log in to the Zyxel Device.
`interface interface_name`	Sets an interface on which packets for the policy must be received.
`[no] schedule schedule_name`	Sets the time criteria for the specified condition. The no command removes the time criteria, making the condition effective all the time.
`[no] source {address_object | group_name}`	Sets the source criteria for the specified condition. The no command removes the source criteria, making the condition effective for all sources.
`[no] sso`	Enables SSO web authentication. The no command disables SSO web authentication.
`show sso { agent | port | presharekey}`	Displays information about the specified condition.

29.2.3 Facebook Wi-Fi Commands

This table lists the commands for Facebook Wi-Fi. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 113 fbwifi Commands

COMMAND	DESCRIPTION
`[no] fbwifi activate`	Turns on Facebook Wi-Fi on the Zyxel Device. The no command disables it.
`[no] fbwifi idle-detection`	Sets the Zyxel Device to monitor how long each user (authenticated via Facebook Wi-Fi) is idle. The no command disables the idle detection feature.
`fbwifi idle-detection timeout <1..60>`	Specifies the user idle timeout between 1 and 60 minutes. The Zyxel Device automatically disconnects a user (authenticated via Facebook Wi-Fi) from the network after a period of inactivity.
`fbwifi reset-fbpage`	Removes the Facebook Page settings.
`fbwifi security {high |low}`	Sets when guests have to check into a business owner's Facebook Page. • `fbwifi security high` (default) only allows HTTP traffic, and blocks all other Internet traffic (HTTPS, FTP, SSH, and so on). Guests can browse using HTTP without checking in to the business owner's Facebook Page. Check-in is necessary for other Internet services such as WeChat, Line and so on. • `fbwifi security low` only blocks HTTP traffic, and allows all other Internet traffic (HTTPS, FTP, SSH, and so on). Guests that browse using HTTP will be redirected to the business owner's Facebook Page, and will need to check-in to continue browsing the Internet. Check-in is not necessary for other Internet services such as WeChat, Line and so on.
`show fbwifi activate`	Displays whether Facebook Wi-Fi is enabled on the Zyxel Device.
`show fbwifi service-register status`	Displays whether the Zyxel Device has been registered with myZyXEL.com.
`show fbwifi status`	Displays Facebook Wi-Fi settings on the Zyxel Device.

29.3 SSO Overview

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

- The Zyxel Device, the DC, the SSO agent and the LDAP or AD server must all be in the same domain and be able to communicate with each other.
- SSO does not support IPv6 or RADIUS; you must use it in an IPv4 network environment with Windows AD (Active Directory) or LDAP (Lightweight Directory Access Protocol) authentication databases.
- You must enable Web Authentication to use SSO.

29.3.1 SSO Configuration Commands

Use these commands to configure the Zyxel Device to communicate with SSO.

Table 114 SSO Commands and Subcommnds

COMMAND	DESCRIPTION
`sso agent primary`	Enters SSO primary agent subcommand mode.
`sso agent secondary`	Enters secondary agent subcommand mode. A secondary agent is an optional backup SSO agent.

`router(config-sso-primary)#`
`router(config-sso-secondary)#`
`[no] ip <w.x.y.z>`
	Sets the primary or secondary SSO agent *ipv4 address.* Use *[no]* to disable the IPv4 address.
	Type the IPv4 address of the SSO agent. The Zyxel Device and the SSO agent must be in the same domain and be able to communicate with each other.

`router(config-sso-primary)#`
`router(config-sso-secondary)# [no] port <1025..65535>`
	Sets the primary or secondary agent port *<1025..65535>.* Use *[no]* to disable the port. Type the same port number here as in the **Agent Listening Port** field on the SSO agent. Type a number ranging from 1025 to 65535.

`sso presharekey <preshared key>`	Sets the SSO pre-shared key. Type 8-32 printable ASCII characters or exactly 32 hex characters (0-9; a-f). The Agent PreShareKey is used to encrypt communications between the Zyxel Device and the SSO agent
`sso encrypted-presharekey <ciphertext>`	Sets the SSO encrypted pre-shared key.
`sso_port <1025..65535>`	Sets the SSO listening port. This port is used to wait for receiving information from Agent. Type a number ranging from 1025 to 65535.

29.3.2 SSO Show Commands

You don't need to enter the configuration mode before you can use these commands. Use them to see SSO configurations done.

Table 115 SSO Show Commands

COMMAND	DESCRIPTION
`show sso agent`	Displays primary and secondary agent IP and Port configurations.
`show sso agent primary`	Displays primary agent IP and Port configurations.

Table 115 SSO Show Commands (continued)

COMMAND	DESCRIPTION
`show sso agent secondary`	Displays secondary agent IP and Port configurations.
`show sso agent status`	Displays primary and secondary agent status.
`show sso port`	Displays the ZySSO port configured.
`show sso presharekey`	Shows the configured ZySSO presharekey.

29.3.3 Command Setup Sequence Example

The following commands show how to configure the Zyxel Device to communicate with an an SSO agent at IP address ‘1.1.1.1’, using port ‘2158’ and preshared key ‘12345678’.

```
Router(config)# sso agent primary
Router(config-sso-primary)# ip 1.1.1.1
Router(config-sso-primary)# port 2158
Router(config-sso-primary)# exit
Router(config)# sso presharekey 12345678
Router(config)# sso port 2158
Router(config)# exit
Router# show sso agent
Agent: primary
  IP Address: 1.1.1.1
  Port: 2158
Agent: secondary
  IP Address:
  Port: 0
Router# show sso agent primary
Agent: primary
  IP Address: 1.1.1.1
  Port: 2158
Router# show sso agent secondary
Agent: secondary
  IP Address:
  Port: 0
Router# show sso agent status
ZySSO Primary Agent: Offline
ZySSO Primary Agent: Offline
Router# show sso port
ZySSO port: 2158
Router# show sso presharekey
ZySSO presharekey: 12345678
Router#
```

CHAPTER 30 Hotspot

30.1 Hotspot Overview

See the Introduction chapter of the ZyWALL USG Series User's Guide for a list of models that support Hotspot management.

30.2 Billing Overview

You can use the built-in billing function to set up billing profiles. A billing profile describes how to charge users. This chapter also shows you how to select an accounting method or configure a discount price plan.

30.3 Billing Commands

This table lists the `billing` commands. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 116 billing Commands

COMMAND	DESCRIPTION
`billing accounting-method {accumulation | time-to-finish }`	Sets how the Zyxel Device accounts the time. `accumulation`: to allow each user a one-time login. Once the user logs in, the system starts counting down the pre-defined usage even if the user stops the Internet access before the time period is finished. If a user disconnects and reconnects before the allocated time expires, the user does not have to enter the user name and password to access the Internet again `time-to-finish`: to allow each user multiple re-login until the time allocated is used up. The Zyxel Device accounts the time that the user is logged in for Internet access
`billing accumulation idle-detection timeout <1..60>`	Specifies the idle timeout between 1 and 60 minutes. The Zyxel Device automatically disconnects a computer from the network after a period of inactivity. The user may need to enter the username and password again before access to the network is allowed.
`billing accumulation-expire {day <1..360> | hour <1..24>}`	Specifies a time unit and number to set how long to wait before the Zyxel Device deletes an idle account.
`billing currency {eur | gbp | usd | user-define` *`currency_code`* `}`	Sets the appropriate currency unit. *`currency_code`*: enter a three-letter alphabetic code, such as TWD or JPY.
`billing decimal-places <2>`	Sets the number of decimal places to be used for billing.
`billing decimal-symbol {comma | dot}`	Sets the Zyxel Device to use a dot (.) or a comma (,) for the decimal point.

Table 116 billing Commands (continued)

COMMAND	DESCRIPTION
`[no] billing discount activate`	Activates the discount price plan. The `no` command disables the discount price plan.
`billing discount button {a | b | c} [charge-by-level]`	Specifies a button to assign the base charge. `charge-by-level`: to charge the rate at each successive level from the first level (most expensive per unit) to the highest level (least expensive per unit) that the total purchase reaches.
`[no] billing discount unit <2..10> price` *`price`*	Creates a new discount level by setting the duration of the billing period that should be reached before the Zyxel Device charges users at this level and defining this level's charge per time unit. The `no` command removes this discount level.
`[no] billing profile` *`profile_name`*	Creates a billing profile and enters the `billing profile` sub-command mode to set the price and the duration of the billing period. See Table 117 on page 224 for the sub-commands. The `no` command removes the specified profile. *`profile_name`*: use up to 31 alphanumeric characters (A-Z, a-z, 0-9) and underscores (_). Spaces are not allowed. The first character must be a letter.
`billing profile rename` *`profile_name profile_name`*	Renames the specified billing profile (first *`profile_name`*) to the specified name (second *`profile_name`*).
`billing tax-rate <0..100>`	Sets the tax rate. For example, type 6 for a 6% sales tax.
`[no] billing tax-rate activate`	Sets the Zyxel Device to charge sales tax for the account. The `no` command sets the Zyxel Device to not charge sales tax for the account.
`billing unused-expire {minute <30..60> | hour <1..24> | day <1..365>}`	Specifies a time unit and number to set how long to wait before the Zyxel Device deletes an account that has not been used.
`billing username-password-length <4..6>`	Sets how many characters the username and password of a newly-created dynamic guest account will have.
`[no] billing wlan-ssid-profile` *`profile_name`*	Sets the name of the SSID profile to which you can apply the general billing settings. The `no` command sets the Zyxel Device to not apply the billing settings to the SSID profile.
`[no] billing replenish activate`	Allows dynamic-guest accounts to purchase additional time units for their accounts before their accounts expire.
`show billing discount default rule`	Displays settings of the default discount price plan.
`show billing discount rule`	Displays settings of the custom discount price plan(s).
`show billing discount status`	Displays billing discount settings.
`show billing profile [`*`profile_name`*`]`	Displays settings for all or the specified billing profile.
`show billing status`	Displays the general billing settings, such as the accounting method or tax rate.

30.3.1 Billing Profile Sub-commands

The following table describes the sub-commands for the `billing profile` command.

Table 117 billing profile Sub-commands

COMMAND	DESCRIPTION
`[no] activate`	Enables the billing profile. The `no` command disables the profile.
`bandwidth {upload | download} <0..1048576> priority <1..7>`	Specifies the maximum bandwidth allowed for the user account in kilobits per second and types a number between 1 and 7 to set the priority for the user's traffic. The smaller the number, the higher the priority. `upload` refers to the traffic the Zyxel Device sends out from a user. `download` refers to the traffic the Zyxel Device sends to a user.
`[no] bandwidth activate`	Turns on bandwidth management for the user account. The `no` command disables bandwidth management for the user account.
`price` *`price`*	Defines each profile's price, up to 999999.99, per time unit.
`quota {total | upload | download} megabytes <0..1023>`	Sets how much downstream and/or upstream data in Megabytes can be transmitted through the external interface before the account expires. 0 means there is no data limit for the user account.
`quota {total | upload | download} gigabytes <0..100>`	Sets how much downstream and/or upstream data in Gigabytes can be transmitted through the external interface before the account expires. 0 means there is no data limit for the user account.
`quota type {total | upload-download}`	Sets a limit for the user account. This only applies to user's traffic that is received or transmitted through the external interface. Note: When the limit is exceeded, the user is not allowed to access the Internet through the Zyxel Device. `total`: set a limit on the total traffic in both directions. `upload-download`: set a limit on the upstream traffic and downstream traffic respectively.
`time-period {day <1..365> | hour <1..24> | minute <30..60>}`	Sets the duration of the billing period. When this period expires, the user's access will be stopped.

30.3.2 Billing Command Example

This example sets the accounting method to `time-to-finish` and configures the idle timeout that elapses before the Zyxel Device disconnects a user.

```
Router# configure terminal
Router(config)# billing accounting-method time-to-finish
Router(config)# billing accumulation idle-detection timeout 30
Router(config)#
```

This example enables and creates a custom discount pricing plan. It uses button A to assign the base charge and also shows the discount status and plan settings.

```
Router# configure terminal
Router(config)# billing discount activate
Router(config)# billing discount button a charge-by-level
Router(config)# billing discount unit 3 price 1.9
Router(config)# show billing discount status
Billing discount status:
  activate: yes
  button: a
  charge_by_level: yes
Router(config)#show billing discount rule
No.  Conditions           Unit            Unit price
===========================================================================
====
1    when >=              3               eur  1,90
Router(config)#
```

This example creates a billing profile named `billing_1hour` and displays the profile settings.

```
Router# configure terminal
Router(config)# billing profile billing_1hour
Router(billing profile button-a)# activate
Router(billing profile button-a)# price 2
Router(billing profile button-a)# time-period hour 1
Router(billing profile button-a)# exit
Router(config)# show billing profile
Billing Profile: billing_30mins
  activate: yes
  time period: 30 minute
  price: eur 0,00
Billing Profile: billing_1hour
  activate: yes
  time period: 1 hour
  price: eur 2,00
Router(config)#
```

This example applies the billing profile `billing_1hour` to button A of the web-based account generator and button A on a connected statement printer. It also displays the default discount price plan settings, that is, the billing profile settings for button A when it is selected as the button to assign the base charge.

```
Router# configure terminal
Router(config)# printer-manager button a billing_1hour
Router(config)# show billing discount default rule
No.        Conditions           Unit            Unit price
===========================================================================
====
default    when >=              1               eur  2,00
Router(config)#
```

30.3.3 Payment Service

Use these commands to use a credit card service to authorize, process, and manage credit card transactions directly through the Internet. You must register with the supported credit card service before you can configure the Zyxel Device to handle credit card transactions.

This table lists the `payment-service` commands. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 118 payment-service Commands

COMMAND	DESCRIPTION
payment-service provider select *provider*	Selects a payment provider. For example, payment-service provider select *paypal*.
payment-service provider paypal	Enters payment-service sub-command mode for PayPal.
payment-service provider paypal exit	Exits payment-service sub-command mode.
[no] payment-service activate	Activates payment service to use PayPal to authorize credit card payments. The no command disables payment service.
payment-service account-delivery *delivery_method* {deactivate | activate}	Enables or disables how the Zyxel Device provides dynamic guest account information after the user's online payment is done. *delivery_method*: type *onscreen* or *sms*. *onscreen* displays the user account information in the web configurator screen. *sms* uses Short Message Service (SMS) to send account information in a text message to the user's mobile device. You should have enabled SMS to send text messages to the user's mobile device.
[no] payment-service page-customization	Enables customization of desktop online payment service pages that displays after an unauthorized user clicks the link in the Web Configurator login screen to purchase access time. The no commands disables customization and uses the default page.
[no] payment-service mobile-page-customization	Enables customization of mobile online payment service pages that displays after an unauthorized user clicks the link in the Web Configurator login screen to purchase access time. The no commands disables customization and uses the default page.
payment-service fail-page failed-message *message*	Creates a message if a desktop payment transaction fails. *message*: The message must be from 1 to 256 characters long and can contain spaces and the following characters ([0-9a-zA-Z '`()+,/:;=~!*#@$_%-\.\&\?\[\]\{\}*\\|\^\\\<\>\+\"]) The default message is "Sorry! We can't handle your payment transaction at this time."
payment-service mobile-fail-page failed-message *message*	Creates a message if a mobile payment transaction fails. *message*: The message must be from 1 to 256 characters long and can contain spaces and the following characters ([0-9a-zA-Z '`()+,/:;=~!*#@$_%-\.\&\?\[\]\{\}*\\|\^\\\<\>\+\"]) The default message is "Sorry! We can't handle your payment transaction at this time."

Table 118 payment-service Commands (continued)

COMMAND	DESCRIPTION
payment-service mobile-profile-page selection-message *message*	Creates a message prompting mobile payment service plan selection. *message*: The message must be from 1 to 256 characters long and can contain spaces and the following characters ([0-9a-zA-Z '`()+,/:;=~!*#@$_%-\.\&\?\[\]\{\}*|\^\\\<\>\+\"]) The default message is “Please choose the service plan from the following profile table.”
payment-service mobile-sms-page info-message *message*	Creates a mobile view customized SMS page when a new account is created. *message*: The message must be from 1 to 256 characters long and can contain spaces and the following characters ([0-9a-zA-Z '`()+,/:;=~!*#@$_%-\.\&\?\[\]\{\}*|\^\\\<\>\+\"]) The default message is “Please check your mobile phone for the account information.”
payment-service mobile-success-page {*notification-message* | *successful-message* | notification-message-color {#00FF00 | *color_name* | rgb(0,0,255)}	Creates custom colored mobile view messages when a new account is created successfully. *message*: The message must be from 1 to 256 characters long and can contain spaces and the following characters ([0-9a-zA-Z '`()+,/:;=~!*#@$_%-\.\&\?\[\]\{\}*|\^\\\<\>\+\"]) The default notification-message is “IMPORTANT! Make a note for your case-sensitive username and password for logging later. This will be your only opportunity to do so.” The default successful-message is “You may now use the Internet.“ notification-message-color: Defines the message color by selecting RGB (0,0,255), or type a *color_name* such as red, or enter the hex color format (#00FF00).
payment-service profile-page selection-message *message*	Creates a message prompting payment service plan selection. *message*: The message must be from 1 to 256 characters long and can contain spaces and the following characters ([0-9a-zA-Z '`()+,/:;=~!*#@$_%-\.\&\?\[\]\{\}*|\^\\\<\>\+\"]) The default message is “Please choose the service plan from the following profile table.”
payment-service success-page {account-message *message* | format-date {dd-mm-yyyy | mm-dd-yyyy | yyyy-mm-dd} | notification-message *message* | notification-message-color {#00FF00 | *color_name* | rgb(0,0,255)} | successful-message *message*}	Creates custom colored, date-formatted desktop view messages when a new account is created successfully. *message*: The message must be from 1 to 256 characters long and can contain spaces and the following characters ([0-9a-zA-Z '`()+,/:;=~!*#@$_%-\.\&\?\[\]\{\}*|\^\\\<\>\+\"]) The default account-message is ”This is your account information, please keep this for your internet service.” The default notification-message is “IMPORTANT! Make a note for your case-sensitive username and password for logging later. This will be your only opportunity to do so.” The default successful-message is “You may now use the Internet.“ notification-message-color: Defines the message color by selecting RGB (0,0,255), or type a *color_name* such as red, or enter the hex color format (#00FF00).
show payment-service account-delivery	Displays how the Zyxel Device provides dynamic guest account information after the user’s online payment is done (*onscreen* or *sms*).

Table 118 payment-service Commands (continued)

COMMAND	DESCRIPTION
`show payment-service check payment-all-currency`	Checks if the billing currency is different from the payment currency configured.
`show payment-service activation`	Displays if payment service is active.
`show payment-service provider select`	Displays the payment service provider selected.
`show payment-service provider paypal`	Displays account, currency, identity token, and payment gateway details of the PayPal payment service provider.
`show payment-service page-customization`	Displays whether customization of desktop online payment service is enabled.
`show payment-service profile-page settings`	Displays the message prompting payment service plan selection
`show payment-service success-page settings`	Displays the settings for messages for when a new account is created successfully.
`show payment-service fail-page settings`	Displays the message for if a desktop payment transaction fails.
`show payment-service sms-page settings`	Displays the SMS message in Desktop View when a new account is created.
`show payment-service mobile-page-customization`	Displays whether customization of mobile online payment service pages that displays after an unauthorized user clicks the link in the Web Configurator login screen to purchase access time, is enabled.
`show payment-service mobile-profile-page settings`	Displays the message prompting mobile payment service plan selection.
`show payment-service mobile-success-page settings`	Displays whether customization for mobile view messages when a new account is created successfully is enabled.
`show payment-service mobile-fail-page settings`	Displays the settings for messages if a mobile payment transaction fails.
`show payment-service mobile-sms-page settings`	Displays the SMS message in Mobile View when a new account is created.

The following table describes the sub-commands for the `payment-service` command.

Table 119 payment-service paypal Sub-commands

COMMAND	DESCRIPTION
`payment-service provider paypal account` *`e-mail`*	Configures an e-mail address for the PayPal account. *`e-mail`*: type a valid e-mail address for this account
`payment-service provider paypal no account`	Removes the PayPal account.
`payment-service provider paypal currency` *`paypal_currency`*	Defines the currency in which payments are made *`paypal_currency`*: Select the currency that PayPal supports. For example, *`aud, cad, chf, czk, dkk, eur, gbp, hkd, huf, ils, jpy, mxn, nok, nzd, php, pln, sek, sgd, thb, twd, usd`*.
`payment-service provider paypal identity-token` *`paypal_token`*	Defines the PayPal ID token. *`paypal_token`*: Enter the ID token provided to you by PayPal after successfully applying for your PayPal account.
`payment-service provider paypal no identity-token`	Removes the PayPal ID token.

Table 119 payment-service paypal Sub-commands (continued)

COMMAND	DESCRIPTION
`payment-service provider paypal gateway` *`payment_gw_url`*	Defines the PayPal gateway. *`payment_gw_url`*: Enter the address of the PayPal gateway provided to you by PayPal after applying for your PayPal account.
`payment-service check paypal-currency`	Displays the currency in which PayPal payments are made.

30.4 Printer Manager Overview

You can create dynamic guest accounts and print guest account information by pressing the button on an external statement printer, such as SP350E. Make sure that the printer is connected to the appropriate power and the Zyxel Device, and that there is printing paper in the printer. Refer to the printer's documentation for details.

30.5 Printer-manager Commands

This table lists the `printer-manager` commands. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 120 printer-manager Commands

COMMAND	DESCRIPTION
`[no] printer-manager activate`	Allows the Zyxel Device to manage and moniter the printer status. The `no` command disables printer management on the Zyxel Device.
`printer-manager discover`	Detects the printer(s) that is connected to the Zyxel Device and display the printer information.
`printer-manager button {a | b | c}` *`profile_name`*	Applies the specified billing profile to a button of the web-based account generator and/or the button on a connected statement printer
`[no] printer-manager encrypt activate`	Turns on data encryption. Data transmitted between the Zyxel Device and the printer will be encrypted with a secret key. The `no` command disables data encryption.
`printer-manager encrypt secret-key` *`secret_key`*	Sets a key for data encryption. *`secret_key`*: four alphanumeric characters (A-Z, a-z, 0-9)
`printer-manager multi-printout <1..3>`	Sets how many copies of subscriber statements you want to print (1 is the default).
`printer-manager port <1..65535>`	Sets the number of port on which the Zyxel Device sends data to the printer for it to print.
`[no] printer-manager printer <1..10>`	Enters the `printer-manager printer` sub-command mode to configure a printer that can be managed by the Zyxel Device. See Table 117 on page 224 for the sub-commands. The `no` command removes the specified printer from the printer list.
`printer-manager printer append`	Enters the `printer-manager printer` sub-command mode to add a printer to the end of the printer list. See Table 117 on page 224 for the sub-commands.

Table 120 printer-manager Commands (continued)

COMMAND	DESCRIPTION
`printer-manager printout-type {customized | default}`	Sets to use the default account printout format built into the Zyxel Device or use a custom account printout format.
`show printer-manager button`	Displays the name of billing profile that is applied to each button.
`show printer-manager discover-printer-status`	Displays information of the printer that is connected to and detected by the Zyxel Device.
`show printer-manager printer [<1..10>]`	Displays settings of all or the specified printer that can be managed by the Zyxel Device.
`show printer-manager printer-status`	Displays information about the printers that are connected and can be managed by the Zyxel Device.
`show printer-manager printerfw version`	Displays the version of the printer firmware currently uploaded to the Zyxel Device. The Zyxel Device automatically installs it in the connected printers to make sure the printers are upgraded to the same version.
`show printer-manager printout-type`	Displays the current account printout format.
`show printer-manager settings`	Displays the printer management settings.
`show printer-manager workableIP`	Displays the number and IP address(s) of printer(s) that can synchronize with the Zyxel Device successfully.

30.5.1 Printer-manager Printer Sub-commands

The following table describes the sub-commands for the `printer-manager printer` command.

Table 121 printer-manager printer Sub-commands

COMMAND	DESCRIPTION
`activate`	Enables the entry.
`deactivate`	Disables the entry.
`description` *`description`*	Sets a descriptive name for the printer.
`printer-ip` *`ipv4_address`*	Sets the IP address of the printer.

30.5.2 Printer-manager Command Example

This example adds a printer to the managed printer list and displays the printer settings.

```
Router# configure terminal
Router(config)# printer-manager printer 1
Router(printer-manager)# activate
Router(printer-manager)# description cafe
Router(printer-manager)# printer-ip 172.16.0.123
Router(printer-manager)# exit
Router(config)# show printer-manager printer
printer: 1
  activate: yes
  IPv4 address: 172.16.0.123
  description:  cafe
Router(config)#
```

30.6 Free Time Overview

With Free Time, the Zyxel Device can create dynamic guest accounts that allow users to browse the Internet free of charge for a specified period of time.

30.7 Free-Time Commands

The following table lists the `free-time` commands. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 122 free-time Commands

COMMAND	DESCRIPTION
`[no] free-time activate`	Turns on the free time feature to allow users to get a free account for Internet surfing during the specified time period. The `no` command disables the free time feature.
`[no] free-time auto-login`	Allow users to log into their free account directly without having to enter their user name and password. The `no` command requires users to enter their user name and password, and click login to access their free account.
`[no] free-time deliver-method onscreen`	Sets the Zyxel Device to display the user account information in the web screen. The `no` command sets the Zyxel Device to not display the user account information in the web screen.
`[no] free-time deliver-method sms`	Sets the Zyxel Device to send account information in an SMS text message to the user's mobile device. The `no` command sets the Zyxel Device to not send account information in an SMS text message to the user's mobile device.
`[no] free-time maximum-register-number <1..5>`	Specifies the maximum number of the users that are allowed to log in for Internet access with a free guest account before the time specified using the `free-time reset-register` command. The `no` command resets the setting to its default value (`1`).
`[no] free-time reset-register` *`hh:mm`*	Sets the time in 24-hour format at which the new free time account is allowed to access the Internet. The `no` command resets the setting to its default value (`00:00`).
`[no] free-time time-period` *`time_period`*	Sets the duration of time period (in minutes) for which the free time account is allowed to access the Internet. *`time_period`*: x - y, where x and y depend on the Zyxel Device model. The `no` command resets the setting to its default value (`30`).
`show free-time status`	Displays the free time settings.

30.8 Free-Time Commands Example

The following example enables the free time feature and sets the Zyxel Device to provide user account information in the web screen and also sent account information via SMS text messages. It then displays the free time settings.

```
Router# configure terminal
Router(config)# free-time activate
Router(config)# free-time deliver-method onscreen
Router(config)# free-time deliver-method sms
Router(config)# show free-time status
Activate: yes
Time Period: 30
Reset Time: 00:00
Maximum registration number before reset time: 1
Delivery Method: onscreen-sms
Router(config)#
```

30.9 SMS Overview

The Zyxel Device supports Short Message Service (SMS) to send short text messages to mobile devices. At the time of writing, the Zyxel Device uses ViaNett as the SMS gateway to help forward SMS messages. You must already have a Vianett account in order to use the SMS service.

30.10 SMS Commands

The following table lists the `sms-service` commands. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 123 sms-service Commands

COMMAND	DESCRIPTION
sms-service account-send phone *phone_number* account *user_name* password *password*	Specifies the guest account information and the number of mobile device to which you want to send a text message.
[no] sms-service activate	Enables the SMS service on the Zyxel Device. The `no` command disabled the SMS service.
sms-service default-country-code *country_code*	Sets the default country code for the mobile phone number to which you want to send SMS messages. *country_code*: one to four digits
sms-service provider vianett	Enters the `sms-service-vianett` sub-command mode to configure your ViaNett account information.
[no] password *password*	Sets the password for your ViaNett account.
[no] username *e-mail*	Sets the user name for your ViaNett account.
sms-service provider-select vianett	Selects to use ViaNett as the SMS gateway to help forward SMS messages.

Table 123 sms-service Commands (continued)

COMMAND	DESCRIPTION
`sms-service test-send phone` *`phone_number`* `msg` *`message`*	Specifies the mobile phone number and message to test whether the Zyxel Device can use SMS to send a text message.
`show sms-service`	Displays the SMS settings.
`show sms-service activation`	Displays whether the SMS service is enabled.
`show sms-service default-country-code`	Displays the default country code for the mobile phone number to which you want to send SMS messages.
`show sms-service provider vianett`	Displays the ViaNett account information.

30.11 SMS Commands Example

The following example enables the SMS service on the Zyxel Device to provide and configures the ViaNett account information. It then displays the SMS settings.

```
Router# configure terminal
Router(config)# sms-service activate
Router(config)# sms-service provider vianett
Router(sms-service-vianett)# username test@example.com
Router(sms-service-vianett)# password 12345
Router(sms-service-vianett)# exit
Router(config)# show sms-service
enable sms service: yes
SMS Country-Code: 0
SMS Provider-Selected: vianett
SMS Service: Vianett
  username: test@example.com
  password: 12345
Router(config)#
```

30.12 IPnP Overview

IP Plug and Play (IPnP) allows a computer to access the Internet without changing the network settings (such as IP address and subnet mask) of the computer, even when the IP addresses of the computer and the Zyxel Device are not in the same subnet.

When you disable the IPnP feature, only computers with dynamic IP addresses or static IP addresses in the same subnet as the Zyxel Device's LAN IP address can connect to the Zyxel Device or access the Internet through the Zyxel Device.

The IPnP feature does not apply to a computer using either a dynamic IP address or a static IP address that is in the same subnet as the Zyxel Device's IP address.

Note: You must enable NAT to use the IPnP feature.

30.13 IPnP Commands

The following table lists the `ipnp` commands. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 124 ipnp Commands

COMMAND	DESCRIPTION
`[no] ip ipnp activate`	Enables IPnP on the Zyxel Device. The `no` command disables IPnP.
`ip ipnp config`	Enters the IPnP sub-command mode to enable IPnP on specific internal interface(s).
`[no] interface` *`interface_name`*	Enables IPnP on a specific internal interface. The `no` command disables IPnP for the specified interface.
`show ip ipnp activation`	Displays whether IPnP is enabled on the Zyxel Device.
`show ip ipnp interface`	Displays whether IPnP is enabled on an interface.

30.14 IPnP Commands Example

The following example enables IPnP on the Zyxel Device and interface lan1. It also displays the IPnP settings.

```
Router# configure terminal
Router(config)# ip ipnp activate
Router(config)# ip ipnp config
Router(ipnp)# interface lan1
Router(ipnp)# exit
Router(config)# show ip ipnp activation
IPnP Status: yes
Router(config)# show ip ipnp interface
interface
===============================================================================
lan1
Router(config)#
```

30.15 Walled Garden Overview

A user must log in before the Zyxel Device allows the user's access to the Internet. However, with a walled garden, you can define one or more web site addresses that all users can access without logging in. These can be used for advertisements for example.

30.16 Walled Garden Commands

This table lists the `walled-garden` commands. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 125 walled-garden Commands

COMMAND	DESCRIPTION
`[no] walled-garden activate`	Enables the walled garden feature. The no command disables the walled garden feature.
`[no] walled-garden rule <1..50>`	Creates a walled garden URL link entry (URLs that use the HTTP or HTTPS protocol) for web site that all users are allowed to access without logging in, and enters sub-command mode. See Section Table 126 on page 235 for the rule sub-commands.
`walled-garden rule append`	Creates a new walled garden URL entry at the end of the current list and enters sub-command mode. See Table 126 on page 235 for the sub-commands.
`walled-garden rule flush`	Deletes all walled garden URL entries.
`walled-garden rule insert <1..50>`	Creates a new walled garden URL entry at the specified location, renumbers the other entries accordingly, and enters sub-command mode. See Table 126 on page 235 for the sub-commands.
`walled-garden rule move <1..50> to <1..50>`	Moves the specified walled garden URL entry to the specified location and renumbers the other entries accordingly.
`walled-garden domain-ip rule <1..50>`	Creates a walled garden web site link entry, which uses a (wildcard) domain name or an IP address for web site that all users are allowed to access without logging in, and enters sub-command mode. See Section Table 127 on page 236 for the rule sub-commands.
`walled-garden domain-ip rule append`	Creates a new walled garden domain name or IP address entry at the end of the current list and enters sub-command mode. See Table 127 on page 236 for the sub-commands.
`walled-garden domain-ip rule flush`	Deletes all walled garden domain name or an IP address entries.
`show walled-garden activation`	Displays whether the walled garden feature is enabled or not.
`show walled-garden rule <1..50>`	Displays settings of the specified walled garden URL entry.

30.16.1 walled-garden rule Sub-commands

The following table describes the sub-commands for several `walled-garden rule` commands. Note that not all rule commands use all the sub-commands listed here.

Table 126 walled-garden rule Sub-commands

COMMAND	DESCRIPTION
`[no] activate`	Enables this entry. The `no` command disables the entry.
`[no] name` *`description`*	Sets a descriptive name for the walled garden link to be displayed in the login screen. The `no` command clears the description. *`description`*: You can use up to 31 alphanumeric characters (A-Z, a-z, 0-9) and underscores (_). Spaces are not allowed. The first character must be a letter.

Table 126 walled-garden rule Sub-commands (continued)

COMMAND	DESCRIPTION
`[no] hidden`	Sets the Zyxel Device to not display the web site link in the user login screen. This is helpful if a user's access to a specific web site is required to stay connected but he or she does not need to visit that web site. The `no` command displays the web site link in the user login screen.
`[no] url` *`url`*	Sets the URL or IP address of the web site. Use "http://" followed by up to 262 characters (0-9a-zA-Z;/?:@&=+$\.-_!~*'()%). For example, http://www.example.com or http://172.16.1.35. The `no` command removes the web site address.

30.16.2 walled-garden domain-ip rule Sub-commands

The following table describes the sub-commands for several `walled-garden domain-ip rule` commands. Note that not all rule commands use all the sub-commands listed here.

Table 127 walled-garden domain-ip rule Sub-commands

COMMAND	DESCRIPTION
`[no] activate`	Enables this entry. The `no` command disables the entry.
`[no] name` *`description`*	Sets a descriptive name for the walled garden link to be displayed in the login screen. The `no` command clears the description. *`description`*: You can use up to 31 alphanumeric characters (A-Z, a-z, 0-9) and underscores (_). Spaces are not allowed. The first character must be a letter.
`[no] type {domain|ip}`	Sets the rule type to be a domain name or an IPv4 IP address.
`[no] domain-name` *`walled_garden_fqdn`*	Sets a fully qualified name for the `domain` type rule. *`walled_garden_fqdn`*: Type a valid fully qualified name for this rule. The `no` command removes the fully qualified name.
`[no] ip-address` *`<w.x.y.z>/<1..32>`*	Sets the IPv4 subnet in CIDR format for the `ip` type rule. For example, 192.168.1.0/32. The `no` command removes the web site address.

30.16.3 Walled Garden Command Example

This example shows how to enable the walled garden feature and insert a walled garden link rule at position 1 of the checking order. This example also displays the rule settings. The link rule uses the following settings:

- Activate: yes
- Name: Example1

- URL: www.example.com

```
Router# configure terminal
Router(config)# walled-garden activate
Router(config)# walled-garden rule insert 1
Router(walled-garden)# activate
Router(walled-garden)# name Example1
Router(walled-garden)# url http://www.example.com
Router(walled-garden)# exit
Router(config)# show walled-garden
walled garden rule: 1
  active: yes
  url: http://www.example.com
  name: Example1
Router(config)#
```

30.17 Advertisement Overview

You can set the Zyxel Device to display an advertisement web page as the first web page whenever the user connects to the Internet.

30.18 Advertisement Commands

This table lists the `advertisement` commands. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 128 advertisement Commands

COMMAND	DESCRIPTION
`[no] advertisement activate`	Enables the advertisement feature. The no command disables the advertisement feature.
`advertisement flush`	Deletes all advertisement rules.
`[no] advertisement name` *`description`* `url` *`url`*	Sets a descriptive name for the advertisement web page and enters the web site address to create a new rule. The `no` command removes the advertisement rule. *`description`*: You can use up to 31 alphanumeric characters (A-Z, a-z, 0-9) and underscores (_). Spaces are not allowed. The first character must be a letter. *`url`*: the URL or IP address of the web site. Use "http://" followed by up to 262 characters (0-9a-zA-Z;/?:@&=+$\.-_!~*'()%). For example, http://www.example.com or http://172.16.1.35.
`advertisement rename` *`description_old description_new`*	Gives an existing rule a new name.
`show advertisement`	Displays settings of advertisement rule(s).
`show advertisement activation`	Displays whether the advertisement feature is enabled or not.

30.18.1 Advertisement Command Example

This example shows how to set an advertisement rule and displays the rule settings.

```
Router# configure terminal
Router(config)# advertisement activate
Router(config)# advertisement name example url http://www.example.com
Router(config)# show advertisement
advertisement rule: 1
  name: example
  url: http://www.example.com
Router(config)#
```

CHAPTER 31
IPSec VPN

This chapter explains how to set up and maintain IPSec VPNs in the Zyxel Device.

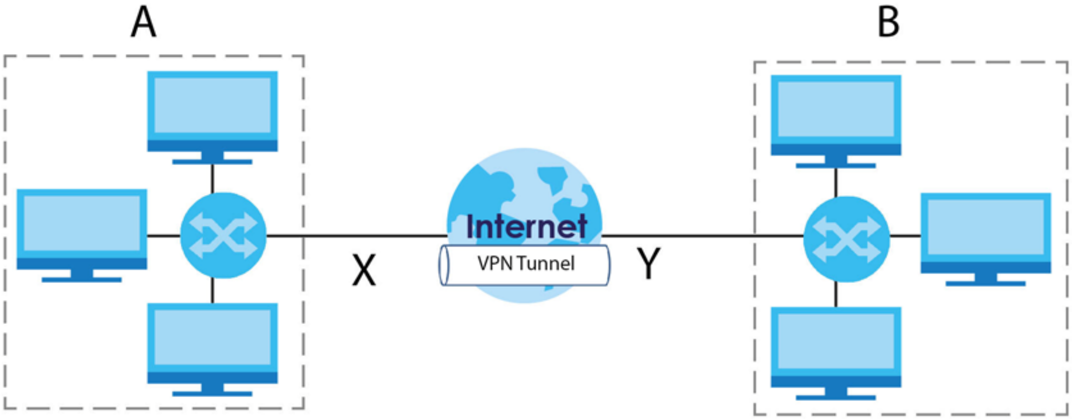
31.1 IPSec VPN Overview

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

Internet Protocol Security (IPSec) is a standards-based VPN that offers flexible solutions for secure data communications across a public network like the Internet. IPSec is built around a number of standardized cryptographic techniques to provide confidentiality, data integrity and authentication at the IP layer.

The following figure is one example of a VPN tunnel.

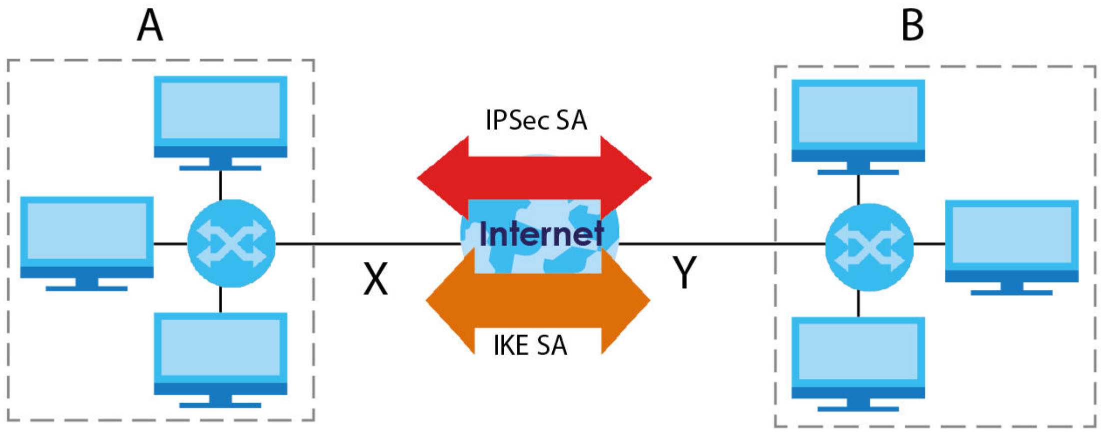
Figure 20 VPN: Example



The VPN tunnel connects the Zyxel Device (**X**) and the remote IPSec router (**Y**). These routers then connect the local network (**A**) and remote network (**B**).

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

Figure 21 VPN: IKE SA and IPSec SA



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

31.2 IPSec VPN Commands Summary

The following table describes the values required for many IPSec VPN commands. Other values are discussed with the corresponding commands.

Table 129 Input Values for IPSec VPN Commands

LABEL	DESCRIPTION
profile_name	The name of a VPN concentrator. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
policy_name	The name of an IKE SA. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
map_name	The name of an IPSec SA. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
domain_name	Fully-qualified domain name. You may use up to 254 alphanumeric characters, dashes (-), or periods (.), but the first character cannot be a period.
e_mail	An e-mail address. You can use up to 63 alphanumeric characters, underscores (_), dashes (-), or @ characters.
distinguished_name	A domain name. You can use up to 511 alphanumeric, characters, spaces, or `.@=,_-` characters.

Table 129 Input Values for IPSec VPN Commands (continued)

LABEL	DESCRIPTION
sort_order	Sort the list of currently connected SAs by one of the following classifications. algorithm encapsulation inbound name outbound policy timeout uptime
auth_method	The name of the authentication profile.

The following sections list the IPSec VPN commands.

31.2.1 IPv4 IKEv1 SA Commands

This table lists the commands for IKE SAs (VPN gateways).

Table 130 isakmp Commands: IKE SAs

COMMAND	DESCRIPTION
show isakmp keepalive	Displays the Dead Peer Detection period.
show isakmp policy [*policy_name*]	Shows the specified IKE SA or all IKE SAs.
[no] isakmp policy *policy_name*	Creates the specified IKE SA if necessary and enters sub-command mode. The no command deletes the specified IKE SA.
activate deactivate	Activates or deactivates the specified IKE SA.
authentication {pre-share | rsa-sig | user-base-psk }	Specifies whether to use a pre-shared key, a certificate, or a user-based pre-shared key for authentication.
certificate *certificate-name*	Sets the certificate that can be used for authentication.
[no] dpd	Enables Dead Peer Detection (DPD). The no command disables DPD.
dpd-interval <15..60>	Sets the Dead Peer Detection (DPD) period.
[no] fall-back	Set this to have the Zyxel Device reconnect to the primary address when it becomes available again and stop using the secondary connection, if the connection to the primary address goes down and the Zyxel Device changes to using the secondary connection. Users will lose their VPN connection briefly while the Zyxel Device changes back to the primary connection. To use this, the peer device at the secondary address cannot be set to use a nailed-up VPN connection.
fall-back-check-interval <60..86400>	Sets how often (in seconds) the Zyxel Device checks if the primary address is available.
mode {main | aggressive}	Sets the negotiating mode.
transform-set isakmp-algo [isakmp_algo [*isakmp_algo*]]	Sets the encryption and authentication algorithms for each IKE SA proposal. *isakmp_algo*: {des-md5 | des-sha | 3des-md5 | 3des-sha | aes128-md5 | aes128-sha | aes192-md5 | aes192-sha | aes256-md5 | aes256-sha | aes256-sha256 | aes256-sha512}
lifetime <180..3000000>	Sets the IKE SA life time to the specified value.

Table 130 isakmp Commands: IKE SAs (continued)

COMMAND	DESCRIPTION
group1 group2 group5 group14	Sets the DH*x* group to the specified group.
[no] natt	Enables NAT traversal. The no command disables NAT traversal.
local-ip {ip {*ip* | *domain_name*} | interface *interface_name*}	Sets the local gateway address to the specified IP address, domain name, or interface.
peer-ip {*ip* | *domain_name*} [*ip* | *domain_name*]	Sets the remote gateway address(es) to the specified IP address(es) or domain name(s).
keystring *pre_shared_key*	Sets the pre-shared key that can be used for authentication. The *pre_shared_key* can be: • 8 - 32 alphanumeric characters or ,;|`~!@#$%^&*()_+\{}':./<>=-". • 16 - 64 hexadecimal (0-9, A-F) characters, preceded by "0x". The pre-shared key is case-sensitive.
local-id type {ip *ip* | fqdn *domain_name* | mail *e_mail* | dn *distinguished_name*}	Sets the local ID type and content to the specified IP address, domain name, or e-mail address.
peer-id type {any | ip *ip* | fqdn *domain_name* | mail *e_mail* | dn *distinguished_name*}	Sets the peer ID type and content to any value, the specified IP address, domain name, or e-mail address.
xauth type {server *auth_method* [user-id {*username* | any}] | client name *username* password *password*} [deactivate]	Enables extended authentication and specifies whether the Zyxel Device is the server or client. If the Zyxel Device is the server, it also specifies the extended authentication method (aaa authentication *profile_name*); if the Zyxel Device is the client, it also specifies the username and password to provide to the remote IPSec router. The deactivate command disables extended authentication. *auth_method:* The name of the authentication profile the VPN configuration provisioning service uses to authenticate users. user-id: A user or user group allowed to use the IKE SA. any allows any user with a valid user account and password on the Zyxel Device to use the IKE SA. *username*: You can use alphanumeric characters, underscores (_), and dashes (-), and it can be up to 31 characters long. *password*: You can use most printable ASCII characters. You cannot use square brackets [ ], double quotation marks ("), question marks (?), tabs or spaces. It can be up to 31 characters long.
isakmp policy rename *policy_name* *policy_name*	Renames the specified IKE SA (first *policy_name*) to the specified name (second *policy_name*).

31.2.2 IPv4 IPSec SA Commands (except Manual Keys)

This table lists the commands for IPSec SAs, excluding manual keys (VPN connections using VPN gateways).

Table 131 crypto Commands: IPSec SAs

COMMAND	DESCRIPTION
[no] crypto ignore-df-bit	Fragment packets larger than the MTU (Maximum Transmission Unit) that have the "don't" fragment" bit in the header turned on. The no command has the Zyxel Device drop packets larger than the MTU that have the "don't" fragment" bit in the header turned on.
show crypto map [*map_name*]	Shows the specified IPSec SA or all IPSec SAs.
crypto map dial *map_name*	Dials the specified IPSec SA manually. This command does not work for IPSec SAs using manual keys or for IPSec SAs where the remote gateway address is 0.0.0.0.
[no] crypto map *map_name*	Creates the specified IPSec SA if necessary and enters sub-command mode. The no command deletes the specified IPSec SA.
crypto map rename *map_name map_name*	Renames the specified IPSec SA (first *map_name*) to the specified name (second *map_name*).
crypto map *map_name*	
activate deactivate	Activates or deactivates the specified IPSec SA.
adjust-mss {auto | <200..1500>}	Set a specific number of bytes for the Maximum Segment Size (MSS) meaning the largest amount of data in a single TCP segment or IP datagram for this VPN connection or use auto to have the ZyWALL automatically set it.
ipsec-isakmp *policy_name*	Specifies the IKE SA for this IPSec SA and disables manual key.
encapsulation {tunnel | transport}	Sets the encapsulation mode.
transform-set *crypto_algo_esp* [*crypto_algo_esp* [*crypto_algo_esp*]]	Sets the active protocol to ESP and sets the encryption and authentication algorithms for each proposal. *crypto_algo_esp*: esp-null-md5 | esp-null-sha | esp-null-sha256 | esp-null-sha512 | esp-des-md5 | esp-des-sha | esp-des-sha256 | esp-des-sha512 | esp-3des-md5 | esp-3des-sha | esp-3des-sha256 | esp-3des-sha512 | esp-aes128-md5 | esp-aes128-sha | esp-aes128-sha256 | esp-aes128-sha512 | esp-aes192-md5 | esp-aes192-sha | esp-aes192-sha256 | esp-aes192-sha512 | esp-aes256-md5 | esp-aes256-sha | esp-aes256-sha256 | esp-aes256-sha512
transform-set *crypto_algo_ah* [*crypto_algo_ah* [*crypto_algo_ah*]]	Sets the active protocol to AH and sets the encryption and authentication algorithms for each proposal. *crypto_algo_ah*: ah-md5 | ah-sha | ah-sha256 | ah-sha512

Table 131 crypto Commands: IPSec SAs (continued)

COMMAND	DESCRIPTION
`scenario {site-to-site-static|site-to-site-dynamic|remote-access-server|remote-access-client}`	Select the scenario that best describes your intended VPN connection. `Site-to-site`: The remote IPSec router has a static IP address or a domain name. This Zyxel Device can initiate the VPN tunnel. `site-to-site-dynamic`: The remote IPSec router has a dynamic IP address. Only the remote IPSec router can initiate the VPN tunnel. `remote-access-server`: Allow incoming connections from IPSec VPN clients. The clients have dynamic IP addresses and are also known as dial-in users. Only the clients can initiate the VPN tunnel. `remote-access-client`: Connects to an IPSec server. This Zyxel Device is the client (dial-in user) and can initiate the VPN tunnel. `vpn-tunnel-interface:` Sets up a VPN tunnel interface to bind with a VPN connection. The Zyxel Device can use the interface to do load balancing using a specific Trunk. The remote IPsec router should have a static IP address or a domain name.
`set security-association lifetime seconds <180..3000000>`	Sets the IPSec SA life time.
`set pfs {group1 | group2 | group5 | none}`	Enables Perfect Forward Secrecy group.
`local-policy` *`address_name`*	Sets the address object for the local policy (local network).
`remote-policy` *`address_name`*	Sets the address object for the remote policy (remote network).
`[no] policy-enforcement`	Drops traffic whose source and destination IP addresses do not match the local and remote policy. This makes the IPSec SA more secure. The `no` command allows traffic whose source and destination IP addresses do not match the local and remote policy. Note: You must allow traffic whose source and destination IP addresses do not match the local and remote policy, if you want to use the IPSec SA in a VPN concentrator.
`[no] nail-up`	Automatically re-negotiates the SA as needed. The `no` command does not.
`[no] replay-detection`	Enables replay detection. The `no` command disables it.
`[no] netbios-broadcast`	Enables NetBIOS broadcasts through the IPSec SA. The `no` command disables NetBIOS broadcasts through the IPSec SA.
`[no] out-snat activate`	Enables out-bound traffic SNAT over IPSec. The `no` command disables out-bound traffic SNAT over IPSec.
`out-snat source` *`address_name`* `destination` *`address_name`* `snat` *`address_name`*	Configures out-bound traffic SNAT in the IPSec SA.
`[no] in-snat activate`	Enables in-bound traffic SNAT in the IPSec SA. The `no` command disables in-bound traffic SNAT in the IPSec SA.
`in-snat source` *`address_name`* `destination` *`address_name`* `snat` *`address_name`*	Configures in-bound traffic SNAT in the IPSec SA.
`[no] in-dnat activate`	Enables in-bound traffic DNAT in the IPSec SA. The `no` command disables in-bound traffic DNAT in the IPSec SA.
`in-dnat delete <1..10>`	Deletes the specified rule for in-bound traffic DNAT in the specified IPSec SA.

Table 131 crypto Commands: IPSec SAs (continued)

COMMAND	DESCRIPTION
`in-dnat move <1..10> to <1..10>`	Moves the specified rule (first rule number) to the specified location (second rule number) for in-bound traffic DNAT.
`in-dnat append protocol {all | tcp | udp} original-ip` *`address_name`* `<0..65535> <0..65535> mapped-ip` *`address_name`* `<0..65535> <0..65535>`	Maps the specified IP address and port range (original-ip) to the specified IP address and port range (mapped-ip) and appends this rule to the end of the rule list for in-bound traffic DNAT.
`in-dnat insert <1..10> protocol {all | tcp | udp} original-ip` *`address_name`* `<0..65535> <0..65535> mapped-ip` *`address_name`* `<0..65535> <0..65535>`	Maps the specified IP address and port range (original-ip) to the specified IP address and port range (mapped-ip) and inserts this rule before the specified rule.
`in-dnat <1..10> protocol {all | tcp | udp} original-ip` *`address_name`* `<0..65535> <0..65535>` *`mapped-ip`* *`address_name`* `<0..65535> <0..65535>`	Creates or revises the specified rule and maps the specified IP address and port range (original-ip) to the specified IP address and port range (mapped-ip).
`[no] configuration-payload-provide activate`	Enables configuration payload in server role. The `no` command disables it.
`configuration-payload-provide address- {}`	Sets configuration payload address . The `no` command disables it
`[no] configuration-payload-provide {first-dns IPv6|second-dns IPv6}`	Sets configuration payload address dns server. The `no` command disables it
`[no] narrowed`	Enables policy narrowed. The `no` command disables it.
`[no] protocol gre`	Enables GRE over IPSec to allow traffic using the Generic Routing Encapsulation (GRE) tunneling protocol through an IPSec tunnel. The `no protocol` command disables it.
`mode-config activate`	Allows the IPSec VPN client to receive an IP address, DNS and WINS information from the Zyxel Device when the scenario is Remote Access (Server Role) and VPN Gateway uses IKEv1. `remote-access-server` allows incoming connections from IPSec VPN clients with dynamic IP addresses.
`mode-config address-` *`profile_name`*	Sets the IP address to be included in the VPN setup data. *`profile_name`*: an address or address group object
`[no] mode-config {first-dns | second-dns}`	Specifies the DNS server IP address to assign to the remote users. The `second-dns` server's IP address is checked if `first-dns` is unavailable. The `no` command removes the setting.
`[no] mode-config {first-wins | second-wins}`	Sets the IP address of the WINS (Windows Internet Naming Service) server that you want to send to the remote users. The WINS server keeps a mapping table of the computer names on your network and the IP addresses that they are currently using. The `second-wins` server's IP address is checked if `first-wins` is unavailable. The `no` command removes the setting.

31.2.3 IPv4 IPSec SA Commands (for Manual Keys)

This table lists the additional commands for IPSec SAs using manual keys (VPN connections using manual keys).

Table 132 crypto map Commands: IPSec SAs (Manual Keys)

COMMAND	DESCRIPTION
crypto map *map_name*	
set session-key {ah <256..4095> *auth_key* | esp <256..4095> [cipher *enc_key*] authenticator *auth_key*}	Sets the active protocol, SPI (<256..4095>), authentication key and encryption key (if any). *auth_key*: You can use any alphanumeric characters or ,;|`~!@#$%^&*()_+\{}':./<>=-". The length of the key depends on the algorithm. md5 - 16-20 characters sha - 20 characters sha256 - 32 characters sha512 - 64 characters *enc_key*: You can use any alphanumeric characters or ,;\|`~!@#$%^&*()_+\{}':./<>=-". The length of the key depends on the algorithm. des - 8-32 characters 3des - 24-32 characters aes128 - 16-32 characters aes192 - 24-32 characters aes256 - 32 characters If you want to enter the key in hexadecimal, type "0x" at the beginning of the key. For example, "0x0123456789ABCDEF" is in hexadecimal format; in "0123456789ABCDEF" is in ASCII format. If you use hexadecimal, you must enter twice as many characters. The Zyxel Device automatically ignores any characters above the minimum number of characters required by the algorithm. For example, if you enter 1234567890XYZ for a DES encryption key, the Zyxel Device only uses 12345678. The Zyxel Device still stores the longer key.
local-ip *ip*	Sets the local gateway address to the specified IP address.
peer-ip *ip*	Sets the remote gateway address to the specified IP address.

31.2.4 VPN Concentrator Commands

This table lists the commands for the VPN concentrator.

Table 133 vpn-concentrator Commands: VPN Concentrator

COMMAND	DESCRIPTION
show vpn-concentrator [*profile_name*]	Shows the specified VPN concentrator or all VPN concentrators.
[no] vpn-concentrator *profile_name*	Creates the specified VPN concentrator if necessary and enters sub-command mode. The no command deletes the specified VPN concentrator.

Table 133 vpn-concentrator Commands: VPN Concentrator (continued)

COMMAND	DESCRIPTION
`[no] crypto` *`map_name`*	Adds the specified IPSec SA to the specified VPN concentrator. The `no` command removes the specified IPSec SA from the specified VPN concentrator.
`vpn-concentrator rename` *`profile_name profile_name`*	Renames the specified VPN concentrator (first *`profile_name`*) to the specified name (second *`profile_name`*).

31.2.5 VPN Configuration Provisioning Commands

This table lists the commands for VPN configuration provisioning.

Table 134 vpn-configuration-provision Commands: VPN Configuration Provisioning

COMMAND	DESCRIPTION
`vpn-configuration-provision rule { append |` *`conf_index`* `| insert` *`conf_index`* `}`	Enters the VPN configuration provisioning sub-command mode to add or edit a rule. *`conf_index`*: The index number of a VPN configuration provisioning rule, 1 to the Zyxel Device's maximum number of VPN connection rules.
`[no] activate`	Turns the VPN configuration provisioning rule on or off.
`crypto` *`map_name`*	Specifies the name of the IPSec VPN connection (*`map_name`*) to bind to this VPN configuration provisioning rule's user or group.
`user` *`username`*	Specifies a user or group of users allowed to use the Zyxel Device IPSec VPN client to retrieve the associated VPN rule settings. A user may belong to a number of groups. If VPN configuration provisioning rules are configured for different groups, the Zyxel Device will allow VPN rule setting retrieval based on the first match found. Admin or limited-admin users are not allowed.
`no user`	Removes the VPN configuration provisioning rule's user or user group configuration. In other words, any users can match the rule. In the GUI "any" will display in the **Allowed User** field.
`exit`	Leaves sub-command mode.
`vpn-configuration-provision rule { delete` *`conf_index`* `| move` *`conf_index`* `to` *`conf_index`* `}`	Deletes or moves the specified VPN configuration provisioning rule.
`[no] vpn-configuration-provision activate`	Turns the VPN configuration provisioning service on or off.
`vpn-configuration-provision authentication` *`auth_method`*	Sets the authentication method the VPN configuration provisioning service uses to authenticate users.
`show vpn-configuration-provision activation`	Displays whether or not the VPN configuration provisioning service is activated.
`show vpn-configuration-provision authentication`	Displays the authentication method the VPN configuration provisioning service uses to authenticate users.
`show vpn-configuration-provision rules`	Displays the settings of the configured VPN configuration provisioning rules.
`show vcp allowed users`	Displays available users who can be configured as allowed users (using `user` *`username`*) of a VPN Configuration Provision (VCP) rule.
`show vcp allowed crypto map`	Displays IPv4 VPN Connection rules which can be used in a VPN Configuration Provision (VCP) rule. Nothing displays if no suitable rules are available.
`show vcp allowed crypto map6`	Displays IPv6 VPN Connection rules which can be used in a VPN Configuration Provision (VCP) rule. Nothing displays if no suitable rules are available.

Table 134 vpn-configuration-provision Commands: VPN Configuration Provisioning

COMMAND	DESCRIPTION
[no] vpn-configuration-provision iosfilter	Enables over-the-air VPN provisioning for mobile Apple (iOS) devices. The Apple (iOS) user must log into the Zyxel Device web configurator using a Safari browser to be authenticated. The user can then set up a VPN connection by visiting a link in the Safari browser to install an XML VPN configuration file. The VPN rule for the Apple (iOS) device must be configured first. Each VPN rule must have a separate link. Types of VPN supported are: • L2TP • IKEv1 Cisco VPN • IKEv2 (for iOS 9.3 and later) The no command disables over-the-air VPN provisioning for mobile Apple (iOS) devices using a Safari browser.
show vpn-configuration-provision iosfilter	Displays if over-the-air VPN provisioning for mobile Apple (iOS) devices is enabled on the Zyxel Device.

31.2.6 SA Monitor Commands

This table lists the commands for the SA monitor.

Table 135 sa Commands: SA Monitor

COMMAND	DESCRIPTION
show sa monitor [{begin <1..1000>} | {end <1..1000>} | {crypto-map *regexp*} | {policy *regexp*} |{rsort *sort_order*} | {sort *sort_order*}]	Displays the current IPSec SAs and the status of each one. You can specify a range of SA entries to display. You can also control the sort order of the display and search by VPN connection or (local or remote) policy. *regexp*: A keyword or regular expression. Use up to 30 alphanumeric and _+-.()!$*^:? | {}[]<>/ characters. A question mark (?) lets a single character in the VPN connection or policy name vary. For example, use "a?c" (without the quotation marks) to specify abc, acc and so on. Wildcards (*) let multiple VPN connection or policy names match the pattern. For example, use "*abc" (without the quotation marks) to specify any VPN connection or policy name that ends with "abc". A VPN connection named "testabc" would match. There could be any number (of any type) of characters in front of the "abc" at the end and the VPN connection or policy name would still match. A VPN connection or policy name named "testacc" for example would not match. A * in the middle of a VPN connection or policy name has the Zyxel Device check the beginning and end and ignore the middle. For example, with "abc*123", any VPN connection or policy name starting with "abc" and ending in "123" matches, no matter how many characters are in between. The whole VPN connection or policy name has to match if you do not use a question mark or asterisk. See Table 129 on page 240 for other parameter description.
show isakmp sa	Displays current IKE SA and the status of each one.
no sa spi *spi*	Deletes the SA specified by the SPI. *spi*: 2-8 hexadecimal (0-9, A-F) characters
no sa tunnel-name *map_name*	Deletes the specified IPSec SA.
show vpn-counters	Displays VPN traffic statistics.

31.2.7 IPv4 IKEv2 SA Commands

This table lists the commands for the IPv4 IKEv2 SA.

Table 136 sa Commands: IPv4 IKEv2

COMMAND	DESCRIPTION
show ikev2 policy [*policy_name*]	Shows the specified IKEv2 SA or all IKEv2 SAs.
[no] ikev2 policy *policy_name*	Creates the specified IKEv2 SA if necessary and enters sub-command mode. The no command deletes the specified IKEv2 SA.
activate deactivate	Activates or deactivates the specified IKEv2 SA.
authentication {pre-share | rsa-sig}	Specifies whether to use a pre-shared key or a certificate for authentication
certificate certificate-name	Sets the certificate that can be used for authentication.
[no] fall-back	Set this to have the Zyxel Device reconnect to the primary address when it becomes available again and stop using the secondary connection, if the connection to the primary address goes down and the Zyxel Device changes to using the secondary connection. Users will lose their VPN connection briefly while the Zyxel Device changes back to the primary connection. To use this, the peer device at the secondary address cannot be set to use a nailed-up VPN connection.
fall-back-check-interval <60..86400>	Sets how often (in seconds) the Zyxel Device checks if the primary address is available.
transform-set isakmp-algo [isakmp_algo [isakmp_algo]]	Sets the encryption and authentication algorithms for each IKEv2 SA proposal. isakmp_algo: {des-md5 | des-sha | 3des-md5 | 3des-sha | aes128-md5 | aes128-sha | aes192-md5 | aes192-sha | aes256- md5 | aes256-sha | aes256-sha256 | aes256-sha512}
lifetime <180..3000000>	Sets the IKEv2 SA life time to the specified value.
group1 group2 group5 group14 group15 group16 group17 group18	Sets the DH group to the specified group.
local-ip {ip {ip | domain_name} | interface interface_name}	Sets the local gateway address to the specified IP address, domain name, or interface.
peer-ip {ip | domain_name} [ip | domain_name]	Sets the remote gateway address(es) to the specified IP address(es) or domain name(s).
keystring pre_shared_key	Sets the pre-shared key that can be used for authentication. The pre_shared_key can be: • 8 - 32 alphanumeric characters or ,; | `~!@#$%^&*()_+\{}':./<>=-". • 16 - 64 hexadecimal (0-9, A-F) characters, preceded by “0x”. The pre-shared key is case-sensitive.

Table 136   sa Commands: IPv4 IKEv2 (continued)

COMMAND	DESCRIPTION
`local-id type {ip ip	fqdn domain_name	mail e_mail	dn distinguished_name}`	Sets the local ID type and content to the specified IP address, domain name, or e-mail address.
`peer-id type {any	ip ip	fqdn domain_name	mail e_mail	dn distinguished_name}`	Sets the peer ID type and content to any value, the specified IP address, domain name, or e-mail address.
`eap auth_method AUTH_METHOD`	Sets auth method for EAP. Default value is `Mschapv2`.
`[no] eap type {server AAA_method user-id {name|any}| client name username {password PASSWORD| encrypted-password PASSWORD}`	Enables extended authentication and specifies whether the ZyWALL/ USG is the server or client. If the Zyxel Device is the server, it also specifies the AAA authentication method (aaa authentication profile_name); if the Zyxel Device is the client, it also specifies the username and password to provide to the remote IPSec router. The no command disables extended authentication. • username: You can use alphanumeric characters, underscores (_), and dashes (-), and it can be up to 31 characters long. • password: You can use most printable ASCII characters. You cannot use square brackets [ ], double quotation marks (“), question marks (?), tabs or spaces. It can be up to 31 characters long.
`ikev2 policy rename policy_name policy_name`	Renames the specified IKEv2 SA (first policy_name) to the specified name (second policy_name).

31.2.8 IPv6 IKEv2 SA Commands

This table lists the commands for the IPv4 IKEv2 SA.

Table 137   sa Commands: IPv6 IKEv2

COMMAND	DESCRIPTION
`show ikev2 policy6 [`*`policy_name`*`]`	Shows the specified IKEv2 SA or all IKEv2 SAs.
`[no] ikev2 policy6` *`policy_name`*	Creates the specified IKEv2 SA if necessary and enters sub-command mode. The no command deletes the specified IKEv2 SA.
`activate` `deactivate`	Activates or deactivates the specified IKEv2 SA.
`authentication {pre-share	rsa-sig}`	Specifies whether to use a pre-shared key or a certificate for authentication
`certificate certificate-name`	Sets the certificate that can be used for authentication.
`[no] fall-back`	Set this to have the Zyxel Device reconnect to the primary address when it becomes available again and stop using the secondary connection, if the connection to the primary address goes down and the Zyxel Device changes to using the secondary connection. Users will lose their VPN connection briefly while the Zyxel Device changes back to the primary connection. To use this, the peer device at the secondary address cannot be set to use a nailed-up VPN connection.
`fall-back-check-interval <60..86400>`	Sets how often (in seconds) the Zyxel Device checks if the primary address is available.

Table 137 sa Commands: IPv6 IKEv2 (continued)

COMMAND	DESCRIPTION
transform-set isakmp-algo [isakmp_algo [isakmp_algo]]	Sets the encryption and authentication algorithms for each IKEv2 SA proposal. isakmp_algo: {des-md5 | des-sha | 3des-md5 | 3des-sha | aes128-md5 | aes128-sha | aes192-md5 | aes192-sha | aes256- md5 | aes256-sha | aes256-sha256 | aes256-sha512}
lifetime <180..3000000>	Sets the IKEv2 SA life time to the specified value.
group1 group2 group5	Sets the DH group to the specified group.
local-ip {ip IPv6}	Sets the local gateway address to the specified IP address.
peer-ip {ip IPv6]	Sets the remote gateway address(es) to the specified IP address(es).
keystring pre_shared_key	Sets the pre-shared key that can be used for authentication. The pre_shared_key can be: • 8 - 32 alphanumeric characters or ,;|`~!@#$%^&*()_+\{}':./<>=-". • 16 - 64 hexadecimal (0-9, A-F) characters, preceded by “0x”. The pre-shared key is case-sensitive.
local-id type {ip IPv6 | fqdn domain_name | mail e_mail | dn distinguished_name}	Sets the local ID type and content to the specified IP address, domain name, or e-mail address.
peer-id type {any | ip IPv6 | fqdn domain_name | mail e_mail | dn distinguished_name}	Sets the peer ID type and content to any value, the specified IP address, domain name, or e-mail address.
eap auth_method *auth_method*	Sets auth method for EAP. Default value is Mschapv2.
[no] eap type {server *auth_method* user-id {name|any}| client name username {password PASSWORD| encrypted-password *password*}	Enables extended authentication and specifies whether the ZyWALL/ USG is the server or client. If the Zyxel Device is the server, it also specifies the AAA authentication method (aaa authentication profile_name); if the Zyxel Device is the client, it also specifies the username and password to provide to the remote IPSec router. The no command disables extended authentication. • *username*: You can use alphanumeric characters, underscores (_), and dashes (-), and it can be up to 31 characters long. • *password*: You can use most printable ASCII characters. You cannot use square brackets [ ], double quotation marks (“), question marks (?), tabs or spaces. It can be up to 31 characters long.
ikev2 policy rename policy_name policy_name	Renames the specified IKEv2 SA (first policy_name) to the specified name (second policy_name).

31.2.9 IPv6 IPSec SA Commands

This table lists the commands for IPv6 IPSec SAs.

Table 138 crypto Commands: IPv6 IPSec SAs

COMMAND	DESCRIPTION
show crypto map6 [*map_name*]	Shows the specified IPSec SA or all IPSec SAs.
crypto map6 dial *map_name*	Dials the specified IPSec SA manually. This command does not work for IPSec SAs using manual keys or for IPSec SAs where the remote gateway address is 0.0.0.0.

Table 138 crypto Commands: IPv6 IPSec SAs (continued)

COMMAND	DESCRIPTION
`[no] crypto map map_name`	Creates the specified IPSec SA if necessary and enters sub-command mode. The no command deletes the specified IPSec SA.
`crypto map rename map_name map_name`	Renames the specified IPSec SA (first `map_name`) to the specified name (second `map_name`).
`crypto map map_name`	
`activate` `deactivate`	Activates or deactivates the specified IPSec SA.
`adjust-mss {auto | <200..1500>}`	Set a specific number of bytes for the Maximum Segment Size (MSS) meaning the largest amount of data in a single TCP segment or IP datagram for this VPN connection or use `auto` to have the ZyWALL automatically set it.
`ipsec-isakmp policy_name`	Specifies the IKE SA for this IPSec SA and disables manual key.
`encapsulation {tunnel | transport}`	Sets the encapsulation mode.
`transform-set crypto_algo_esp [crypto_algo_esp [crypto_algo_esp]]`	Sets the active protocol to ESP and sets the encryption and authentication algorithms for each proposal. `crypto_algo_esp`: esp-null-md5 | esp-null-sha | esp-null-sha256 | esp-null-sha512 | esp-des-md5 | esp-des-sha | esp-des-sha256 | esp-des-sha512 | esp-3des-md5 | esp-3des-sha | esp-3des-sha256 | esp-3des-sha512 | esp-aes128-md5 | esp-aes128-sha | esp-aes128-sha256 | esp-aes128-sha512 | esp-aes192-md5 | esp-aes192-sha | esp-aes192-sha256 | esp-aes192-sha512 | esp-aes256-md5 | esp-aes256-sha | esp-aes256-sha256 | esp-aes256-sha512
`transform-set crypto_algo_ah [crypto_algo_ah [crypto_algo_ah]]`	Sets the active protocol to AH and sets the encryption and authentication algorithms for each proposal. `crypto_algo_ah`: ah-md5 | ah-sha | ah-sha256 | ah-sha512
`scenario {site-to-site-static|site-to-site-dynamic|remote-access-server|remote-access-client}`	Select the scenario that best describes your intended VPN connection. `Site-to-site`: The remote IPSec router has a static IP address or a domain name. This Zyxel Device can initiate the VPN tunnel. `site-to-site-dynamic`: The remote IPSec router has a dynamic IP address. Only the remote IPSec router can initiate the VPN tunnel. `remote-access-server`: Allow incoming connections from IPSec VPN clients. The clients have dynamic IP addresses and are also known as dial-in users. Only the clients can initiate the VPN tunnel. `remote-access-client`: Choose this to connect to an IPSec server. This Zyxel Device is the client (dial-in user) and can initiate the VPN tunnel.
`set security-association lifetime seconds <180..3000000>`	Sets the IPSec SA life time.
`set pfs {group1 | group2 | group5 | none}`	Enables Perfect Forward Secrecy group.
`local-policy address_name`	Sets the address object for the local policy (local network).
`remote-policy address_name`	Sets the address object for the remote policy (remote network).

Table 138 crypto Commands: IPv6 IPSec SAs (continued)

COMMAND	DESCRIPTION
`[no] policy-enforcement`	Drops traffic whose source and destination IP addresses do not match the local and remote policy. This makes the IPSec SA more secure. The `no` command allows traffic whose source and destination IP addresses do not match the local and remote policy. Note: You must allow traffic whose source and destination IP addresses do not match the local and remote policy, if you want to use the IPSec SA in a VPN concentrator.
`[no] nail-up`	Automatically re-negotiates the SA as needed. The `no` command does not.
`[no] replay-detection`	Enables replay detection. The `no` command disables it.
`[no] configuration-payload-provide activate`	Enables configuration payload in server role. The `no` command disables it.
`configuration-payload-provide address- {}`	Sets configuration payload address . The `no` command disables it
`[no] configuration-payload-provide {first-dns IPv6|second-dns IPv6}`	Sets configuration payload address dns server. The `no` command disables it
`[no] narrowed`	Enables policy narrowed. The `no` command disables it

31.2.10 IPv6 VPN Concentrator Commands

This table lists the commands for the IPv6 VPN concentrator.

Table 139 vpn-concentrator Commands: VPN Concentrator

COMMAND	DESCRIPTION
`show vpn-concentrator6 [`*`profile_name`*`]`	Shows the specified IPv6 VPN concentrator or all IPv6 VPN concentrators.
`[no] vpn-concentrator6` *`profile_name`*	Creates the specified IPv6 VPN concentrator if necessary and enters sub-command mode. The `no` command deletes the specified IPv6 VPN concentrator.
`[no] crypto` *`map_name`*	Adds the specified IPSec SA to the specified IPv6 VPN concentrator. The `no` command removes the specified IPSec SA from the specified IPv6 VPN concentrator.
`vpn-concentrator6 rename` *`profile_name profile_name`*	Renames the specified IPv6 VPN concentrator (first *`profile_name`*) to the specified name (second *`profile_name`*).

CHAPTER 32
SSL VPN

This chapter shows you how to set up secure SSL VPN access for remote user login.

32.1 SSL Access Policy

An SSL access policy allows the Zyxel Device to perform the following tasks:

- limit user access to specific applications or files on the network.
- allow user access to specific networks.
- assign private IP addresses and provide DNS/WINS server information to remote users to access internal networks.

32.1.1 SSL Application Objects

SSL application objects specify an application type and server that users are allowed to access through an SSL tunnel. See Chapter 55 on page 383 for how to configure SSL application objects.

32.1.2 SSL Access Policy Limitations

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

32.2 SSL VPN Commands

The following table describes the values required for some SSL VPN commands. Other values are discussed with the corresponding commands.

Table 140 Input Values for SSL VPN Commands

LABEL	DESCRIPTION
profile_name	The descriptive name of an SSL VPN access policy. You may use up to 31 characters ("a-z", A-Z", "0-9") with no spaces allowed.
address_object	The name of an IP address (group) object. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
application_object	The name of an SSL application object. You may use up to 31 characters ("0-9", "a-z", "A-Z", "-" and "_"). No spaces are allowed.
user_name	The name of a user (group). You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.

The following sections list the SSL VPN commands.

32.2.1 SSL VPN Commands

This table lists the commands for SSL VPN. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 141 SSL VPN Commands

COMMAND	DESCRIPTION
`show sslvpn policy [`*`profile_name`*`]`	Displays the settings of the specified SSL VPN access policy.
`show ssl-vpn network-extension local-ip`	Displays the IP address that the Zyxel Device uses in setting up the SSL VPN.
`show sslvpn monitor`	Displays a list of the users who are currently logged into the VPN SSL client portal.
`sslvpn network-extension local-ip `*`ip`*	Sets the IP address that the Zyxel Device uses in setting up the SSL VPN.
`sslvpn policy {`*`profile_name`*` | `*`profile_name`*` append | `*`profile_name`*` insert <1..16>}`	Enters the SSL VPN sub-command mode to add or edit an SSL VPN access policy.
`[no] activate`	Turns the SSL VPN access policy on or off.
`[no] application `*`application_object`*	Adds the SSL application object to the SSL VPN access policy.
`[no] description `*`description`*	Adds information about the SSL VPN access policy. Use up to 60 characters (“0-9”, “a-z”, “A-Z”, “-” and “_”).
`[no] network-extension {activate | ip- `*`address_object`*` | 1st-dns {`*`address_object`*` | `*`ip`*` } | 2nd-dns {`*`address_object`*` | `*`ip`*` } | 1st-wins {`*`address_object`*` | `*`ip`*` } | 2nd-wins {`*`address_object`*` | `*`ip`*` } | network `*`address_object`*`}`	Use this to configure for a VPN tunnel between the authenticated users and the internal network. This allows the users to access the resources on the network as if they were on the same local network. `ip-`: specify the name of the of IP addresses to assign to the user computers for the VPN connection. Specify the names of the DNS or WINS servers to assign to the remote users. This allows them to access devices on the local network using domain names instead of IP addresses. `network`: specify a network users can access.
`[no] network-extension traffic-enforcement`	Forces all SSL VPN client traffic to be sent through the SSL VPN tunnel. The `no` command disables this setting.
`[no] network-extension netbios-broadcast`	Allows netbios broadcast packets to pass through the SSL VPN tunnel.
`[no] user `*`user_name`*	Specifies the user or user group that can use the SSL VPN access policy.
`sslvpn policy move <1..16> to <1..16>`	Moves the specified SSL VPN access policy to the number that you specified.
`sslvpn no connection username `*`user_name`*	Terminates the user’s SSL VPN connection and deletes corresponding session information from the Zyxel Device.
`no sslvpn policy `*`profile_name`*	Deletes the specified SSL VPN access policy.
`sslvpn policy rename `*`profile_name profile_name`*	Renames the specified SSL VPN access policy.
`show workspace application`	Displays the SSLVPN resources available to each user when logged into SSLVPN.
`show workspace cifs`	Displays the shared folders available to each user when logged into SSLVPN.

32.2.2 Setting an SSL VPN Rule Tutorial

Here is an example SSL VPN configuration. The SSL VPN rule defines:

- Only users using the “tester” account can use the SSL VPN.
- The Zyxel Device will assign an IP address from 192.168.100.1 to 192.168.100.10 (defined in object “IP-”) to the computers which match the rule’s criteria.
- The Zyxel Device will assign two DNS server settings (172.16.1.1 and 172.16.1.2 defined in objects DNS1 and DNS2) to the computers which match the rule’s criteria.
- The SSL VPN users are allowed to access the Zyxel Device’s local network, 172.16.10.0/24 (defined in object “Network1”).

1 First of all, configure 10.1.1.254/24 for the IP address of interface ge2 which is an external interface for public SSL VPN to access. Configure 172.16.10.254/24 for the IP address of interface ge3 which is an internal network.

```
Router(config)# interface ge2
Router(config-if-ge)# ip address 10.1.1.254 255.255.255.0
Router(config-if-ge)# exit
Router(config)# interface ge3
Router(config-if-ge)# ip address 172.16.10.254  255.255.255.0
Router(config-if-ge)# exit
```

2 Create four address objects for the SSL VPN DHCP , DNS servers and the local network for SSL VPN authenticated users to access.

```
Router(config)# address-object IP- 192.168.100.1-192.168.100.10
Router(config)# address-object DNS1 172.16.5.1
Router(config)# address-object DNS2 172.16.5.2
Router(config)# address-object NETWORK1 172.16.10.0/24
```

3 Create the SSL VPN user account named tester with password 1234.

```
Router(config)# username tester password 1234 user-type user
```

4 Create an SSL VPN rule named SSL_VPN_TEST. Enable it and apply objects you just created.

```
Router(config)# sslvpn policy SSL_VPN_TEST
Router(policy SSL_VPN_TEST)# activate
Router(policy SSL_VPN_TEST)# user tester
Router(policy SSL_VPN_TEST)# network-extension activate
Router(policy SSL_VPN_TEST)# network-extension ip- IP-
Router(policy SSL_VPN_TEST)# network-extension 1st-dns DNS1
Router(policy SSL_VPN_TEST)# network-extension 2nd-dns DNS2
Router(policy SSL_VPN_TEST)# network-extension network NETWORK1

Router(policy SSL_VPN_TEST)# exit
```

5 Displays the SSL VPN rule settings.

```
Router(config)# show sslvpn policy SSL_VPN_TEST
index: 1
  active: yes
  name: SSL_VPN_TEST
  description:
  user: tester
  ssl application: none
  network extension: yes
  traffic enforcement:no
  netbios broadcast: no
  ip : IP-
  dns server 1: DNS1
  dns server 2: DNS2
  wins server 1: none
  wins server 2: none
  network: NETWORK1

  reference count: 0
```

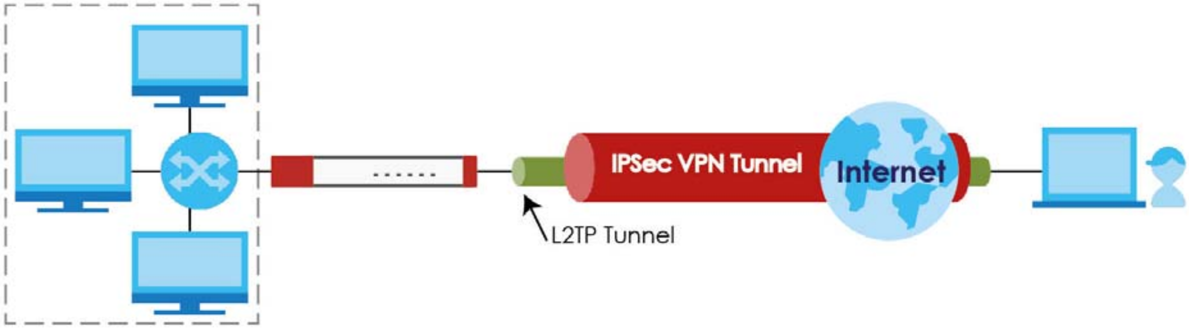
CHAPTER 33
L2TP VPN

This chapter explains how to set up and maintain L2TP VPNs in the Zyxel Device.

33.1 L2TP VPN Overview

L2TP VPN lets remote users use the L2TP and IPSec client software included with their computers' operating systems to securely connect to the network behind the Zyxel Device. The remote users do not need their own IPSec gateways or VPN client software.

Figure 22 L2TP VPN Overview



The Layer 2 Tunneling Protocol (L2TP) works at layer 2 (the data link layer) to tunnel network traffic between two peers over another network (like the Internet). In L2TP VPN, an IPSec VPN tunnel is established first (see Chapter 31 on page 239 for information on IPSec) and then an L2TP tunnel is built inside it.

Note: At the time of writing the L2TP remote user must have a public IP address in order for L2TP VPN to work (the remote user cannot be behind a NAT router or a firewall).

33.2 IPSec Configuration

You must configure an IPSec VPN connection for L2TP VPN to use (see Chapter 31 on page 239 for details). The IPSec VPN connection must:

- Be enabled.
- Use transport mode.
- Not be a manual key VPN connection.
- Use **Pre-Shared Key** authentication.

- Use a VPN gateway with the **Secure Gateway** set to **0.0.0.0** if you need to allow L2TP VPN clients to connect from more than one IP address.

33.2.1 Using the Default L2TP VPN Connection

Default_L2TP_VPN_Connection is pre-configured to be convenient to use for L2TP VPN. If you use it, edit the following.

Configure the local and remote policies as follows.

- For the **Local Policy**, create an address object that uses host type and contains the **My Address** IP address that you configured in the **Default_L2TP_VPN_GW**. Use this address object in the local policy.
- For the **Remote Policy**, create an address object that uses host type and an IP address of 0.0.0.0. Use this address object in the remote policy.

You must also edit the **Default_L2TP_VPN_GW** gateway entry.

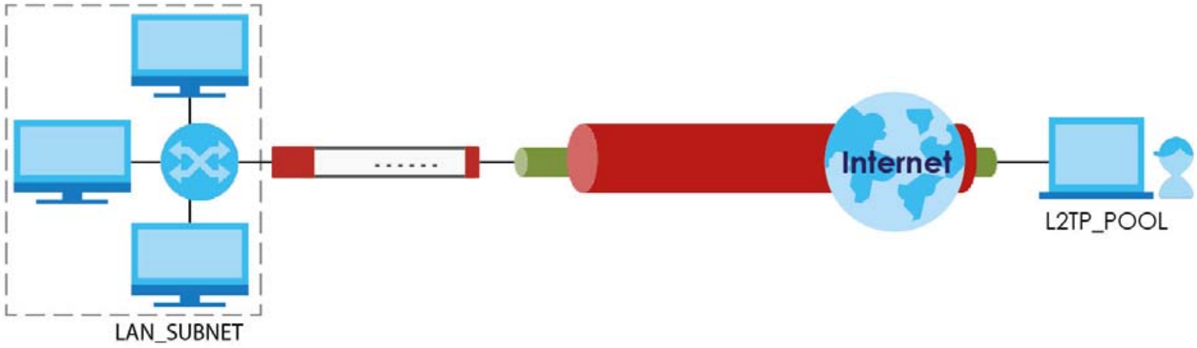
- Configure the **My Address** setting according to your requirements.
- Replace the default **Pre-Shared Key**.

33.3 Policy Route

You must configure a policy route to let remote users access resources on a network behind the Zyxel Device.

- Set the policy route's **Source Address** to the address object that you want to allow the remote users to access (**LAN_SUBNET** in the following figure).
- Set the **Destination Address** to the IP address that the Zyxel Device assigns to the remote users (**L2TP_** in the following figure).

Figure 23   Policy Route for L2TP VPN



33.4 L2TP VPN Commands

The following table describes the values required for some L2TP VPN commands. Other values are discussed with the corresponding commands.

Table 142 Input Values for L2TP VPN Commands

LABEL	DESCRIPTION
address_object	The name of an IP address (group) object. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
interface_name	The name of the interface. Ethernet interface: For some Zyxel Device models, use gex, *x* = 1 - N, where N equals the highest numbered Ethernet interface for your Zyxel Device model. For other Zyxel Device models, use a name such as wan1, wan2, opt, lan1, or dmz. VLAN interface: vlan*x*, *x* = 0 - 4094 bridge interface: br*x*, *x* = 0 - N, where N depends on the number of bridge interfaces your Zyxel Device model supports.
ppp_interface	PPPoE/PPTP interface: ppp*x*, *x* = 0 - N, where N depends on the number of PPPoE/PPTP interfaces your Zyxel Device model supports.
map_name	The name of an IPSec SA. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
user_name	The name of a user (group). You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
domain_name	Fully-qualified domain name. You may use up to 254 alphanumeric characters, dashes (-), or periods (.), but the first character cannot be a period.
profile_name	The name of an L2TP VPN account. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.

The following sections list the L2TP VPN commands.

33.4.1 L2TP VPN Commands

This table lists the commands for L2TP VPN. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 143 L2TP VPN Commands

COMMAND	DESCRIPTION
`l2tp-over-ipsec recover default-ipsec-policy`	If the default L2TP IPSec policy has been deleted, use this command to recreate it (with the default settings).
`[no] l2tp-over-ipsec activate;`	Turns L2TP VPN on. The `no` command turns it off.
`l2tp-over-ipsec crypto` *map_name*	Specifies the IPSec VPN connection the Zyxel Device uses for L2TP VPN. It must meet the requirements listed in Section 33.2 on page 258. Note: Modifying this VPN connection (or the VPN gateway that it uses) disconnects any existing L2TP VPN sessions.
`l2tp-over-ipsec` *address-object*	Specifies the address object that defines the of IP addresses that the Zyxel Device uses to assign to the L2TP VPN clients.

Table 143 L2TP VPN Commands

COMMAND	DESCRIPTION
`l2tp-over-ipsec authentication` *`authentication profile_name`*	Specifies how the Zyxel Device authenticates a remote user before allowing access to the L2TP VPN tunnel. The authentication method has the Zyxel Device check a user's user name and password against the Zyxel Device's local database, a remote LDAP, RADIUS, a Active Directory server, or more than one of these.
`certificate` *`cert_name`*	Select the certificate to use to identify the Zyxel Device for L2TP VPN connections. The certificate is used with the EAP, PEAP, and MSCHAPv2 authentication protocols. The certificate must already be configured.
`[no] l2tp-over-ipsec user user_name`	Specifies the user or user group that can use the L2TP VPN tunnel. If you do not configure this, any user with a valid account and password on the Zyxel Device to log in. The `no` command removes the user name setting.
`[no] l2tp-over-ipsec keepalive-timer <1..180>`	The Zyxel Device sends a Hello message after waiting this long without receiving any traffic from the remote user. The Zyxel Device disconnects the VPN tunnel if the remote user does not respond. The `no` command returns the default setting.
`[no] l2tp-over-ipsec first-dns-server {`*`ip`*` | `*`interface_name`*`} {1st-dns|2nd-dns|3rd-dns}| {`*`ppp_interface`*`}{1st-dns|2nd-dns}}`	Specifies the first DNS server IP address to assign to the remote users. You can specify a static IP address, or a DNS server that an interface received from its DHCP server. The `no` command removes the setting.
`[no] l2tp-over-ipsec second-dns-server {`*`ip`*` | `*`interface_name`*`} {1st-dns|2nd-dns|3rd-dns}| {`*`ppp_interface`*`}{1st-dns|2nd-dns}}`	Specifies the second DNS server IP address to assign to the remote users. You can specify a static IP address, or a DNS server that an interface received from its DHCP server. The `no` command removes the setting.
`[no] l2tp-over-ipsec first-wins-server` *`ip`*	Specifies the first WINS server IP address to assign to the remote users. The `no` command removes the setting.
`[no] l2tp-over-ipsec second-wins-server` *`ip`*	Specifies the second WINS server IP address to assign to the remote users. The `no` command removes the setting.
`no l2tp-over-ipsec session tunnel-id <0..65535>`	Deletes the specified L2TP VPN tunnel.
`show l2tp-over-ipsec`	Displays the L2TP VPN settings.
`show l2tp-over-ipsec session`	Displays current L2TP VPN sessions.

33.4.2 L2TP Account Commands

This table lists the commands to create, remove, display and bind L2TP VPN accounts. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

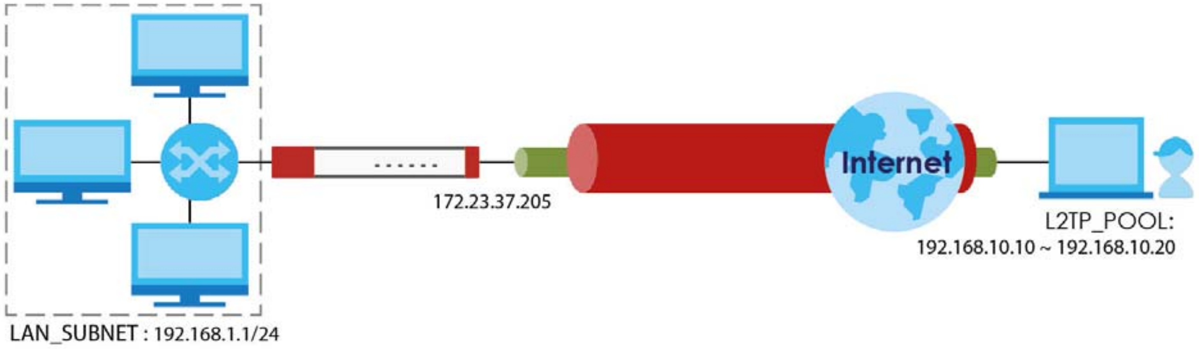
Table 144 L2TP VPN Commands

COMMAND	DESCRIPTION
`[no] account l2tp` *`profile_name`*	Creates an L2TP account and enters sub-command mode.
`authentication {chap | chap-pap | mschap | mschap-v2 | pap}`	Selects how the Zyxel Device authenticates a remote user before allowing access to the L2TP VPN tunnel. PAP (Password Authentication Protocol) is more readily available than CHAP (Challenge Handshake Authentication Protocol), but CHAP is more secure than PAP. • `chap-pap` - Your Zyxel Device accepts either CHAP or PAP when requested by this remote node. • `chap` - Your Zyxel Device accepts CHAP only. • `pap` - Your Zyxel Device accepts PAP only. • `mschap` - Your Zyxel Device accepts MSCHAP only. • `mschap-v2` - Your Zyxel Device accepts MSCHAP-V2 only.
`encrypted-password` *`ciphertext`*	Sets the password to encrypt L2TP traffic. *`ciphertext`*: The encryption password.
`idle <0..360>`	Specifies the number of seconds (0 to 360) that must elapse without traffic before the Zyxel Device automatically disconnects the L2TP tunnel. 0 (zero) means the timeout is disabled.
`password` *`isp_account_password`*	Sets the password given by the ISP for this account. *`isp_account_password`*: Password as given by ISP.
`server {`*`domain_name`* `|` *`w.x.y.z`*`}`	Specifies the fully-qualified domain name (*`domain_name`*) or IP address for the ISP account.
`user` *`isp_account_username`*	Displays the activity log for the specified user. *`isp_account_username`*: User name as given by ISP.
`show account l2tp [`*`profile_name`*`]`	Displays above details of all L2TP accounts or the one specified.
`Interface` *`interface_name`*	Specifies a PPP interface (see Section 14.2 on page 100) and enters that interface sub-command mode to bind an L2TP account to it.
`account` *`profile_name`*	Specifies the L2TP account to bind to this interface.
`local-address` *`w.x.y.z`*	Specifies the IP address of this interface.
`Interface disconnect`	Disconnects the L2TP tunnel on this interface.
`Interface dial wan1_ppp`	Connects the L2TP tunnel on this interface.
`show interface ppp`	Displays details of each PPP interface connection.

33.5 L2TP VPN Examples

This example uses the following settings in creating a basic L2TP VPN tunnel. See the Web Configurator User's Guide for how to configure L2TP in remote user computers using Windows XP and Windows 2000.

Figure 24 L2TP VPN Example



- The Zyxel Device has a static IP address of 172.23.37.205 for the ge3 interface.
- The remote user has a dynamic public IP address and connects through the Internet.
- You configure an IP address object named **L2TP_** to assign the remote users IP addresses from 192.168.10.10 to 192.168.10.20 for use in the L2TP VPN tunnel.
- The VPN rule allows the remote user to access the **LAN_SUBNET** which covers the 192.168.1.1/24 subnet.

33.5.1 Configuring the Default L2TP VPN Gateway Example

The following commands configure the **Default_L2TP_VPN_GW** entry.

- Configure the **My Address** setting. This example uses interface ge3 with static IP address 172.23.37.205.
- Configure the **Pre-Shared Key**. This example uses “top-secret”.

```
Router(config)# isakmp policy Default_L2TP_VPN_GW
Router(config-isakmp Default_L2TP_VPN_GW)# local-ip interface ge3
Router(config-isakmp Default_L2TP_VPN_GW)# authentication pre-share
Router(config-isakmp Default_L2TP_VPN_GW)# keystring top-secret
Router(config-isakmp Default_L2TP_VPN_GW)# activate
Router(config-isakmp Default_L2TP_VPN_GW)# exit
Router(config)#
```

33.5.2 Configuring the Default L2TP VPN Connection Example

The following commands configure the **Default_L2TP_VPN_Connection** entry.

Enforce and configure the local and remote policies.

- For the **Local Policy**, create an address object that uses host type and contains the **My Address** IP address that you configured in the **Default_L2TP_VPN_GW**. The address object in this example uses IP address 172.23.37.205 and is named **L2TP_IFACE**.
- For the **Remote Policy**, create an address object that uses host type and an IP address of 0.0.0.0. It is named **L2TP_HOST** in this example.

```
Router(config)# crypto map Default_L2TP_VPN_Connection
Router(config-crypto Default_L2TP_VPN_Connection)# policy-enforcement
Router(config-crypto Default_L2TP_VPN_Connection)# local-policy L2TP_IFACE
Router(config-crypto Default_L2TP_VPN_Connection)# remote-policy L2TP_HOST
Router(config-crypto Default_L2TP_VPN_Connection)# activate
Router(config-crypto Default_L2TP_VPN_Connection)# exit
Router(config)#
```

33.5.3 Configuring the L2TP VPN Settings Example

The following commands configure and display the L2TP VPN settings.

- Set it to use the **Default_L2TP_VPN_Connection** VPN connection.
- Configure an IP address for the range of 192.168.10.10 to 192.168.10.20. In this example it is already created and called **L2TP_**.
- This example uses the default authentication method (the Zyxel Device’s local user data base).
- Select a user or group of users that can use the tunnel. Here a user account named **L2TP-test** has been created.
- The other settings are left to the defaults in this example.
- Enable the connection.

```
Router(config)# l2tp-over-ipsec crypto Default_L2TP_VPN_Connection
Router(config)# l2tp-over-ipsec  L2TP_
Router(config)# l2tp-over-ipsec authentication default
Router(config)# l2tp-over-ipsec user L2TP-test
Router(config)# l2tp-over-ipsec activate
Router(config)# show l2tp-over-ipsec
L2TP over IPSec:
  activate          : yes
  crypto            : Default_L2TP_VPN_Connection
  address       : L2TP_
  authentication    : default
  user              : L2TP-test
  keepalive timer   : 60
  first dns server  : aux 1st-dns
  second dns server : aux 1st-dns
  first wins server :
  second wins server:
```

33.5.4 Configuring the Policy Route for L2TP Example

The following commands configure and display the policy route for the L2TP VPN connection entry.

- Set the policy route’s **Source Address** to the address object that you want to allow the remote users to access (**LAN_SUBNET** in this example).
- Set the **Destination Address** to the IP address that the Zyxel Device assigns to the remote users (**L2TP_** in this example).
- Set the next hop to be the **Default_L2TP_VPN_Connection** tunnel.

- Enable the policy route.

```
Router(config)# policy 3
Router(policy-route)# source LAN_SUBNET
Router(policy-route)# destination L2TP_
Router(policy-route)# service any
Router(policy-route)# next-hop tunnel
Default_L2TP_VPN_ConnectionRouter(policy-route)# no deactivate
Router(policy-route)# exit
Router(config)# show policy-route 3
index: 3
  active: yes
  description: WIZ_VPN
  user: any
  schedule: none
  interface: ge1
  tunnel: none
  sslvpn: none
  source: PC_SUBNET
  destination: L2TP_
  service: any
  nexthop type: Tunnel
  nexthop: Default_L2TP_VPN_Connection
  bandwidth: 0
  bandwidth priority: 0
  maximize bandwidth usage: no
  SNAT: none
  amount of port trigger: 0
```

CHAPTER 34
Bandwidth Management

34.1 Bandwidth Management Overview

Bandwidth management provides a convenient way to manage the use of various services on the network. It manages general protocols (for example, HTTP and FTP) and applies traffic prioritization to enhance the performance of delay-sensitive applications like voice and video.

34.1.1 BWM Type

The Zyxel Device supports two types of bandwidth management: **shared**, **per-user** and **per-source-ip**.

The **shared** BWM type is selected by default in a bandwidth management rule. All users to which the rule is applied need to share the bandwidth configured in the rule. If the BWM type is set to **per-user** in a rule, every user that matches the rule can use up to the configured bandwidth by his/her own. Set the BWM type set to **per-source-ip** in a rule,when you want to set the maximum bandwidth for traffic from an individual source IP address.

34.2 Bandwidth Management Commands

The following table lists the `bwm` commands. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 145 bwm Commands

COMMAND	DESCRIPTION
`bwm <1..127>`	Enters the `config-bwm` sub-command mode to configure a bandwidth management policy. See Table 146 on page 267 for the sub-commands.
`[no] bwm activate`	Enables bandwidth management on the Zyxel Device. The `no` command disabled bandwidth management.
`bwm append`	Enters the `config-bwm` sub-command mode to add a policy to the end of the policy list. See Table 146 on page 267 for the sub-commands.
`bwm default inbound priority <1..7>`	Specifies a number between 1 and 7 to set the priority for incoming traffic that matches the default policy. The smaller the number, the higher the priority. Traffic with a higher priority is given bandwidth before traffic with a lower priority.
`bwm default outbound priority <1..7>`	Specifies a number between 1 and 7 to set the priority for outgoing traffic that matches the default policy.
`bwm delete <1..127>`	Removes a policy.
`bwm insert <1..127>`	Enters the `config-bwm` sub-command mode to add a policy before the specified policy number. See Table 146 on page 267 for the sub-commands.

Table 145 bwm Commands (continued)

COMMAND	DESCRIPTION
`bwm <1..127>`	Enters the `config-bwm` sub-command mode to create a bandwidth management policy. See Table 146 on page 267 for the sub-commands.
`bwm modify <1..127>`	Enters the `config-bwm` sub-command mode to edit a bandwidth management policy. See Table 146 on page 267 for the sub-commands.
`bwm move <1..127> to <1..127>`	Moves a policy to the number that you specified.
`show bwm activation`	Displays whether bandwidth management is enabled.
`show bwm all`	Displays all bandwidth management policies.
`show bwm default`	Displays the default bandwidth management policy.

34.2.1 Bandwidth Sub-Commands

The following table describes the sub-commands for several `bwm` commands.

Table 146 bwm Sub-commands

COMMAND	DESCRIPTION
`[no] activate`	Enables a policy. The `no` command disables the policy.
`[no] description` *`description`*	Sets a descriptive name (up to 60 printable ASCII characters) for a policy. The `no` command removes the descriptive name from the policy.
`[no] destination` *`address_object`*	Sets the destination IP address or address group for whom this policy applies. The `no` command resets the destination IP address(es) to the default (`any`). `any` means all IP addresses.
`[no] dscp {<0..63> | any | class {af11 | af12 | af13 | af21 | af22 | af23 | af31 | af32 | af33 | af41 | af42 | af43 | cs0 | cs1 | cs2 | cs3 | cs4 | cs5 | cs6 | cs7 | default | wmm_be0 | wmm_be24 | wmm_bk16 | wmm_bk8 | wmm_vi32 | wmm_vi40 | wmm_vo48 | wmm_vo56}}`	Specifies a DSCP code point value or sets an AF class or QoS access class of incoming or outgoing packets to which this policy applies. `any` means all DSCP value or no DSCP marker. The `no` command resets the DSCP code to the default (`any`).
`[no] inbound ceiling {<0..1048576> | maximize-bandwidth-usage}`	Sets the maximum bandwidth allowed for incoming traffic or enables maximize bandwidth usage to let the traffic matching this policy "borrow" any unused bandwidth on the incoming interface. The `no` command resets the inbound maximum bandwidth to the default (`0`).
`[no] inbound guarantee-bandwidth <0..1048576> priority <1..7>`	Sets how much inbound bandwidth, in kilobits per second, this policy allows the traffic to use and also sets a number between 1 and 7 to set the priority for traffic that matches this policy. The smaller the number, the higher the priority. Inbound refers to the traffic the Zyxel Device sends to a connection's initiator. The `no` command resets the inbound guarantee bandwidth to the default (`0`).

Table 146 bwm Sub-commands (continued)

COMMAND	DESCRIPTION
`[no] inbound-dscp-mark {<0..63> | class {af11 | af12 | af13 | af21 | af22 | af23 | af31 | af32 | af33 | af41 | af42 | af43 | cs0 | cs1 | cs2 | cs3 | cs4 | cs5 | cs6 | cs7 | default | wmm_be0 | wmm_be24 | wmm_bk16 | wmm_bk8 | wmm_vi32 | wmm_vi40 | wmm_vo48 | wmm_vo56}}`	Sets the DSCP value to apply to the incoming packets that match this policy. `default`: to have the Zyxel Device set the DSCP value of the packets to 0. The `no` command resets the incoming DSCP code to the default (`preserve`) and have the Zyxel Device keep the packets' original DSCP value.
`[no] incoming-interface {interface` *`interface_name`* `| trunk` *`group_name`*`}`	Sets the source interface of the traffic to which this policy applies. *`interface_name`*: The name of the interface. This depends on the Zyxel Device model. See Table 40 on page 100 for detailed information about the interface name. *`group_name`*: A descriptive name for the trunk. The name cannot start with a number. This value is case-sensitive. The `no` command resets the incoming interface to the default (`any`).
`[no] log [alert]`	Sets the Zyxel Device to generate a log (and alert) for packets that match the policy. The `no` command sets the Zyxel Device to not generate a log and alert for packets that match the policy.
`[no] outbound ceiling {<0..1048576> | maximize-bandwidth-usage}`	Sets the maximum bandwidth allowed for outgoing traffic or enables maximize bandwidth usage to let the traffic matching this policy "borrow" any unused bandwidth on the out-going interface. The `no` command resets the outbound maximum bandwidth to the default (`0`).
`[no] outbound guarantee-bandwidth <0..1048576> priority <1..7>`	Sets how much outbound bandwidth, in kilobits per second, this policy allows the traffic to use and also sets a number between 1 and 7 to set the priority for traffic that matches this policy. The smaller the number, the higher the priority. Outbound refers to the traffic the UAG sends out from a connection's initiator. The `no` command resets the outbound guarantee bandwidth to the default (`0`).
`[no] outbound-dscp-mark {<0..63> | class {af11 | af12 | af13 | af21 | af22 | af23 | af31 | af32 | af33 | af41 | af42 | af43 | cs0 | cs1 | cs2 | cs3 | cs4 | cs5 | cs6 | cs7 | default | wmm_be0 | wmm_be24 | wmm_bk16 | wmm_bk8 | wmm_vi32 | wmm_vi40 | wmm_vo48 | wmm_vo56}}`	Sets the DSCP value to apply to the outgoing packets that match this policy. `default`: to have the Zyxel Device set the DSCP value of the packets to 0. The `no` command resets the outgoing DSCP code to the default (`preserve`) and have the Zyxel Device keep the packets' original DSCP value.

Table 146 bwm Sub-commands (continued)

COMMAND	DESCRIPTION
`[no] outgoing-interface {interface interface_name | trunk group_name}`	Sets the destination interface of the traffic to which this policy applies. *interface_name*: The name of the interface. This depends on the Zyxel Device model. See Table 40 on page 100 for detailed information about the interface name. *group_name*: A descriptive name for the trunk. The name cannot start with a number. This value is case-sensitive. The `no` command resets the outgoing interface to the default (`any`).
`[no] schedule schedule_object`	Specifies a schedule that defines when the policy applies. The `no` command resets the schedule to the default (`none`) to make the policy always effective.
`[no] service service-object {service_name | any}`	Specifies a service or service group to identify the type of traffic to which this policy applies. `any`: the policy is effective for every service. The `no` command resets the service to the default (`any`).
`show`	Displays the policy settings.
`[no] source address_object`	Sets the source IP address or address group for whom this policy applies. The `no` command resets the source IP address(es) to the default (`any`). `any` means all IP addresses.
`[no] type {per-user | shared | per-ip-source}`	Sets the type of bandwidth management. `per-user`: to allow every user that matches this policy to use up to the bandwidth configured in this policy. `shared`: to have users that match this policy to share the bandwidth configured in this policy. `per-ip-source`: tset the maximum bandwidth for traffic from an individual source IP address. The `no` command resets the bandwidth management type to the default (`shared`).
`[no] user user_name`	Sets a user name or user group to which to apply the policy. The no command resets the user name to the default (`any`). `any` means all users.
`priority-code <0..7>`	Priority code is applied to outgoing traffic. The BWM policy priority code setting overwrites the VLAN priority code setting. Sets the priority code for the specified VLAN from 0 (lowest, background traffic) to 7 (highest, network control traffic). This is the priority code for packets in the specified VLAN that don't match the BWM rule.
`vlan-priority-code <0..7>`	Sets the priority code for matching outgoing traffic in the specfied VLAN.
`marked-interface interface vlan<1..4064>`	When a packet matches BWM criteria, choose the VLAN interface(s) to which to apply the priority code using a `marked-interface` command. Marks matching outgoing traffic from the specfied VLAN with the configured priority code.

Table 146 bwm Sub-commands (continued)

COMMAND	DESCRIPTION
`marked-interface any`	Marks matching outgoing traffic from any VLAN with the configured priority code.
`marked-interface trunk` *`trunk_name`*	Marks matching outgoing traffic from the specfied trunk with the configured priority code.
`marked-interface none`	Doesn't mark outgoing traffic with priority code for this BWM rule.

34.3 Bandwidth Management Commands Examples

The following example sets the priority code to 3 for packets in VLAN 1 that don't match any other BWM rule. BWM rule 1 marks matching outgoing traffic from VLAN 1 to priority code 4.

```
Router(config)# interface vlan1
Router(config-if-vlan)# priority-code 3
Router(config-if-vlan)# exit
Router(config)# bwm 1
Router(config-bwm modify 1)# vlan-priority-code 4
Router(config-bwm modify 1)# marked-interface interface vlan1
Router(config-bwm modify 1)# exit
Router(config)#
```

The following example adds a new bandwidth management policy for trial-users to limit incoming and outgoing bandwidth and sets the traffic priority to 3. It then displays the policy settings.

```
Router# configure terminal
Router(config)# bwm append
Router(config-bwm append 6)# activate
Router(config-bwm append 6)# description example
Router(config-bwm append 6)# user trial-users
Router(config-bwm append 6)# inbound guarantee-bandwidth 800 priority 3
Router(config-bwm append 6)# outbound guarantee-bandwidth 700 priority 3
Router(config-bwm append 6)# show
Current Configuration:
index: 6
   Activate: yes
   Description: example
   BWM Type: shared
   Schedule: none
   User: trial-users
   Incoming_Type: any
   Incoming_Interface: any
   Outgoing_Type: any
   Outgoing_Interface: any
   Src: any
   Dst: any
   Service_Type: service-object
   Service_Name: any
   Inbound_Excess: no
   Inbound_Prio: 3
   Inbound: 800
   Inbound_Ceiling: 0
   Outbound_Excess: no
   Outbound_Prio: 3
   Outbound: 700
   Outbound_Ceiling: 0
   DSCP_Code: any
   DSCP_Inbound: preserve
   DSCP_Outbound: preserve
   Log: no
Router(config-bwm append 6)# exit
Router(config)#
```

CHAPTER 35
Application Patrol

This chapter describes how to set up application patrol for the Zyxel Device.

35.1 Application Patrol Overview

Application patrol provides a convenient way to manage the use of various applications on the network. It manages general protocols (for example, http and ftp) and instant messenger (IM), peer-to-peer (P2P), Voice over IP (VoIP), and streaming (RSTP) applications. You can even control the use of a particular application's individual features (like text messaging, voice, video conferencing, and file transfers). Application patrol also has powerful bandwidth management including traffic prioritization to enhance the performance of delay-sensitive applications like voice and video.

Note: The Zyxel Device checks firewall rules before application patrol rules for traffic going through the Zyxel Device. To use a service, make sure both the firewall and application patrol allow the service's packets to go through the Zyxel Device.

Application patrol examines every TCP and UDP connection passing through the Zyxel Device and identifies what application is using the connection. Then, you can specify, by application, whether or not the Zyxel Device continues to route the connection.

35.2 Application Patrol Commands Summary

The following table describes the values required for many application patrol commands. Other values are discussed with the corresponding commands.

Table 147 Input Values for Application Patrol Commands

LABEL	DESCRIPTION
<profile-name>	Type the name of the profile. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
description	This is a description of the App Patrol Profile.

The following sections list the application patrol commands.

35.2.1 Application Patrol Commands

This table lists the application patrol commands.

Table 148 app Commands: Application Patrol

COMMAND	DESCRIPTION
`[no] app <profile-name>`	Creates a profile with the specified name. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive. The `no` command disables it.
`    [no] description DESCRIPTION`	Write a description of the App Patrol Profile.
`    application <profile-name> action {forward|drop|reject} {no log|log [alert]}`	Sets the action and generates a log, log and alert or neither (`no`) when traffic matches a signature in this profile. Actions are: • **forward** - routes packets that matches these signatures. • **Drop** - silently drops packets that matches these signatures without notification. • **Reject** - drops packets that matches these signatures and sends notification.
`[no] app log_sid`	Generate a log when traffic matches a signature in this category. The `no` command disables it.
`app reload signatures`	Re-downloads signatures from the update server.
`app rename <profile-name> <profile-name>`	Renames an existing profile
`[no] app statistics collect`	Enables application patrol statistics gathering. The `no` command disables it.
`app statistics flush`	Clears all application patrol statistics.
`app update`	Immediately downloads signatures from an update server.
`[no] app update auto`	Enables (disables) automatic signature downloads at regular times and days.
`app update daily <0..23>`	Enables automatic signature download every day at the time specified.
`app update hourly`	Enables automatic signature download every hour.
`app update weekly {sun | mon | tue | wed | thu | fri | sat} <0..23>`	Enables automatic signature download once-a-week at the time and day specified.
`no application-object <profile-name>`	Removes the application object from the named profile.
`[no] security-service app-patrol activate`	Turns on application patrol on the Zyxel Device. The `no` command disables application patrol.
`show app category <category_id>`	Shows tag IDs for a specific category.
`show app profiles`	Shows the description, application name, and object reference number for all application patrol profiles on the Zyxel Device.
`show app profiles <profile-name>`	Shows the description, application name, and object reference number associated with the named profile.
`show app profiles <profile-name> application`	Shows the application name, action and log associated with the named profile.
`show app profiles <profile-name> application category {category_id | all}`	Shows the description, application name, and object reference number associated with the named profile within a specific or all categories.
`show app search-name <application_keyword>`	Searches for applications that contain the specified keyword.

Table 148   app Commands: Application Patrol

COMMAND	DESCRIPTION
`show app signature update`	Displays signature update schedule.
`show app signatures date`	Displays the date (yyyy-mm-dd) and time the set was released.
`show app signatures status`	Displays details about the current application patrol signature set.
`show app signatures version`	Displays the App Patrol signature set version number. This number gets larger as the set is enhanced.
`show app statistics collect`	Shows if application patrol statistics gathering is enabled and if yes, when.
`show app statistics summary`	Shows a summary of application patrol statistics (if any).
`show app tag info`	Displays the ID and name of tags for applications.
`show app update status`	Displays signature update status.
`show security-service signature status`	Displays details about all current signature sets.
`show security-service status`	Displays whether the security services are enabled on the Zyxel Device.

35.2.1.1 Application Patrol Command Examples

This command shows details of an application patrol profile created.

```
Router# show app profiles
APP-patrol: 1
  profile name: app1
  description:
  application: ultrasurf_app
  ref: 1
```

These are some other example application patrol usage commands

```
Router(config)# show app statistics collect
collect statistics: yes
collect statistics time: since 2014-06-03 05:39:59 to 2014-06-10 06:20:17
Router(config)# show app signatures version
version: 3.1.4.049
Router(config)# show app signatures date
date: 2013-12-05 18:09:51
Router(config)# app john
Router(config-app-patrol-profile-john)# description this is a dummy
profile
Router(config-app-patrol-profile-john)# exit
Router(config)# show app profiles
APP-patrol: 1
  profile name: testfb
  description:
  application: tests
  ref: 0
APP-patrol: 2
  profile name: test
  description: this is a test
  application:
  ref: 0
APP-patrol: 3
  profile name: john
  description: this is a dummy profile
  application:
  ref: 0
Router(config)#
```

CHAPTER 36
Anti-Virus

This chapter introduces and shows you how to configure the anti-virus scanner.

36.1 Anti-Virus Overview

A computer virus is a small program designed to corrupt and/or alter the operation of other legitimate programs. A worm is a self-replicating virus that resides in active memory and duplicates itself. The effect of a virus attack varies from doing so little damage that you are unaware your computer is infected to wiping out the entire contents of a hard drive to rendering your computer inoperable.

36.2 Anti-Virus Commands

The following table identifies the values required for many of these commands. Other input values are discussed with the corresponding commands.

Table 149 Input Values for General Anti-Virus Commands

LABEL	DESCRIPTION
<profile-name>	The name of the profile. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
av_file_pattern	Use up to 80 characters to specify a file pattern. Alphanumeric characters, underscores (_), dashes (-), question marks (?) and asterisks (*) are allowed. A question mark (?) lets a single character in the file name vary. For example, use “a?.zip” (without the quotation marks) to specify aa.zip, ab.zip and so on. Wildcards (*) let multiple files match the pattern. For example, use “*a.zip” (without the quotation marks) to specify any file that ends with “a.zip”. A file named “testa.zip” would match. There could be any number (of any type) of characters in front of the “a.zip” at the end and the file name would still match. A file named “test.zipa” for example would not match. A * in the middle of a pattern has the Zyxel Device check the beginning and end of the file name and ignore the middle. For example, with “abc*.zip”, any file starting with “abc” and ending in “.zip” matches, no matter how many characters are in between. The whole file name has to match if you do not use a question mark or asterisk. If you do not use a wildcard, the Zyxel Device checks up to the first 80 characters of a file name.

36.2.1 General Anti-Virus Commands

The following table describes general anti-virus commands. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Note: You must register for the anti-virus service in order to use it (see Chapter 5 on page 50).

Table 150   General Anti-Virus Commands

COMMAND	DESCRIPTION
`[no] anti-virus activate`	Enables the anti-virus service. The Anti-Virus service depends on anti-virus service registration.
`show anti-virus activation`	Displays anti-virus service status.
`show anti-virus eicar activation`	Displays anti-virus eicar status.
`[no] anti-virus eicar activate`	Turns detection of the EICAR test file on or off.
`[no] anti-virus cloud-query activate`	Turns anti-virus cloud query feature on or off.
`show anti-virus cloud-query status`	Displays anti-virus cloud query status.
`[no] anti-virus cloud-query ftype-identify` *`file_type`*	Applies anti-virus cloud query on this file type.
`show anti-virus cloud-query ftype-identify status`	Displays the anti-virus cloud query status of all recognized file types.
`anti-virus reload signatures`	Recovers anti-virus signatures. You should only need to do this if instructed to do so by a support technician.
`[no] anti-virus skip-unknown-file-type activate`	Sets whether or not anti-virus checks unknown file types.
`show anti-virus skip-unknown-file-type activation`	Displays whether or not anti-virus checks unknown file types.
`anti-virus mail-infect-ext activate`	Has the Zyxel Device add a notification text file to an e-mail after modifying a virus-infected e-mail attachment.
`no anti-virus mail-infect-ext activate`	Has the Zyxel Device not add a notification text file to an e-mail after identifying an infected file.
`[no] security-service anti-virus activate`	Turns on anti-viruson the Zyxel Device. The `no` command disables anti-virus.
`show security-service status`	Displays whether the security services are enabled on the Zyxel Device.

36.2.2 Anti-Virus Profile

This table lists the AV profile-related commands.

Table 151   anti-virus profile Commands

COMMAND	DESCRIPTION
`anti-virus rename` *`old_profile_name new_profile_name`*	Renames the AV profile.
`anti-virus profile_name`	Enters the anti-virus sub-command mode to edit the specified direction specific profile.
`[no] infected-action destroy`	Sets the action to take when the Zyxel Device finds a virus in a file. When activated, infected files are modified before being forwarded to the user.

Table 151 anti-virus profile Commands

COMMAND	DESCRIPTION
`[no] file-decompression [unsupported destroy]`	Enable file decompression to have the ZyWALL / USG attempt to decompress zipped files for further scanning. You can also have it destroy the zipped files it cannot decompress due to encryption or system resource limitations.
`[no] log [alert]`	Set whether the Zyxel Device should create a log or alert if it finds a virus in a file.
`description`	Describes the profile.
`[no] scan {http | ftp | imap4 | smtp | pop3}`	Sets the traffic protocols you want to scan for viruses.
`[no] infected-action {destroy | send-win-msg}`	Sets the action to take when the Zyxel Device detects a virus in a file. The file can be "destroyed" (overwrite a portion of the file with zeros before forwarding to the user). The Zyxel Device can also send a message alert to the user using a Microsoft Windows computer connected to the to interface.
`[no] bypass {white-list | black-list}`	Have the Zyxel Device use a white-list (bypassed files) or black-list (checked files) based on patterns.
`[no] file-decompression [unsupported destroy]`	Enable file decompression to have the Zyxel Device attempt to decompress compressed files for further scanning. You can also have it modify the compressed files that cannot be decompressed due to encryption or system resource limitations. Note that the Zyxel Device cannot decompress compressed files within a compressed file.
`show [all]`	Displays the details of the anti-virus rule you are configuring or all the rules.
`anti-virus rule move <1..32> to <1..32>`	Moves a direction specific anti-virus rule to the number that you specified.
`anti-virus rule delete <1..32>`	Removes a direction specific anti-virus rule.
`show anti-virus profile [profile_name]`	Shows details of the named profile.

36.2.2.1 Anti-Virus Profile Command Example

This is an example of anti-virus profile commands.

```
Router(config)# anti-virus office1
Router(config-av-profile-office1)# infected-action destroy
Router(config-av-profile-office1)# file-decompression
Router(config-av-profile-office1)# no file-decompression unsupported
destroy
Router(config-av-profile-office1)# exit
Router(config)# show an
anti-spam    anti-virus
Router(config)# show anti-virus profile office1
Anti-Virus Rule: 3
  name: office1
  description:
  log: log
  file decompression: yes
  destroy unsupported compressed file: no
  destroy infected compressed file: yes
  reference count: 0
```

36.2.3 White and Black Lists

The following table describes the commands for configuring the white list and black list. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 152 Commands for Anti-Virus White and Black Lists

COMMAND	DESCRIPTION
`[no] anti-virus white-list activate`	Turn on the white list to have the Zyxel Device anti-virus scan bypass files with names that match the white list patterns.
`[no] anti-virus white-list file-pattern` *`av_file_pattern`* `{activate|deactivate}`	Adds or removes a white list file pattern. Turns a file pattern on or off.
`anti-virus white-list replace` *`old_av_file_pattern new_av_file_pattern`* `{activate|deactivate}`	Replaces the specified white list file pattern with a new file pattern.
`[no] anti-virus black-list activate`	Turn on the black list to log and delete files with names that match the black list patterns.
`[no] anti-virus black-list file-pattern` *`av_file_pattern`* `{activate|deactivate}`	Adds or removes a black list file pattern. Turns a file pattern on or off.
`anti-virus black-list replace` *`old_av_file_pattern new_av_file_pattern`* `{activate|deactivate}`	Replaces the specified black list file pattern with a new file pattern.

36.2.3.1 White and Black Lists Example

This example shows how to enable the white list and configure an active white list entry for files with a .exe extension. It also enables the black list and configures an inactive black list entry for files with a .exe extension.

```
Router(config)# anti-virus white-list activate
Router(config)# anti-virus white-list file-pattern
Router(config)# anti-virus white-list file-pattern *.exe activate
Router(config)# anti-virus black-list activate
Router(config)# anti-virus black-list file-pattern *.exe deactivate
Router(config)# show anti-virus white-list status
anti-virus white-list status: yes
Router(config)# show anti-virus white-list
No.  Status
File-Pattern
===========================================================================
1    yes
*.exe
Router(config)# show anti-virus black-list status
anti-virus black-list status: yes
Router(config)# show anti-virus black-list
No.  Status
File-Pattern
===========================================================================
1    no
*.exe
```

36.2.4 Signature Search Anti-Virus Command

The following table describes the command for searching for signatures. You must use the `configure terminal` command to enter the configuration mode before you can use this command.

Table 153 Command for Anti-Virus Signature Search

COMMAND	DESCRIPTION
`show anti-virus search signature {all | name virus_name} [{from id to id}]`	Searches for signatures by name.Type the ID or part of the ID that you want to find.

36.2.4.1 Signature Search Example

This example shows how to search for anti-virus signatures with MSN in the name.

```
Router(config)# anti-virus search signature name MSN
signature: 1
  virus name: MSN
```

36.3 Update Anti-Virus Signatures

Use these commands to update new signatures. You should be registered for anti-virus service to use these.

Table 154 Update Signatures

COMMAND	DESCRIPTION
`[no] anti-virus update auto`	Enables (disables) automatic signature downloads at regular times and days.
`anti-virus update ctdb`	Immediately downloads the Cloud Threat Database signature from an update server.
`anti-virus update daily <0..23>`	Enables automatic signature download every day at the time specified.
`anti-virus update hourly`	Enables automatic signature download every hour.
`anti-virus update signatures`	Immediately downloads the anti-virus signatures from an update server.
`anti-virus update weekly {sun | mon | tue | wed | thu | fri | sat} <0..23>`	Enables automatic signature download once-a-week at the time and day specified.
`show anti-virus update`	Displays the signature update schedule.
`show anti-virus update status`	Displays the signature update status.
`show anti-virus signatures status`	Displays details about the current anti-virus signature set.
`show security-service signature status`	Displays details about all current signature sets.

36.3.1 Update Signature Examples

These examples show how to enable/disable automatic anti-virus downloading, schedule updates, display the schedule, display the update status, show the (new) updated signature version number, show the total number of signatures and show the date/time the signatures were created.

```
Router# configure terminal
Router(config)# anti-virus update signatures
ANTI-VIRUS signature update in progress.
Please check system log for future information.
Router(config)# anti-virus update auto
Router(config)# no anti-virus update auto
Router(config)# anti-virus update hourly
Router(config)# anti-virus update daily 10
Router(config)# anti-virus update weekly fri 13
Router(config)# show anti-virus update
auto: yes
schedule: weekly at Friday 13 o'clock
Router(config)# show anti-virus update status
current status: Anti-Virus Current signature version 1.046 on device is
latest at Tue Apr 17 10:18:00 2007
last update time: 2007/04/07 10:41:01
Router(config)# show anti-virus signatures status
current version : 1.046
release date    : 2007/04/06 10:41:29
signature number: 686000
SSII (signature) number: 6000
SSII(md5 checksum) number: 680000
```

36.4 Anti-Virus Statistics

The following table describes the commands for collecting and displaying anti-virus statistics. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 155 Commands for Anti-Virus Statistics

COMMAND	DESCRIPTION
`[no] anti-virus statistics collect`	Turns the collection of anti-virus statistics on or off.
`anti-virus statistics flush`	Clears the collected statistics.
`show anti-virus statistics summary`	Displays the collected statistics.

Table 155 Commands for Anti-Virus Statistics (continued)

COMMAND	DESCRIPTION
`show anti-virus statistics collect`	Displays whether the collection of anti-virus statistics is turned on or off.
`show anti-virus statistics ranking {destination | destination6 | source | source6 | virus-name}`	Queries and sorts anti-virus statistics entries by destination IP address, source IP address, or virus name. `virus-name`: lists the most common viruses detected. `source(6)`: lists the source IP addresses (IPv4 or IPv6) having the most number virus-infected files. `destination(6):` lists the most common destination IP addresses (IPv4 or IPv6) for virus-infected files.

36.4.1 Anti-Virus Statistics Example

This example shows how to collect and display anti-virus statistics. It also shows how to sort the display by the most common destination IP addresses.

```
Router(config)# anti-virus statistics collect
Router(config)# show anti-virus statistics collect
collect statistics: yes
Router(config)# show anti-virus statistics summary
virus detected: 0
Router(config)# show anti-virus statistics ranking destination
```

CHAPTER 37
RTLS

37.1 RTLS Overview

Ekahau RTLS (Real Time Location Service) tracks battery-powered Wi-Fi tags attached to APs managed by the Zyxel Device to create maps, alerts, and reports.

The Ekahau RTLS Controller is the centerpiece of the RTLS system. This server software runs on a Windows computer to track and locate Ekahau tags from Wi-Fi signal strength measurements. Use the Zyxel Device with the Ekahau RTLS system to take signal strength measurements at the APs (Integrated Approach / Blink Mode).

You need:

- At least three APs managed by the Zyxel Device (the more APs the better since it increases the amount of information the Ekahau RTLS Controller has for calculating the location of the tags)
- IP addresses for the Ekahau Wi-Fi tags
- A dedicated RTLS SSID is recommended
- Ekahau RTLS Controller in blink mode with TZSP Updater enabled
- Secure policies to allow RTLS traffic if the Zyxel Device Secure Policy control is enabled or the Ekahau RTLS Controller is behind a firewall.

For example, if the Ekahau RTLS Controller is behind a firewall, open ports 8550, 8553, and 8569 to allow traffic the APs send to reach the Ekahau RTLS Controller.

The following table lists default port numbers and types of packets RTLS uses.

Table 156 RTLS Traffic Port Numbers

PORT NUMBER	TYPE	DESCRIPTION
8548	TCP	Ekahau T201 location update.
8549	UDP	Ekahau T201 location update.
8550	TCP	Ekahau T201 tag maintenance protocol and Ekahau RTLS Controller user interface.
8552	UDP	Ekahau Location Protocol
8553	UDP	Ekahau Maintenance Protocol
8554	UDP	Ekahau T301 firmware update.
8560	TCP	Ekahau Vision web interface
8562	UDP	Ekahau T301W firmware update.
8569	UDP	Ekahau TZSP Listener Port

37.1.1 RTLS Configuration Commands

Use these commands to configure RTLS on the Zyxel Device.

Table 157 RTLS Commands

COMMAND	DESCRIPTION
[no] rtls ekahau activate	Enables RTLS to use Wi-Fi to track the location of Ekahau Wi-Fi tags. The no command disables tracking.
rtls ekahau ip address <*ip*>	Specifies the IP address of the Ekahau RTLS Controller.
rtls ekahau ip port <*1..65535*>	Specifies the server port of the Ekahau RTLS Controller.
show rtls ekahau config	Displays RTLS configuration details.
show rtls ekahau cli	Displays commands run on the AP. The AP runs the flush command before executing other commands.

37.1.2 RTLS Configuration Examples

The following commands show how to enable RTLS to use Wi-Fi to track the location of Ekahau Wi-Fi tags, specify the IP address of the Ekahau RTLS Controller and then show the configuration settings.

```
Router# configure terminal
Router(config)# rtls ekahau activate
Router(config)# rtls ekahau ip address 1.1.1.1
Router(config)# exit
Router# show rtls ekahau config
ekahau activate: yes
ekahau address: 1.1.1.1
ekahau port: 8569
Router#
```

The following command displays the commands run on the AP.

```
Router(config)# show rtls ekahau cli
!
rtls ekahau flush
!
rtls ekahau ip port 11111
rtls ekahau ip address 1.1.1.1
rtls ekahau activate
!
Router(config)#
```

CHAPTER 38
Botnet Filter

This chapter introduces and shows you how to configure botnet filtering.

38.1 Anti-Botnet Overview

A botnet is a network consisting of computers that are infected with malware and remotely controlled. The infected computers will contact and wait for instructions from a command and control (C&C) server(s). An attacker can control the botnet by setting up a C&C server and sending commands to the infected computers. Alternatively, a peer-to-peer network approach is used. The infected computer scans and communicates with the peer devices in the same botnet to share commands or malware sent by the C&C server.

The Zyxel Device's botnet filtering service allows you to detect and block connection attempts to or from the C&C server or known botnet IP addresses. When you register for and enable the botnet filtering service, your Zyxel Device downloads signature files that contain known botnet domain names and IP addresses. The Zyxel Device will also access an external database that has millions of web sites categorized based on content. You can have the Zyxel Device allow, block, block and/or log access to web sites or hosts based on these signatures and categories.

38.2 Anti-Botnet Commands

The following table describes general anti-botnet commands. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 158 Anti-Botnet Commands

COMMAND	DESCRIPTION
`anti-botnet action {forward | reject-both | reject-receiver | reject-sender}`	Sets what action the Zyxel Device takes when a packet contains a botnet IP address. `forward`: the Zyxel Device allows the packet to go through. `reject-sender`: the Zyxel Device denies the packets and send a TCP RST to the sender when a packet contains a botnet IP address. `reject-receiver`: the Zyxel Device denies the packets and send a TCP RST to the receiver when a packet contains a botnet IP address. `reject-both`: the Zyxel Device denies the packets and send a TCP RST to both the sender and receiver when a packet contains a botnet IP address.
`[no] anti-botnet log [alert]`	Creates a log on the Zyxel Device (and sends an alert) when the packet contains a botnet IP address.
`[no] security-service anti-botnet-ip activate`	Turns on IP blocking on the Zyxel Device. The `no` command disables IP blocking.

Table 158 Anti-Botnet Commands (continued)

COMMAND	DESCRIPTION
`[no] security-service anti-botnet-url activate`	Turns on URL blocking on the Zyxel Device. The `no` command disables URL blocking.
`show anti-botnet signatures date`	Displays the date and time the signature set was released.
`show anti-botnet signatures number`	Displays the number of signatures in this set.
`show anti-botnet signatures version`	Displays the signature set version number currently used by the Zyxel Device. This number gets larger as new signatures are added.
`show anti-botnet status`	Displays the action and log settings for botnet IP blocking.
`show security-service status`	Displays whether the security services, such as IP blocking and URL blocking are enabled on the Zyxel Device.
`show threat-website status`	Displays the action, log, message and category settings for botnet URL blocking.
`[no] threat-website action {block | log | pass | warn}`	Sets what action the Zyxel Device takes when it detects a connection attempt to or from the web pages of the specified categories. `block`: the Zyxel Device blocks access to the web pages that match the categories that you specified. `log`: the Zyxel Device creates a log when it detects a connection attempt to or from the web pages of the specified categories. `warn`: the Zyxel Device displays a warning message to the access requesters for the web pages before allowing users to access web pages that match the categories that you specified. `pass`: the Zyxel Device allows access to the web pages that match the categories that you specified.
`[no] threat-website block message` *`message`*	Sets a message to be displayed when the botnet filter blocks access to a web page. *`message`*: Use up to 127 characters (0-9a-zA-Z;/?:@&=+$\.-_!~*'()%,"). For example, "Access to this web page is not allowed. Please contact the network administrator".
`[no] threat-website block redirect` *`url`*	Sets the URL of the web page to which you want to send users when their web access is blocked by the botnet filter. The web page you specify here opens in a new frame below the denied access message. *`url`*: Use "http://" or "https://" followed by up to 262 characters (0-9a-zA-Z;/?:@&=+$\.-_!~*'()%). For example, http://192.168.1.17/blocked access.
`[no] threat-website category {anonymizers | botnets | compromised | malware | phishing-fraud | spam-sites}`	Specifies the categories of web pages that are known to pose a security threat to users or their computers.

38.3 Update Anti-Botnet Signatures

Use these commands to update new signatures. You should have already registered for anti-botnet service.

Table 159 Update Signatures

COMMAND	DESCRIPTION
`anti-botnet update signatures`	Immediately downloads signatures from an update server.
`[no] anti-botnet update auto`	Enables (disables) automatic signature downloads at regular times and days.
`anti-botnet update daily <0..23>`	Enables automatic signature download every day at the time specified.
`anti-botnet update hourly`	Enables automatic signature download every hour.
`anti-botnet update weekly {sun | mon | tue | wed | thu | fri | sat} <0..23>`	Enables automatic signature download once-a-week at the time and day specified.
`show anti-botnet signature update`	Displays signature update schedule.
`show anti-botnet update status`	Displays signature update status.
`show security-service signature status`	Displays details about all current signature sets.

38.3.1 Update Signature Examples

These examples show how to enable/disable automatic anti-botnet signature downloading, schedule updates, display the schedule, display the update status, show the (new) updated signature version number and show the date/time the signatures were created.

```
Router# configure terminal
Router(config)# anti-botnet update signatures
Anti-Botnet signature update in progress.
Please check system log for more information.
Router(config)# anti-botnet update auto
Router(config)# no anti-botnet update auto
Router(config)# anti-botnet update hourly
Router(config)# anti-botnet update daily 10
Router(config)# anti-botnet update weekly fri 13
Router(config)# show anti-botnet signature update
auto: no
schedule: weekly at Friday 13 o'clock
Router(config)# show anti-botnet update status
current status: Botnet Filter signature download has failed. (failed) at Mon Jul 9
18:01:32 2018
last update time: 2018/07/09 18:01:32
Router(config)# show security-service signature status
Feature         Type                      Current Version   Released Date
            Last Sync
==================================================================================
=====================================
Anti-Malware    Anti-Malware Signature    1.0.0.000         2018-01-01 00:00:00
(UTC+08:00) 2018-07-08 23:26:01
Anti-Malware    Cloud Threat Database     1.0.0.20171211.1  2017-12-11 13:46:40
(UTC+08:00) 2018-07-08 23:26:01
App-Patrol      App-Patrol                1.0.0.20180125.0  2018-01-25 09:45:25
(UTC+08:00) 2018-07-08 00:46:01
IDP             IDP                       3.1.4.050         2013-12-05 18:09:51
(UTC+08:00) 2018-07-08 01:11:01
Botnet Filter   Botnet Filter             1.0.0.000         2017-04-01 11:25:37
(UTC+08:00) 2018-07-09 18:01:19
```

38.4 Anti-Botnet Statistics

The following table describes the commands for collecting and displaying anti-botnet statistics. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 160 Commands for Anti-Botnet Statistics

COMMAND	DESCRIPTION
`[no] anti-botnet statistics collect`	Turns the collection of botnet IP blocking statistics on or off.
`anti-botnet statistics flush`	Clears the collected IP blocking statistics.
`[no] threat-website statistics collect`	Turns the collection of botnet URL blocking statistics on or off.
`threat-website statistics flush`	Clears the collected URL blocking statistics.
`show anti-botnet statistics summary`	Displays the collected botnet IP blocking statistics.

Table 160 Commands for Anti-Botnet Statistics (continued)

COMMAND	DESCRIPTION
`show anti-botnet statistics collect status`	Displays whether the collection of botnet IP blocking statistics is turned on or off.
`show anti-botnet statistics recent-activities`	Displays a list of connection attempts to or from the botnet IP addresses.
`show threat-website statistics collect`	Displays whether the collection of botnet URL blocking statistics is turned on or off.
`show threat-website statistics list`	Displays a list of connection attempts to or from the web pages of the specified categories.
`show threat-website statistics summary`	Displays the collected botnet URL blocking statistics.

38.4.1 Anti-Botnet Statistics Example

This example shows how to collect and display botnet IP filtering statistics.

```
Router(config)# anti-botnet statistics collect
Router(config)# show anti-botnet statistics collect status
Anti-BotNet Statistics Status: yes
duration: since 2018-07-09 17:38:15 to 2018-07-09 18:17:15
Router(config)# show anti-botnet statistics summary
enable: 1
scan: 0
total_threat: 0
high: 0
medium: 0
low: 0
Router(config)#
```

CHAPTER 39 Sandboxing

This chapter introduces and shows you how to configure sandboxing.

39.1 Sandboxing Overview

The Zyxel Device sandboxing is a security mechanism, which provides a safe environment to separate running programs from your network and host devices. Unknown or untrusted programs/codes are executed within an isolated virtual machine (VM) to monitor and analyze the zero-day malware and advanced persistent threats (APTs) that may evade the Zyxel Device protection, such as anti-malware. When a file with malicious or suspicious codes is detected, the Zyxel Device can take specific actions on the threats.

39.2 Sandbox Commands

The following table describes general sandbox commands. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 161 Sandbox Commands

COMMAND	DESCRIPTION
`[no] sandbox file-type {archives | chm | eicar | executables | macromedia-flash-data | ms-office-document | pdf | rtf | unknow-type}`	Specifies the type of files to be sent for sandboxing inspection. The `no` command sets the Zyxel Device to not send the specified type of files for sandboxing inspection.
`sandbox file-scanning-log {log | log-alert | no}`	Generates a log, log and alert or neither (no) when a file is being scanned.
`sandbox file-send-log {log | log-alert | no}`	Generates a log, log and alert or neither (no) when a file is sent for sandboxing inspection.
`sandbox malicious-action malicious {allow | destroy} {log | log-alert | no}`	Sets whether the Zyxel Device deletes (`destroy`) or forwards (`allow`) malicious files. This also sets the Zyxel Device to generate a log, log and alert or neither (no) when a malicious file is detected.
`sandbox malicious-action suspicious {allow | destroy} {log | log-alert | no}`	Sets whether the Zyxel Device deletes (`destroy`) or forwards (`allow`) suspicious files. This also sets the Zyxel Device to generate a log, log and alert or neither (no) when a suspicious file is detected.
`sandbox mdb flush`	Removes sandboxing MDB files.
`sandbox response-clean-log {log | log-alert | no}`	Generates a log, log and alert or neither (no) when no malicious or suspicious files are detected.
`sandbox server-file {delete | keep}`	Sets the Zyxel Device to delete or keep s the server file.

Table 161   Sandbox Commands (continued)

COMMAND	DESCRIPTION
`[no] sandbox statistics collect`	Turns the collection of sandboxing statistics on or off.
`sandbox statistics flush`	Clears the collected sandboxing statistics.
`[no] security-service sandbox activate`	Turns on sandboxing on the Zyxel Device. The `no` command disables sandboxing.
`show sandbox file-type all`	Displays all the file types and whether a type of files is to be sent for sandboxing inspection.
`show sandbox file-type status`	Displays only the types of files that are set to be sent for sandboxing inspection.
`show sandbox statistics collect`	Displays whether the collection of sandboxing statistics is turned on or off.
`show sandbox statistics ranking file-name`	Queries and sorts the sandboxing statistics entries by file name.
`show sandbox statistics summary`	Displays the collected sandboxing statistics.
`show sandbox status`	Displays the action and log settings for sandboxing.
`show security-service status`	Displays whether the security services are enabled on the Zyxel Device.

39.2.1 Sandbox Command Examples

This command shows how to enable sandboxing on the Zyxel Device and displays the status of security services.

```
Router# configure terminal
Router(config)# security-service sandbox activate
Router(config)# show security-service status
ips activation: no
sandbox activation: yes
anti-virus activation: yes
anti-botnet-ip activation: no
anti-botnet-url activation: no
anti-spam activation: no
content-filter activation: yes
app-patrol activation: yes
Router(config)#
```

This command sets the Zyxel Device to delete malicious files and generate a log when a malicious file is detected.

```
Router# configure terminal
Router(config)# sandbox malicious-action malicious destroy log
Router(config)#
```

CHAPTER 40
IDP Commands

This chapter introduces IDP-related commands.

40.1 Overview

Commands mostly mirror web configurator features. It is recommended you use the web configurator for IDP features such as searching for web signatures, creating/editing an IDP profile or creating/editing a custom signature. Some web configurator terms may differ from the command-line equivalent.

Note: The `no` command negates the action or returns it to the default value.

The following table lists valid input for IDP commands.

Table 162 Input Values for IDP Commands

LABEL	DESCRIPTION
zone_profile	The name of a zone. For some Zyxel Device models, use up to 31 characters (a-zA-Z0-9_-). The name cannot start with a number. This value is case-sensitive. For other Zyxel Device models, use pre-defined zone names like DMZ, LAN1, SSL VPN, IPSec VPN, OPT, and WAN.
idp_profile	The name of an IDP profile. It can consist of alphanumeric characters, the underscore, and the dash, and it is 1-31 characters long. Spaces are not allowed.

40.2 General IDP Commands

40.2.1 IDP Activation

Note: You must register for the IDP/AppPatrol signature service (at least the trial) before you can use it. See Chapter 5 on page 50.

This table shows the IDP signature, and system-protect activation commands.

Table 163 IDP Activation

COMMAND	DESCRIPTION
`[no] idp {signature | system-protect} activate`	Enables IDP signatures, anomaly detection, and/or system-protect. IDP signatures use requires IDP service registration. If you don’t have a standard license, you can register for a once-off trial one. The `no` command disables the specified service.
`idp system-protect deactivate`	Disables system-protect.

Table 163 IDP Activation

COMMAND	DESCRIPTION
show idp {signature | system-protect} activation	Displays IDP signature, or system protect service status.
idp reload	Recovers the IDP signatures. You should only need to do this if instructed to do so by a support technician.
[no] security-service ips activate	Turns on IDP on the Zyxel Device. The no command disables IDP.
show security-service status	Displays whether the security services are enabled on the Zyxel Device.

40.2.1.1 Activate/Deactivate IDP Example

This example shows how to activate and deactivate signature-based IDP on the Zyxel Device.

```
Router# configure terminal
Router(config)# idp signature activate
Router(config)# show idp signature activation
idp signature activation: yes
Router(config)# no idp signature activate
Router(config)# show idp signature activation
idp signature activation: no
```

40.3 IDP Profile Commands

40.3.1 Global Profile Commands

Use these commands to rename or delete existing profiles and show IDP base profiles.

Table 164 Global Profile Commands

COMMAND	DESCRIPTION
idp rename signature *profile1* *profile2*	Rename an IDP signature originally named *profile1* to *profile2*.
no idp signature *profile3*	Delete an IDP signature or system protect profile named *profile3*.
idp signature profile signature sid {activate | log [alert] | action {drop | reject-sender | reject-receiver | reject-both}}	Sets the action and log for the specified signature.
show idp signature *profile* signature all details	Lists the settings for all of the specified profile's signatures. Use |more to display the settings page by page.
show idp signature all details	Lists the settings for all of the signatures. Use |more to display the settings page by page.
show idp {signature | anomaly} base profile	Displays all IDP signature or system protect base profiles.
show idp signature base profile {all|none|wan|lan|dmz} settings	Lists the specified signature base profile's settings. Use |more to display the settings page by page.
show idp signature profiles	Displays IDP profiles created.

Table 164 Global Profile Commands

COMMAND	DESCRIPTION
show idp engine version	Displays the IDP engine version.
show idp signature profile signature sid details	Displays specified signature details.

40.3.1.1 Example of Global Profile Commands

In this example we rename an IDP signature profile from “old_profile” to “new_profile”, delete the “bye_profile” and show all base profiles available.

```
Router# configure terminal
Router(config)# idp rename signature old_profile new_profile
Router(config)# no idp signature bye_profile
Router(config)# show idp signature base profile
No.  Base Profile Name
==============================================================
1    none
2    all
3    wan
4    lan
5    dmz
Router(config)#
```

40.3.2 Editing/Creating IDP Signature Profiles

Use these commands to create a new IDP signature profile or edit an existing one. It is recommended you use the web configurator to create/edit profiles. If you do not specify a base profile, the default base profile is none.

Note: You CANNOT change the base profile later!

Table 165 Editing/Creating IDP Signature Profiles

COMMAND	DESCRIPTION
idp signature *newpro* [base {all | lan | wan | dmz | none}]	Creates a new IDP signature profile called *newpro*. *newpro* uses the base profile you specify. Enters sub-command mode. All the following commands relate to the new profile. Use exit to quit sub-command mode.
[no] signature *sid* activate	Activates or deactivates an IDP signature.
signature *sid* log [alert]	Sets log or alert options for an IDP signature
no signature *sid* log	Deactivates log options for an IDP signature
signature *sid* action {drop | reject-sender | reject-receiver | reject-both}	Sets an action for an IDP signature
no signature *sid* action	Deactivates an action for an IDP signature.
description description2	Describes the signature profile.

40.3.3 Signature Search

Use this command to search for signatures in the named profile.

Note: It is recommended you use the web configurator to search for signatures.

Table 166 Signature Search Command

COMMAND	DESCRIPTION
`idp search signature` *`my_profile`* `name` *`quoted_string`* `sid SID severity` *`severity_mask`* `platform` *`platform_mask`* `policytype` *`policytype_mask`* `service` *`service_mask`* `activate {any | yes | no} log {any | no | log | log-alert} action` *`action_mask`*	Searches for signature(s) in a profile by the parameters specified. The quoted string is any text within the signature name in quotes, for example, [idp search LAN_IDP name "WORM" sid 0 severity 0 platform 0 policytype 0 service 0 activate any log any action] searches for all signatures in the LAN_IDP profile containing the text "worm" within the signature name.
`show idp search signature` *`my_profile`* `name` *`quoted_string`* `sid SID severity` *`severity_mask`* `platform` *`platform_mask`* `policytype` *`policytype_mask`* `service` *`service_mask`* `activate {any | yes | no} log {any | no | log | log-alert} action` *`action_mask`*	Searches for signature(s) in a profile by the parameters specified. The quoted string is any text within the signature name in quotes, for example, [idp search LAN_IDP name "WORM" sid 0 severity 0 platform 0 policytype 0 service 0 activate any log any action] searches for all signatures in the LAN_IDP profile containing the text "worm" within the signature name.

40.3.3.1 Search Parameter Tables

The following table displays the command line severity, platform and policy type equivalent values. If you want to combine platforms in a search, then add their respective numbers together. For example, to search for signatures for Windows NT, Windows XP and Windows 2000 computers, then type "12" as the platform parameter.

Table 167 Severity, Platform and Policy Type Command Values

SEVERITY	PLATFORM	POLICY TYPE
1 = Very Low	1 = All	1 = DoS
2 = Low	2 = Win95/98	2 = Buffer-Overflow
3 = Medium	4 = WinNT	3 = Access-Control
4 = High	8 = WinXP/2000	4 = Scan
5 = Severe	16 = Linux	5 = Backdoor/Trojan
	32 = FreeBSD	6 = Others
	64 = Solaris	7 = P2P
	128 = SGI	8 = IM
	256 = Other-Unix	9 = Virtus/Worm
	512 = Network-Device	10 = Botnet
		11 = Web-Attack
		12 = Spam

The following table displays the command line service and action equivalent values. If you want to combine services in a search, then add their respective numbers together. For example, to search for signatures for DNS, Finger and FTP services, then type “7” as the service parameter.

Table 168 Service and Action Command Values

SERVICE	SERVICE	ACTION
1 = DNS	65536 = SMTP	1 = None
2 = FINGER	131072 = SNMP	2 = Drop
4 = FTP	262144 = SQL	4 = Reject-sender
8 = MYSQL	524288 = TELNET	8 = Reject-receiver
16 = ICMP	1048576 = TFTP	16 = Reject-both
32 = IM	2097152 = n/a	
64 = IMAP	4194304 = WEB_ATTACKS	
128 = MISC	8388608 = WEB_CGI	
256 = NETBIOS	16777216 = WEB_FRONTPAGE	
512 = NNTP	33554432 = WEB_IIS	
1024 = ORACLE	67108864 = WEB_MISC	
2048 = P2P	134217728 = WEB_PHP	
4096 = POP2	268435456 = MISC_BACKDOOR	
8192 = POP3	536870912 = MISC_DDOS	
16384 = RPC	1073741824 = MISC_EXPLOIT	
32768 = RSERVICES		

40.3.3.2 Signature Search Example

This example command searches for all signatures in the LAN_IDP profile:

- Containing the text “worm” within the signature name
- With an ID of 12345
- Has a very low severity level
- Operates on the Windows NT platform
- Is a scan policy type, DNS service
- Is enabled
- Generates logs.

```
Router# configure terminal
Router(config)#
Router(config)# idp search signature LAN_IDP name “worm” sid 12345 severity
1 platform 4 policytype 4 service 1 activate yes log log action 2
```

40.4 IDP Custom Signatures

Use these commands to create a new signature or edit an existing one.

Note: It is recommended you use the web configurator to create/edit signatures using the web configurator **Anti-X > UTM Profile > Custom Signatures** screen.

Note: You must use the web configurator to import a custom signature file.

Table 169 Custom Signatures

COMMAND	DESCRIPTION
`idp customize signature` *`quoted_string`*	Create a new custom signature. The quoted string is the signature command string enclosed in quotes. for example. "alert tcp any any <> any any (msg: \"test\"; sid: 9000000 ;)".
`idp customize signature edit` *`quoted_string`*	Edits an existing custom signature.
`no idp customize signature` *`custom_sid`*	Deletes a custom signature.
`idp customize_import name sig_name`	Edits an existing signature.
`show idp signatures custom-signature` *`custom_sid`* `{details | contents | non-contents}`	Displays custom signature information.
`show idp signatures custom-signature all details`	Displays all custom signatures' information.
`show idp signatures custom-signature number`	Displays the total number of custom signatures.

40.4.1 Custom Signature Examples

These examples show how to create a custom signature, edit one, display details of one, all and show the total number of custom signatures.

```
Router# configure terminal
Router(config)# idp customize signature "alert tcp any any <> any any
(msg: \"test\"; sid: 9000000 ;  )"
sid: 9000000
  message: test
  policy type:
  severity:
  platform:
    all: no
    Win95/98: no
    WinNT: no
    WinXP/2000: no
    Linux: no
    FreeBSD: no
    Solaris: no
    SGI: no
    other-Unix: no
    network-device: no
  service:
  outbreak: no
```

This example shows you how to edit a custom signature.

```
Router(config)# idp customize signature edit "alert tcp any any <> any any
(msg : \"test edit\"; sid: 9000000 ;  )"
sid: 9000000
  message: test edit
  policy type:
  severity:
  platform:
    all: no
    Win95/98: no
    WinNT: no
    WinXP/2000: no
    Linux: no
    FreeBSD: no
    Solaris: no
    SGI: no
    other-Unix: no
    network-device: no
  service:
  outbreak: no
```

This example shows you how to display custom signature details.

```
Router(config)# show idp signatures custom-signature 9000000 details
sid: 9000000
  message: test edit
  policy type:
  severity:
  platform:
    all: no
    Win95/98: no
    WinNT: no
    WinXP/2000: no
    Linux: no
    FreeBSD: no
    Solaris: no
    SGI: no
    other-Unix: no
    network-device: no
  service:
  outbreak: no
```

This example shows you how to display custom signature contents.

```
Router(config)# show idp signatures custom-signature 9000000 contents
sid: 9000000
Router(config)# show idp signatures custom-signature 9000000 non-contents
sid: 9000000
  ack:
  dport: 0
  dsize:
  dsize_rel:
  flow_direction:
  flow_state:
  flow_stream:
  fragbits_reserve:
  fragbits_dontfrag:
  fragbits_morefrag:
  fragoffset:
  fragoffset_rel:
  icmp_id:
  icmp_seq:
  icode:
  icode_rel:
  id:
  ipopt:
  itype:
  itype_rel:
  sameip:
  seq:
  sport: 0
  tcp_flag_ack:
  tcp_flag_fin:
  tcp_flag_push:
  tcp_flag_r1:
  tcp_flag_r2:
  tcp_flag_rst:
  tcp_flag_syn:
  tcp_flag_urg:
  threshold_type:
  threshold_track:
  threshold_count:
  threshold_second:
  tos:
  tos_rel:
  transport: tcp
  ttl:
  ttl_rel:
  window:
  window_rel:
```

This example shows you how to display all details of a custom signature.

```
Router(config)# show idp signatures custom-signature all details
sid: 9000000
  message: test edit
  policy type:
  severity:
  platform:
    all: no
    Win95/98: no
    WinNT: no
    WinXP/2000: no
    Linux: no
    FreeBSD: no
    Solaris: no
    SGI: no
    other-Unix: no
    network-device: no
  service:
  outbreak: no
```

This example shows you how to display the number of custom signatures on the Zyxel Device.

```
Router(config)# show idp signatures custom-signature number
signatures:  1
```

40.5 Update IDP Signatures

Use these commands to update new signatures. You register for IDP service before you can update IDP signatures, although you do not have to register in order to update system-protect signatures.

Note: You must use the web configurator to import a custom signature file.

Table 170 Update Signatures

COMMAND	DESCRIPTION
`idp signature update signatures`	Immediately downloads IDP signatures from an update server.
`[no] idp signature update auto`	Enables (disables) automatic signature downloads at regular times and days.
`idp signature update hourly`	Enables automatic signature download every hour.
`idp signature update daily <0..23>`	Enables automatic signature download every day at the time specified.
`idp signature update weekly {sun | mon | tue | wed | thu | fri | sat} <0..23>`	Enables automatic signature download once-a-week at the time and day specified.
`show idp signature update`	Displays signature update schedule.
`show idp signature update status`	Displays signature update status.
`show idp signature signatures {version | date | number}`	Displays signature information
`show idp signatures date`	Displays the date and time the signature set was released.

Table 170 Update Signatures

COMMAND	DESCRIPTION
`show idp signatures number`	Displays the number of signatures in this set.
`show idp signatures version`	Displays the signature set version number currently used by the Zyxel Device. This number gets larger as new signatures are added.

40.5.1 Update Signature Examples

These examples show how to enable/disable automatic IDP downloading, schedule updates, display the schedule, display the update status, show the (new) updated signature version number, show the total number of signatures and show the date/time the signatures were created.

```
Router# configure terminal
Router(config)# idp signature update signatures
IDP signature update in progress.
Please check system log for future information.
Router(config)# idp signature update auto
Router(config)# no idp signature update auto
Router(config)# idp signature update hourly
Router(config)# idp signature update daily 10
Router(config)# idp signature update weekly fri 13
Router(config)# show idp signature update
auto: yes
schedule: weekly at Friday 13 o'clock
Router(config)# show idp signature update status
current status: IDP signature download failed, do 1 retry at Sat Jan  4
22:47:47  2003
last update time: 2003-01-01 01:34:39
Router(config)# show idp signature signatures version
version: 1.2000
Router(config)# show idp signature signatures number
signatures: 2000
Router(config)# show idp signature signatures date
date: 2005/11/13 13:56:03
```

40.6 IDP Statistics

The following table describes the commands for collecting and displaying IDP statistics. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 171 Commands for IDP Statistics

COMMAND	DESCRIPTION
`[no] idp statistics collect`	Turn the collection of IDP statistics on or off.
`idp statistics flush`	Clears the collected statistics.
`show idp statistics summary`	Displays the collected statistics.

Table 171 Commands for IDP Statistics (continued)

COMMAND	DESCRIPTION
`show idp statistics collect`	Displays whether the collection of IDP statistics is turned on or off.
`show idp statistics collect status`	Displays the status of collected statistics.
`show idp statistics ranking {signature-name | source | source6 | destination |destination6}`	Query and sort the IDP statistics entries by signature name, source IP address, or destination IP address. `signature-name`: lists the most commonly detected signatures. `source(6)`: lists the source IP addresses (IPv4 or IPv6) from which the Zyxel Device has detected the most intrusion attempts. `destination(6):` lists the most common destination IP addresses (IPv4 or IPv6) for detected intrusion attempts.

40.6.1 IDP Statistics Example

This example shows how to collect and display IDP statistics. It also shows how to sort the display by the most common signature name, source IP address, or destination IP address.

```
Router# configure terminal
Router(config)# idp statistics collect
Router(config)# no idp statistics activate
Router(config)# idp statistics flush
Router(config)# show idp statistics collect status
IDP collect statistics status: yes
Router(config)# show idp statistics summary
scanned session : 268
packet dropped: 0
packet reset: 0
Router(config)# show idp statistics ranking signature-name
ranking: 1
  signature id: 8003796
  signature name: ICMP L3retriever Ping
  type: Scan
  severity: verylow
  occurence: 22
ranking: 2
  signature id: 8003992
  signature name: ICMP Large ICMP Packet
  type: DDOS
  severity: verylow
  occurence: 4
Router(config)# show idp statistics ranking destination
ranking: 1
  destination ip: 172.23.5.19
  occurence: 22
ranking: 2
  destination ip: 172.23.5.1
  occurence: 4
Router(config)# show idp statistics ranking source
ranking: 1
  source ip: 192.168.1.34
  occurence: 26
```

CHAPTER 41
Content Filtering

This chapter covers how to use the content filtering feature to control web access.

41.1 Content Filtering Overview

Content filtering allows you to block certain web features, such as cookies, and/or block access to specific web sites. It can also block access to specific categories of web site content. You can create different content filtering policies for different addresses, schedules, users or groups and content filtering profiles. For example, you can configure one policy that blocks John Doe's access to arts and entertainment web pages during the workday and another policy that lets him access them after work.

41.2 External Web Filtering Service

When you register for and enable the external web filtering service, your Zyxel Device accesses an external database that has millions of web sites categorized based on content. You can have the Zyxel Device block, block and/or log access to web sites based on these categories.

41.3 Content Filtering Reports

See the web configurator User's Guide to see how to view content filtering reports after you have activated the category-based content filtering subscription service.

41.4 Content Filter Command Input Values

The following table explains the values you can input with the `content-filter` commands.

Table 172 Content Filter Command Input Values

LABEL	DESCRIPTION
filtering_profile	The filtering profile defines how to filter web URLs or content. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
category_name	The name of a web category. {advertisements-pop-ups | job-search | alcohol-tobacco | leisure-recreation | anonymizers | malware | arts | network-errors | botnets | news | business | non-profits-ngos | chat | nudity | child-abuse-images | parked-domains | compromised | peer-to-peer | computers-technology | personal-sites | criminal-activity | phishing-fraud |cults | politics | dating-personals | pornography-sexually-explicit | download-sites | private-ip-addresses | education | real-estate | entertainment | religion | fashion-beauty | restaurants-dining | finance | school-cheating | forums-newsgroups | search-engines-portals | gambling | sex-education | games | shopping | general | social-networking | government | spam-sites | greeting-cards | sports | hacking | streaming-media-downloads | hate-intolerance | tasteless | health-medicine | translators | illegal-drugs | transportation | illegal-software | travel | image-sharing | violence | information-security | weapons | instant-messaging | web-based-email }
trust_hosts	The IP address or domain name of a trusted web site. Use a host name such as www.good-site.com. Do not use the complete URL of the site – that is, do not include "http://". All subdomains are allowed. For example, entering "zyxel.com" also allows "www.zyxel.com", "partner.zyxel.com", "press.zyxel.com", etc. Use up to 63 case-insensitive characters (0-9a-z-). You can enter a single IP address in dotted decimal notation like 192.168.2.5. You can enter a subnet by entering an IP address in dotted decimal notation followed by a slash and the bit number of the subnet mask of an IP address. The range is 0 to 32. To find the bit number, convert the subnet mask to binary and add all of the 1's together. Take "255.255.255.0" for example. 255 converts to eight 1's in binary. There are three 255's, so add three eights together and you get the bit number (24). An example is 192.168.2.1/24 You can enter an IP address range by entering the start and end IP addresses separated by a hyphen, for example 192.168.2.5-192.168.2.23. IPv6 support format like: Single ip - 2001::1 Range format - 2001::1-2001::5 Prefix format - 2001::1/64

Table 172 Content Filter Command Input Values (continued)

LABEL	DESCRIPTION
forbid_hosts	The IP address or domain name of a forbidden web site. Use a host name such as www.bad-site.com into this text field. Do not use the complete URL of the site – that is, do not include "http://". All subdomains are also blocked. For example, entering "bad-site.com" also blocks "www.bad-site.com", "partner.bad-site.com", "press.bad-site.com", etc. Use up to 63 case-insensitive characters (0-9a-z-). You can enter a single IP address in dotted decimal notation like 192.168.2.5. You can enter a subnet by entering an IP address in dotted decimal notation followed by a slash and the bit number of the subnet mask of an IP address. The range is 0 to 32. To find the bit number, convert the subnet mask to binary and add all of the 1's together. Take "255.255.255.0" for example. 255 converts to eight 1's in binary. There are three 255's, so add three eights together and you get the bit number (24). An example is 192.168.2.1/24 You can enter an IP address range by entering the start and end IP addresses separated by a hyphen, for example 192.168.2.5-192.168.2.23. IPv6 support format like: Single ip - 2001::1 Range format - 2001::1-2001::5 Prefix format - 2001::1/64
keyword	A keyword or a numerical IP address to search URLs for and block access to if they contain it. Use up to 63 case-insensitive characters (0-9a-zA-Z;/?:@&=+$\.-_!~*'()%,) in double quotes. For example enter "Bad_Site" to block access to any web page that includes the exact phrase "Bad_Site". This does not block access to web pages that only include part of the phrase (such as "Bad" in this example).
message	The message to display when a web site is blocked. Use up to 255 characters (0-9a-zA-Z;/?:@&=+$\.-_!~*'()%,) in quotes. For example, "Access to this web page is not allowed. Please contact the network administrator."
redirect_url	The URL of the web page to which you want to send users when their web access is blocked by content filtering. The web page you specify here opens in a new frame below the denied access message. Use "http://" followed by up to 255 characters (0-9a-zA-Z;/?:@&=+$\.-_!~*'()%) in quotes. For example, "http://192.168.1.17/blocked access". IPv6 format support: http://[2001::1]/blocked_access
service_timeout	The value specifies the maximum querying time in seconds <1…60>
url	The URL of a web site in http://xxx.xxx.xxx format.
query_timeout	The value specifies the maximum querying time when testing the connection to an external content filtering server or checking its rating for a URL. <1..60> seconds.

41.5 General Content Filter Commands

The following table lists the commands that you can use for general content filter configuration such as creating a denial of access message or specifying a redirect URL and checking your external web filtering service registration status. Use the `configure terminal` command to enter the configuration mode to be able to use these commands. See Table 172 on page 304 for details about the values you can input with these commands.

Table 173 content-filter General Commands

COMMAND	DESCRIPTION
`[no] content-filter block message` *`message`*	Sets the message to display when content filtering blocks access to a web page. The `no` command clears the setting.
`[no] content-filter block redirect` *`redirect_url`*	Sets the URL of the web page to which to send users when their web access is blocked by content filtering. The `no` command clears the setting.
`content-filter passed warning flush`	Clears the Zyxel Device's record of sessions for which it has given the user a warning before allowing access.
`content-filter passed warning timeout <1..1440>`	Sets how long to keep records of sessions for which the Zyxel Device has given the user a warning before allowing access.
`content-filter url-server test commtouch`	Enters the sub-command mode for testing the Commtouch external content filter server's reachability.
`url` `timeout` *`query_timeout`*	Specify the Commtouch server's URL and how long to wait for a response.
`exit`	Leaves the sub-command mode.
`content-filter common-list {trust|forbid}`	Enters the sub-command for configuring a common list of trusted or forbidden web sites. The content filtering profile commands let you configure trusted or forbidden URLs for individual profiles. URL checking is applied in the following order: profile trusted web sites, common trusted web sites, profile forbidden web sites, common forbidden web sites, and then profile keywords.
`[no] {`*`ipv4`*` | `*`ipv4_cidr`*` | `*`ipv4_range`*` | `*`wildcard_domainname`*` | `*`tld`*` |`*`ipv6`*` | `*`ipv6_range`*` | `*`ipv6_prefix`*` }`	Adds or removes a common trusted or forbidden web site entry. *`ipv4`*: IPv4 address <W.X.Y.Z> *`ipv4_cidr`*: IPv4 subnet in CIDR format, i.e. 192.168.1.0/32 <W.X.Y.Z>/<1..32> *`ipv4_range`*: Range of IPv4 addresses. <W.X.Y.Z>-<W.X.Y.Z> *`wildcard_domainname`*: wildcard domain name, i.e. zyxel*.co* (([*a-z0-9\-]){1,63}\.)+([*a-z0-9\-]){1,63} *`tld`*: top level domain. ipv6: IPv6 address, i.e. 2001::1 ipv6_range: Range of IPv6 address, < IPv6 Address >-< IPv6 Address > ipv6_prefix: IPv6 prefix formant, <IPv6 Address>/<Prefix Length>
`exit`	Leaves the sub-command mode.
`content-filter cf-queue flush`	clears content filter queuing packets.
`[no] content-filter https-domain-filter activate`	Enables HTTPs Domain Filter which lets the ZyWALL/USG take action on HTTPS web pages using the CommTouch category service. In an HTTPS connection, the Zyxel Device can extract the Server Name Indication (SNI) from a client request, check if it matches a category in the CommTouch content filter and then take appropriate action. The keyword match is for the domain name only. The `no` command disables the HTTPs Domain Filter.

Table 173 content-filter General Commands (continued)

COMMAND	DESCRIPTION
`show content-filter passed warning`	Displays the Zyxel Device's record of sessions for which it has given the user a warning before allowing access.
`show content-filter settings`	Displays the general content filtering settings.
`show content-filter common-list {trust|forbid}`	Displays the common list of trusted or forbidden web sites.
`show content-filter https-domain-filter status`	Displays HTTPs Domain Filter content filtering settings.

41.6 Content Filter Filtering Profile Commands

The following table lists the commands that you can use to configure a content filtering profile. Use the `configure terminal` command to enter the configuration mode to be able to use these commands. See Table 172 on page 304 for details about the values you can input with these commands.

Table 174 content-filter Filtering Profile Commands Summary

COMMAND	DESCRIPTION
[no] content-filter profile *filtering_profile*	Creates a content filtering profile. The no command removes the profile.
[no] content-filter profile *filtering_profile* custom	Sets a content filtering profile to use a profile's custom settings (lists of trusted web sites and forbidden web sites and blocking of certain web features). The no command has the profile not use the custom settings.
[no] content-filter profile *filtering_profile* custom activex	Sets a content filtering profile to block ActiveX controls. The no command sets the profile to allow ActiveX.
[no] content-filter profile *filtering_profile* custom cookie	Sets a content filtering profile to block Cookies. The no command sets the profile to allow Cookies.
content-filter profile *filtering_profile* custom-list forbid	Enters the sub-command for configuring the content filtering profile's list of forbidden hosts.
[no] *forbid_hosts*	Adds a forbidden host to the content filtering profile's list. The no command removes it.
exit	Leaves the sub-command mode.
[no] content-filter profile *filtering_profile* custom java	Sets a content filtering profile to block Java. The no command sets the profile to allow Java.
content-filter profile *filtering_profile* custom-list keyword	Enters the sub-command for configuring the content filtering profile's list of forbidden keywords. This has the content filtering profile block access to Web sites with URLs that contain the specified keyword or IP address in the URL.
[no] *keyword*	Adds a forbidden keyword or IP address to the content filtering profile's list. The no command removes it.
exit	Leaves the sub-command mode.
[no] content-filter profile *filtering_profile* custom proxy	Sets a content filtering profile to block access to web proxy servers. The no command sets the profile to allow access to proxy servers.
content-filter profile *filtering_profile* custom-list trust	Enters the sub-command for configuring the content filtering profile's list of trusted hosts.

Table 174   content-filter Filtering Profile Commands Summary (continued)

COMMAND	DESCRIPTION
[no] *trust_hosts*	Adds a trusted host to the content filtering profile's list. The no command removes it.
exit	Leaves the sub-command mode.
[no] content-filter profile *filtering_profile* custom trust-allow-features	Sets a content filtering profile to permit Java, ActiveX and Cookies from sites on the trusted list. The no command has the content filtering profile not permit Java, ActiveX and Cookies from sites on the trusted list
[no] content-filter profile *filtering_profile* custom trust-only	Sets a content filtering profile to only allow access to web sites that are on the trusted list. The no command has the profile allow access to web sites that are not on the trusted list.
[no] content-filter service-timeout *service_timeout*	Sets how many seconds the Zyxel Device is to wait for a response from the external content filtering server. The no command clears the setting.
[no] content-filter profile *filtering_profile* commtouch-url category {category_name}	Sets a CommTouch content filtering profile to check for specific web site categories. The no command has the profile not check for the specified categories.
content-filter profile *filtering_profile* commtouch-url match-unsafe {block | log | warn |pass}	Sets the action for attempted access to web pages that match the CommTouch profile's selected unsafe categories. Block access, log access, or allow access.
content-filter profile *filtering_profile* commtouch-url match {block | log | pass}	Sets the action for attempted access to web pages that match the CommTouch profile's selected managed categories. Block access, allow and log access, display a warning message before allowing access, or allow access.
content-filter profile *filtering_profile* commtouch-url offline {block | log | warn | pass}	Sets the action for attempted access to web pages if the CommTouch external content filtering database is unavailable. Block access, allow and log access, display a warning message before allowing access, or allow access.
content-filter profile *filtering_profile* commtouch-url unrate {block | log | warn | pass}	Sets the action for attempted access to web pages that the CommTouch external web filtering service has not categorized. Block access, allow and log access, display a warning message before allowing access, or allow access.
no content-filter profile *filtering_profile* commtouch-url match-unsafe {log}	Has the Zyxel Device not log attempted access to web pages that match the CommTouch profile's selected unsafe categories.
no content-filter profile *filtering_profile* commtouch-url match {log}	Has the Zyxel Device not log attempted access to web pages that match the CommTouch profile's selected managed categories.
no content-filter profile *filtering_profile* commtouch-url offline {log}	Has the Zyxel Device not log access to web pages if the CommTouch external content filtering database is unavailable.
no content-filter profile *filtering_profile* commtouch-url unrate {log}	Has the Zyxel Device not log access to web pages that the CommTouch external web filtering service has not categorized.
[no] content-filter sslv3 action block	Has the Zyxel Device block HTTPS web pages using SSL V3 or a previous version. The no command allows HTTPS web pages using SSL V3 or a previous version.

Table 174 content-filter Filtering Profile Commands Summary (continued)

COMMAND	DESCRIPTION
`[no] content-filter https-domain-filter block-page activate`	Has the ZyWALL/USG display a warning page instead of a blank page when an HTPPS connection is redirected. The `no` command has the ZyWALL/USG display a blank page when an HTTPS connection is blocked.
`content-filter https-domain-filter block-page port <port>`	Changes the port number of the HTTPS Domain Filter blocking page. The default port is 54088.
`content-filter https-domain-filter block-cache-ttl <1~60>`	Sets how many seconds (1-60) to keep blocked HTTPS pages in the cache. The default value is 5.
`content-filter https-domain-filter forward-cache-ttl <1~1440>`	Sets how many minutes (1-1440) to keep forwarded HTTPS pages in the cache. The default value is 60.
`[no] content-filter profile <filtering_profile> safesearch`	Enables SafeSearch in the specified content filter profile. SafeSearch is a feature of a search engine that can automatically filter sexually explicit videos and images from the search result without overloading the Zyxel Device. It does this by adding a parameter in the search URL: https://www.google.com.tw/?gws_rd=ssl#q=porn&safe=active. Supported search engines at the time of writing are: Yahoo, Google, MSN Live Bing, Yandex
`[no] content-filter safesearch <name>`	Creates a content-filter safesearch rule and enters sub-command mode. The `no` command removes the rule.
`    domain match <string>`	Sets a string that the domain name should (partially) match in a safesearch rule. For example, domain-match: .google.
`    domain not-match <string>`	Sets a string that the domain name should not match in a safesearch rule.
`    url match <string>`	Sets a string that the URL should (partially) match in a safesearch rule. For example, url-match: search
`    url not-match <string>`	Sets a string that the URL should not match in a safesearch rule.
`    url parameter <string>`	Sets a parameter that updates the URL when there is a safesearch rule match. Values in URL Parameters are set dynamically in a page's URL. Example url-parameter: safe=
`    url value <string>`	Sets a value that updates the URL when there is a safesearch rule match. Example url-value: active
`    cookie match <string>`	Sets a string that the cookie should (partially) match in a safesearch rule. A cookie is a small piece of data sent from a website and stored in the user's web browser.
`    cookie parameter <string>`	Sets a parameter that updates the cookie when there is a safesearch rule match. Parameters store information such as the cookie's expiration, domain, and flags.
`    cookie value <string>`	Sets a value that updates the cookie when there is a safesearch rule match. The value of a cookie can be modified by the server in response to a page request.
`show content-filter safesearch`	Displays all safesearch rules created and their sub-command contents.
`show content-filter profile [filtering_profile] commtouch`	Displays the specified content filtering profile's settings or the settings of all them if you don't specify one.

41.7 Content Filtering Statistics

The following table describes the commands for collecting and displaying content filtering statistics. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 175 Commands for Content Filtering Statistics

COMMAND	DESCRIPTION
`[no] content-filter statistics collect`	Turn the collection of content filtering statistics on or off.
`content-filter statistics flush`	Clears the collected statistics.
`show content-filter statistics summary`	Displays the collected statistics.
`show content-filter statistics collect`	Displays whether the collection of content filtering statistics is turned on or off.
`show content-filter statistics summary`	Displays the current content filtering statistics.

41.7.1 Content Filtering Statistics Example

This example shows how to collect and display content filtering statistics.

```
Router(config)# content-filter statistics collect
Router(config)# show content-filter statistics summary
total web pages inspected              : 0
  web pages warned by category service : 0
  web pages blocked by category service: 0
  web pages blocked by custom service  : 0
    restricted web features            : 0
    forbidden web sites                : 0
    url keywords                       : 0
    web pages passed                   : 0

  unsafe web pages                     : 0
  other web pages                      : 0
```

41.8 Content Filtering Commands Example

The following example shows how to limit the web access for a sales group.

1 First, create a sales address object. This example uses a subnet that covers IP addresses 172.21.3.1 to 172.21.3.254.

2 Then create a schedule for all day.

3 Create a filtering profile for the group.

4 You can use the following commands to block sales from accessing adult and pornography websites.

5 Enable the external web filtering service.

Note: You must register for the external web filtering service before you can use it (see Chapter 5 on page 50).

6 You can also customize the filtering profile. The following commands block active-X, java and proxy access.

7 Append a Secure Policy with content filter profile.

```
Router# configure terminal
Router(config)# address-object sales 172.2.3.0/24
Router(config)# schedule-object all_day 00:00 23:59
Router(config)# content-filter profile sales_CF_PROFILE
Router(config)# content-filter profile sales_CF_PROFILE commtouch-url category job-
search
Router(config)# content-filter profile sales_CF_PROFILE commtouch-url category
business
Router(config)# content-filter profile sales_CF_PROFILE url url-server
Router(config)# content-filter profile sales_CF_PROFILE custom java
Router(config)# content-filter profile sales_CF_PROFILE custom activex
Router(config)# content-filter profile sales_CF_PROFILE custom proxy
Router(config)# content-filter profile sales_CF_PROFILE custom

Router(config)# secure-policy insert 1
Router(config)# name UTM
Router(config)# from LAN1
Router(config)# schedule all_day
Router(config)# sourceip sales
Router(config)# no app-profile
Router(config)# cf-profile sales_CF_PROFILE log by-profile activate
Router(config)# exit
```

Use this command to display the settings of the profile.

```
Router(config)# show content-filter profile sales_CF_PROFILE commtouch
service active : yes
url match unsafe: action:   warn, log:  no
url match other : action:  block, log:  no
url unrate      : action:   warn, log:  no
service offline : action:   warn, log:  no

category settings:
Advertisements and Pop-Ups   :  no, Alcohol and Tobacco          :  no
Anonymizers                  : yes, Arts                         :  no
Business                     : yes, Transportation               :  no
Chat                         :  no, Forums and Newsgroups        :  no
Compromised                  : yes, Computers and Technology     :  no
Criminal Activity            :  no, Dating and Personals         :  no
Download Sites               :  no, Education                    :  no
Entertainment                :  no, Finance                      :  no
Gambling                     :  no, Games                        :  no
Government                   :  no, Hate and Intolerance         :  no
Health and Medicine          :  no, Illegal Drugs                :  no
Job Search                   : yes, Streaming Media and Downloads:  no
News                         :  no, Non-profits and NGOs         :  no
Nudity                       :  no, Personal Sites               :  no
Phishing and Fraud           : yes, Politics                     :  no
Pornography/Sexually Explicit:  no, Real Estate                  :  no
Religion                     :  no, Restaurants and Dining       :  no
Search Engines and Portals   :  no, Shopping                     :  no
Social Networking            :  no, Spam Sites                   : yes
Sports                       :  no, Malware                      : yes
Translators                  :  no, Travel                       :  no
Violence                     :  no, Weapons                      :  no
Web-based Email              :  no, General                      :  no
Leisure and Recreation       :  no, Botnets                      : yes
Cults                        :  no, Fashion and Beauty           :  no
Greeting cards               :  no, Hacking                      :  no
Illegal Software             :  no, Image Sharing                :  no
Information Security         :  no, Instant Messaging            :  no
Network Errors               : yes, Parked Domains               : yes
Peer-to-Peer                 :  no, Private IP Addresses         :  no
School Cheating              :  no, Sex Education                :  no
Tasteless                    :  no, Child Abuse Images           :  no

custom active                      : yes
allow traffic to trusted hosts only:  no
allow features to trusted hosts    :  no
block activex                      : yes
block java                         : yes
block cookie                       :  no
block proxy                        : yes
check common list                  : yes
```

CHAPTER 42
Anti-Spam

This chapter introduces and shows you how to configure the anti-spam scanner.

42.1 Anti-Spam Overview

The anti-spam feature marks or discards spam. Activate the anti-spam subscription service for sender IP reputation checking, mail content analysis, and virus outbreak detection. Use the white list to identify legitimate e-mail. Use the black list to identify spam e-mail. You can also check e-mail against a DNS black list (DNSBL) of IP addresses of servers suspected of being used by spammers.

42.2 Anti-Spam Commands

The following table identifies the values used in some of these commands. Other input values are discussed with the corresponding commands.

Table 176 Input Values for General Anti-Spam Commands

LABEL	DESCRIPTION
xheader-name	The name (part that comes before the colon) of a field to add to an e-mail header. Use up to 16 ASCII characters.
xheader-value	The value (part that comes after the colon) of a field to add to an e-mail header. Use up to 16 ASCII characters.

42.2.1 Anti-Spam Profile Rules

The following table describes the commands for configuring the zone to zone rules. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 177 Commands for Anti-Spam Profile Rules

COMMAND	DESCRIPTION
`anti-spam profile append`	Enters the anti-spam sub-command mode to append a profile.
`anti-spam profile insert` *`rule_number`*	Enters the anti-spam sub-command mode to insert a profile.
`anti-spam profile` *`rule_number`*	Enters the anti-spam sub-command mode to edit the specified direction specific rule.
`[no] log [alert]`	Sets the Zyxel Device to create a log (and optionally an alert) when packets match this rule and are found to be spam. The `no` command sets the Zyxel Device not to create a log or alert when packets match this rule.
`[no] scan {smtp | pop3}`	Sets the protocols of traffic to scan for spam.

Table 177 Commands for Anti-Spam Profile Rules (continued)

COMMAND	DESCRIPTION
`[no] match-action pop3 {forward | forward-with-tag}`	Sets the action to take when the Zyxel Device detects a spam POP3 e-mail. The file can be forwarded or forwarded with a spam tag.
`[no] match-action smtp {drop | forward | forward-with-tag}`	Sets the action to take when the Zyxel Device detects a spam SMTP e-mail. The file can be deleted, forwarded, or forwarded with a spam tag.
`[no] bypass {white-list | black-list | dnsbl}`	Bypassing has the Zyxel Device not check files against your configured white (allowed) list, black (spam) list, or DNSBL servers list.
`[no] bypass {ip-reputation | mail-content | virus-outbreak}`	Has the Zyxel Device not check mail's IP reputation, content, or for viruses.
`show`	Displays the details of the anti-spam rule you are configuring.
`anti-spam profile move` *`rule_number`* `to` *`rule_number`*	Moves an anti-spam `profile` to the number that you specified.
`anti-spam profile delete` *`rule_number`*	Removes an anti-spam `profile`.
`show anti-spam profile [`*`rule_number`*`]`	Displays the details of all the configured anti-spam `profiles`.
`[no] anti-spam ip-reputation activate`	Sets whether or not to use IP reputation to identify spam by the sender's IP address.
`anti-spam ip-reputation query-timeout time [`*`timeout`*`]`	Sets how many seconds the Zyxel Device waits for a reply when checking the IP reputation of a sender's IP address.
`[no] anti-spam ip-reputation private-check activate`	Sets whether or not to check the IP reputation of private sender IP addresses.
`[no] anti-spam mail-content activate`	Sets whether or not to identify spam by content, such as malicious content.
`[no] anti-spam mail-phishing activate`	Sets whether or not to identify emails sent from suspicious websites known for phishing.
`anti-spam tag {mail-content | mail-phishing | virus-outbreak} [`*`tag`*`]`	Specifies the labels to add to the beginning of the mail subject if content-analysis identified it as spam, the e-mail has suspicious websites links or it contains a virus.
`[no] anti-spam virus-outbreak activate`	Sets whether or not to scan emails for attached viruses.
`[no] anti-spam xheader {mail-content | virus-outbreak}` *`xheader-name xheader-value`*	Specifies the name and value for the X-Header to add to content-analysis identified spam or e-mails containing a virus.
`anti-spam mail-scan query-timeout pop3 {forward | forward-with-tag}`	Selects how to handle POP3 mail if querying the mail scan server times out. Use `forward` to send it or `forward-with-tag` to add a tag to the mail subject and send it.
`anti-spam mail-scan query-timeout smtp {drop | forward | forward-with-tag}`	Selects how to handle SMTP mail if querying the mail scan server times out. Use `drop` to discard the SMTP mail, `forward` to send it, or `forward-with-tag` to add a tag to the mail subject and send it.
`anti-spam mail-scan query-timeout time [`*`timeout`*`]`	Sets how many seconds the Zyxel Device waits for a reply from the mail scan server before taking the relevant timeout action.
`anti-spam tag query-timeout [`*`tag`*`]`	Specifies the label to add to the mail subject of e-mails the Zyxel Device tags and forwards when queries to the mail scan servers time out.
`[no] anti-spam xheader query-timeout` *`xheader-name xheader-value`*	Specifies the name and value for the X-Header to add to e-mails the Zyxel Device forwards when queries to the mail scan servers time out.
`show anti-spam ip-reputation query-timeout time`	Displays how many seconds the Zyxel Device waits for a reply when checking the IP reputation of a sender's IP address.

Table 177 Commands for Anti-Spam Profile Rules (continued)

COMMAND	DESCRIPTION
`show anti-spam ip-reputation private-check`	Displays the setting for checking the IP reputation of private sender IP addresses.
`show anti-spam mail-scan query-timeout smtp`	Displays the action the Zyxel Device takes on SMTP mail if querying the mail scan server times out.
`show anti-spam mail-scan query-timeout pop3`	Displays the action the Zyxel Device takes on POP3 mail if querying the mail scan server times out.
`show anti-spam mail-scan query-timeout time`	Displays how many seconds the Zyxel Device waits for a reply from the mail scan server before taking the relevant timeout action.
`show anti-spam mail-scan status`	Displays the Zyxel Device's settings for IP reputation, mail content, and virus outbreak checking.
`show anti-spam tag {mail-content | mail-phishing | virus-outbreak}`	Displays the labels for content-analysis identified spam, e-mails that have suspicious websites links or emails containing a virus.
`show anti-spam tag query-timeout`	Displays the label the Zyxel Device adds to the mail subject of e-mails that it tags and forwards when queries to the mail scan servers time out.
`show anti-spam xheader {mail-content | mail-phishing | virus-outbreak}`	Displays the name and value for the X-Header to add to content-analysis identified spam, e-mails that have suspicious websites links or e-mails containing a virus.
`show anti-spam xheader query-timeout`	Displays the name and value for the X-Header the Zyxel Device adds to e-mails that it tags and forwards when queries to the mail scan servers time out.
`[no] security-service anti-spam activate`	Turns on anti-spam/email security on the Zyxel Device. The `no` command disables anti-spam/email security.
`show security-service status`	Displays whether the security services are enabled on the Zyxel Device.

42.2.1.1 Anti-Spam Profile Example

This example shows how to configure (and display) a WAN to DMZ anti-spam profile to scan POP3 and SMTP traffic. SMTP spam is forwarded. POP3 spam is marked with a spam tag. The Zyxel Device logs the event when an e-mail matches the DNSBL (see Section 42.2.3 on page 318 for more on DNSBL). The white and black lists are ignored.

```
Router(config)# anti-spam 1
Router(config-as-rule-1)# activate
Router(config-as-rule-1)# scan smtp
Router(config-as-rule-1)# scan pop3
Router(config-as-rule-1)# match-action smtp forward
Router(config-as-rule-1)# match-action pop3 forward-with-tag
Router(config-as-rule-1)# log
Router(config-as-rule-1)# bypass white-list
Router(config-as-rule-1)# bypass black-list
Router(config-as-rule-1)# exit
Router(config)# show anti-spam 1
Anti-Spam Rule: 1
  profile name: AS_profile_default_SXI
  description:
  log: log
  scan protocols:
    smtp: yes
    pop3: yes
  match action:
    smtp: forward-with-tag
    pop3: forward-with-tag
  bypass white list: no
  bypass black list: no
  bypass ip reputation: no
  bypass mail content: no
  bypass virus outbreak: no
  bypass dnsbl: no
  ref: 0
```

42.2.2 White and Black Lists

The following table identifies values used in these commands. Other input values are discussed with the corresponding commands.

Table 178 Input Values for White and Black list Anti-Spam Commands

LABEL	DESCRIPTION
mail_header	The name part of an e-mail header (the part that comes before the colon). Use up to 63 ASCII characters. For example, if you want the entry to check the “Received:” header for a specific mail server’s domain, use “Received”.
mail_header_value	The value part of an e-mail header (the part that comes after the colon). Use up to 63 ASCII characters. For example, if you want the entry to check the “Received:” header for a specific mail server’s domain, specify the mail server’s domain. See Section 42.2.2.2 on page 318 for more details.
rule_number	The index number of an anti-spam white or black list entry. 1 - *X* where *X* is the highest number of entries the Zyxel Device model supports. See the Zyxel Device’s User’s Guide for details.
subject	A keyword in the content of the e-mail Subject headers. Use up to 63 ASCII characters. Spaces are not allowed, although you could substitute a question mark (?). See Section 42.2.2.2 on page 318 for more details.

Use the white list to identify legitimate e-mail and the black list to identify spam e-mail. The following table describes the commands for configuring the white list and black list. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 179 Commands for Anti-Spam White and Black Lists

COMMAND	DESCRIPTION
`[no] anti-spam white-list activate`	Turns the white list checking on or off. Turn on the white list to forward e-mail that matches (an active) white list entry without doing any more anti-spam checking on that individual e-mail.
[no] anti-spam white-list [*rule_number*] ip-address *ip subnet_mask* {activate|deactivate}	Adds, edits, or removes a white list entry to check e-mail for a specific source or relay IPv4 address. Also turns the entry on or off.
[no] anti-spam white-list [rule_number] ip6-address ipv6_subnet {activate|deactivate}	Adds, edits, or removes a white list entry to check e-mail for a specific source or relay IPv6 address. Also turns the entry on or off.
[no] anti-spam white-list [*rule_number*] e-mail *email* {activate|deactivate}	Adds, edits, or removes a white list entry to check e-mail for a specific source e-mail address or domain name. Also turns the entry on or off.
[no] anti-spam white-list [*rule_number*] mail-header *mail-header mail-header-value* {activate|deactivate}	Adds, edits, or removes a white list entry to check e-mail for specific header fields and values. Also turns the entry on or off.
[no] anti-spam white-list [*rule_number*] subject *subject* {activate|deactivate}	Adds, edits, or removes a white list entry to check e-mail for specific content in the subject line. Also turns the entry on or off.
`[no] anti-spam black-list activate`	Turns the black list checking on or off. Turn on the black list to treat e-mail that matches (an active) black list entry as spam.
[no] anti-spam black-list [*rule_number*] ip-address *ip subnet_mask* {activate|deactivate}	Adds, edits, or removes a black list entry to check e-mail for a specific source or relay IPv4 address. Also turns the entry on or off.
[no] anti-spam black-list [rule_number] ip6-address ipv6_subnet {activate|deactivate}	Adds, edits, or removes a black list entry to check e-mail for a specific source or relay IPv6 address. Also turns the entry on or off.
[no] anti-spam black-list [*rule_number*] e-mail *email* {activate|deactivate}	Adds, edits, or removes a black list entry to check e-mail for a specific source e-mail address or domain name. Also turns the entry on or off.
[no] anti-spam black-list [*rule_number*] mail-header *mail-header mail-header-value* {activate|deactivate}	Adds, edits, or removes a black list entry to check e-mail for specific header fields and values. Also turns the entry on or off.
[no] anti-spam black-list [*rule_number*] subject *subject* {activate|deactivate}	Adds, edits, or removes a black list entry to check e-mail for specific content in the subject line. Also turns the entry on or off.
anti-spam tag black-list [*tag*]	Configures a message or label (up to 15 ASCII characters) to add to the mail subject of e-mails that match an anti-spam black list entry.
`show anti-spam white-list [status]`	Displays the current anti-spam white list. Use `status` to show the activation status only.
`show anti-spam black-list [status]`	Displays the current anti-spam black list. Use `status` to show the activation status only.
`show anti-spam tag black-list`	Shows the configured anti-spam black list tag.
[no] anti-spam xheader {white-list | black-list} *mail-header mail-header-value*	Specifies the name and value for the X-Header to add to e-mails that match the Zyxel Device's spam white list or black list.
show anti-spam xheader {white-list | black-list}	Displays the name and value for the X-Header to add to e-mails that match the Zyxel Device's spam white list or black list.

42.2.2.1 White and Black Lists Example

This example shows how to configure and enable a white list entries for e-mails with “testwhite” in the subject, e-mails from whitelist@ourcompany.com, e-mails with the Date header set to 2007, and e-mails from (or forwarded by) IP address 192.168.1.0 with subnet 255.255.255.0.

```
Router(config)# anti-spam white-list subject testwhite activate
Router(config)# anti-spam white-list e-mail whitelist@ourcompany.com
activate
Router(config)# anti-spam white-list mail-header Date 2007 activate
Router(config)# anti-spam white-list ip-address 192.168.1.0 255.255.255.0
activate
Router(config)# show anti-spam white-list
No.   Type        Status
Content
==========================================================================
1     subject     yes
testwhite
2     e-mail      yes
whitelist@ourcompany.com
3     mail-header yes
Date : 2007
4     ip-address  yes
192.168.1.0 / 255.255.255.0
```

42.2.2.2 Regular Expressions in Black or White List Entries

The following applies for a black or white list entry based on an e-mail subject, e-mail address, or e-mail header value.

- Use a question mark (?) to let a single character vary. For example, use “a?c” (without the quotation marks) to specify abc, acc and so on.
- You can also use a wildcard (*). For example, if you configure *def.com, any e-mail address that ends in def.com matches. So “mail.def.com” matches.
- The wildcard can be anywhere in the text string and you can use more than one wildcard. You cannot use two wildcards side by side, there must be other characters between them.
- The Zyxel Device checks the first header with the name you specified in the entry. So if the e-mail has more than one “Received” header, the Zyxel Device checks the first one.

42.2.3 DNSBL Anti-Spam Commands

This section describes the commands for checking the sender and relay IP addresses in e-mail headers against DNS (Domain Name Service)-based spam Black Lists (DNSBLs). You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

The following table identifies the values required for many of these commands. Other input values are discussed with the corresponding commands.

Table 180 Input Values for DNSBL Commands

LABEL	DESCRIPTION
dnsbl_domain	A domain that is maintaining a DNSBL. You may use 0-254 alphanumeric characters, or dashes (-).

This table describes the DNSBL commands.

Table 181 DNSBL Commands

COMMAND	DESCRIPTION
`[no] anti-spam dnsbl activate`	Turns DNSBL checking on or off.
`anti-spam dnsbl [1..5] domain` *`dnsbl_domain`* `{activate|deactivate}`	Adds or edits a DNSBL domain for checking e-mail header IP addresses.
`no anti-spam dnsbl domain` *`dnsbl_domain`*	Removes the specified DNSBL domain.
`anti-spam dnsbl query-timeout smtp {drop | forward | forward-with-tag}`	Sets how the Zyxel Device handles SMTP mail (mail going to an e-mail server) if the queries to the DNSBL domains time out.
`anti-spam dnsbl query-timeout pop3 {forward | forward-with-tag}`	Sets how the Zyxel Device handles POP3 mail (mail coming to an e-mail client) if the queries to the DNSBL domains time out.
`anti-spam dnsbl max-query-ip [1..5]`	Sets up to how many sender and relay server IP addresses in the mail header to check against the DNSBL.
`anti-spam dnsbl ip-check-order {forward | backward}`	Configures the order in which anti-spam checks e-mail header IP addresses against the DNSBLs. • `forward` checks the first N IP addresses. Checking starts from the first IP address in the mail header. This is the IP of the sender or the first server that forwarded the mail. • `backward` checks the last N IP addresses. Checking starts from the last IP address in the mail header. This is the IP of the last server that forwarded the mail.
`anti-spam tag {dnsbl | dnsbl-timeout} [`*`tag`*`]`	`dnsbl` configures the message or label to add to the beginning of the mail subject of e-mails that have a sender or relay IP address in the header that matches a blacklist maintained by a DNSBL domain listed in the Zyxel Device. `dnsbl-timeout` configures the message or label to add to the mail subject of e-mails that the Zyxel Device forwards if queries to the DNSBL domains time out. Use up to 15 alphanumeric characters, underscores (_), colons (:), or dashes (-).
`show anti-spam dnsbl status`	Displays the activation status of the anti-spam DNSBL checking.
`show anti-spam dnsbl domain`	Displays the Zyxel Device's configured anti-spam DNSBL domain entries.
`show anti-spam dnsbl max-query-ip`	Displays how many sender and relay server IP addresses in the mail header anti-spam checks against the DNSBL.
`show anti-spam dnsbl ip-check-order`	Displays the order in which anti-spam checks e-mail header IP addresses against the DNSBLs.
`show anti-spam dnsbl query-timeout {smtp | pop3}`	Displays how the Zyxel Device handles SMTP or POP3 mail if the queries to the DNSBL domains time out.
`show anti-spam tag {dnsbl | dnsbl-timeout}`	`dnsbl` displays the anti-spam tag for e-mails that have a sender or relay IP address in the header that matches a blacklist maintained by a DNSBL domain. `dnsbl-timeout` displays the message or label to add to the mail subject of e-mails that the Zyxel Device forwards if queries to the DNSBL domains time out.
`show anti-spam dnsbl statistics`	Displays anti-spam DNSBL statistics for each configured DNSBL domain.
`anti-spam dnsbl statistics flush`	Clears the anti-spam DNSBL statistics for each configured DNSBL domain.
`anti-spam dnsbl query-timeout time [1..10]`	Sets how long the Zyxel Device waits for a reply from the DNSBL domains.

Table 181   DNSBL Commands

COMMAND	DESCRIPTION
`show anti-spam dnsbl query-timeout time`	Displays how long the Zyxel Device waits for a reply from the DNSBL domains.
`[no] anti-spam xheader dnsbl` *`mail-header mail-header-value`*	Specify the name and value for the X-Header to add to e-mails with a sender or relay IP address in the header that matches a black list maintained by a DNSBL domain in the Zyxel Device's list
`show anti-spam xheader dnsbl`	Display the name and value for the X-Header to add to e-mails with a sender or relay IP address in the header that matches a black list maintained by a DNSBL domain in the Zyxel Device's list

42.2.3.1 DNSBL Example

This example:

- Sets the Zyxel Device to use "DNSBL-example.com" as a DNSBL.
- Turns DNSBL checking on.
- Sets the Zyxel Device to forward POP3 mail with a tag if the queries to the DNSBL domains time out.
- Sets the Zyxel Device to check up to 4 sender and relay server IP addresses in e-mail headers against the DNSBL.
- Sets the Zyxel Device to start DNSBL checking from the first IP address in the mail header.
- Sets the DNSBL tag to "DNSBL".
- Sets the DNSBL timeout tag to "DNSBL-timeout".

- Displays the DNSBL statistics.

```
Router(config)# anti-spam dnsbl domain DNSBL-example.com activate
Router(config)# show anti-spam dnsbl domain
No.   Status
Domain
===========================================================================
1     yes
DNSBL-example.com
Router(config)# anti-spam dnsbl activate
Router(config)# show anti-spam  dnsbl status
anti-spam dnsbl status: yes
Router(config)# anti-spam dnsbl query-timeout pop3 forward-with-tag
Router(config)# show anti-spam  dnsbl query-timeout pop3
dnsbl query timeout action: forward-with-tag
Router(config)# anti-spam dnsbl max-query-ip 4
Router(config)# show anti-spam  dnsbl max-query-ip
dnsbl max query ip: 4
Router(config)# anti-spam dnsbl ip-check-order forward
Router(config)# show anti-spam  dnsbl ip-check-order
anti-spam dnsbl IP check order: forward
Router(config)# anti-spam tag dnsbl DNSBL
Router(config)# show anti-spam tag dnsbl
dnsbl tag: DNSBL
Router(config)# anti-spam tag dnsbl-timeout DNSBL-timeout
Router(config)# show anti-spam tag dnsbl-timeout
dnsbl-timeout tag: DNSBL-timeout
Router(config)# show anti-spam dnsbl statistics
DNSBL domain: 1
  domain: DNSBL-example.com
  average time: 0.00
  total query: 0
    spam: 0
    clear: 0
    no timeout: 0
    timeout: 0
    no response: 0
```

42.3 Anti-Spam Statistics

The following table describes the commands for collecting and displaying anti-spam statistics. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 182 Commands for Anti-Spam Statistics

COMMAND	DESCRIPTION
`[no] anti-spam statistics collect`	Turn the collection of anti-spam statistics on or off.
`anti-spam statistics flush`	Clears the collected statistics.
`show anti-spam statistics summary`	Displays an overview of the collected statistics.
`show anti-spam statistics collect`	Displays whether the collection of anti-spam statistics is turned on or off.

Table 182 Commands for Anti-Spam Statistics (continued)

COMMAND	DESCRIPTION
`show anti-spam statistics ranking {source | mail-address}`	Query and sort the anti-spam statistics entries by source IP address or mail address. `source`: lists the source IP addresses of the most spam. `mail-address:` lists the most common source mail address for spam.
`show anti-spam ip-reputation statistics`	Displays the mail sender IP reputation checking statistics.
`show anti-spam mail-scan statistics`	Displays the mail scan statistics.

42.3.1 Anti-Spam Statistics Example

This example shows how to collect anti-spam statistics and display a summary.

```
Router(config)# anti-spam statistics collect
Router(config)# show anti-spam statistics collect
collect statistics: yes
collect statistics time: since 2008-03-11 07:16:01 to 2008-03-11 07:16:13
Router(config)# show anti-spam statistics summary
total mails scanned: 0
total clear mails: 0
clear mail by whitelist: 0
total spam mails: 0
spam detected by blacklist: 0
spam detected by ip reputation: 0
spam detected by mail content: 0
spam detected by dnsbl: 0
spam detected with virus: 0
total virus mails: 0
dnsbl timeout: 0
mail session forwarded: 0
mail session dropped: 0
```

CHAPTER 43
SSL Inspection

This chapter describes how to set up SSL Inspection for the Zyxel Device.

43.1 SSL Inspection Overview

Secure Socket Layer (SSL) traffic, such as https://www.google.com/HTTPS, FTPs, POP3s, SMTPs, etc. is encrypted, and cannot be inspected using Unified Threat Management (UTM) profiles such as App Patrol, Content Filter, Intrusion, Detection and Prevention (IDP), or Anti-Virus. The Zyxel Device uses SSL Inspection to decrypt SSL traffic, sends it to the UTM engines for inspection, then encrypts traffic that passes inspection and forwards it to the destination server, such as Google.

The Zyxel Device supports the following in SSL Inspection:

- Supported Cipher Suite
  - RC4 (Rivest Cipher 4)
  - DES (Data Encryption Standard)
  - 3DES
  - AES (Advanced Encryption Standard)
- SSLv3/TLS1.0 (Transport Layer Security) Support
  - SSLv3/TLS1.0 is currently supported with option to pass or block SSLv2 traffic
- Traffic using TLS1.1 (Transport Layer Security) or TLS1.2 is downgraded to TLS1.0 for SSL Inspection
- No Compression Support at time of writing
- No Client Authentication Request Support at time of writing

43.2 SSL Inspection Commands Summary

The following table describes the values required for many SSL inspection commands. Other values are discussed with the corresponding commands.

Table 183 Input Values for SSL Inspection Commands

LABEL	DESCRIPTION
ssi_profile_name	This is the name of the profile. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
description	This is additional information about this SSL Inspection profile. You can enter up to 60 characters ("0-9", "a-z", "A-Z", "-" and "_").
cert_name	This is a name of a certificate.

The following sections list the commands.

43.2.1 SSL Inspection Exclusion Commands

There may be privacy and legality issues regarding inspecting a user's encrypted session. The legal issues may vary by locale, so it's important to check with your legal department to make sure that it's OK to intercept SSL traffic from your Zyxel Device users.

To ensure individual privacy and meet legal requirements, you can configure an exclusion list to exclude matching sessions to destination servers. This traffic is not intercepted and is passed through uninspected.

This table lists the SSL Inspection exclusion-related commands.

Table 184 SSL Inspection Exclusion Commands

<table>
<tr><th>COMMAND</th><th>DESCRIPTION</th></tr>
<tr><td><code>ssl-inspection exclude-list-settings</code></td><td>Use these commands to create a log for traffic that bypasses SSL Inspection.</td></tr>
<tr><td><code>[no] log</code></td><td>The <code>no</code> command disables SSL exclusion list logs.</td></tr>
<tr><td><code>ssl-inspection exclude-list</code></td><td>SSL traffic to a server to be excluded from SSL Inspection is identified by its certificate.</td></tr>
<tr><td><code>[no] entry {IPv4 | IPv4_CIDR | IPv4_RANGE | IPv6 | IPv6_PREFIX | IPv6_RANGE | SSL_INSPECTION_WILDCARD_CNAME}</code></td><td>Identify the certificate in one of the following ways:
• Type an IPv4 or IPv6 address. For example, type 192.168.1.35, or 2001:7300:3500::1
• Type an IPv4/IPv6 in CIDR notation. For example, type 192.168.1.1/24, or 2001:7300:3500::1/64
• Type an IPv4/IPv6 address range. For example, type 192.168.1.1-192.168.1.35, or 2001:7300:3500::1-2001:7300:3500::35
• Type a DNS name or a common name (wildcard char: '*', escape char: '\'). Use up to 127 case-insensitive characters (0-9a-zA-Z`~!@#$%^&*()-_=+[]{}\|;:',.<>/?). '*' can be used as a wildcard to match any string. Use '*' to indicate a single wildcard character.
• Type an email address. For example, type abc@zyxel.com.tw
The <code>no</code> command disables the SSL entry.</td></tr>
<tr><td><code>show ssl-inspection exclude-list [settings]</code></td><td>Displays SSL exclusion list settings.</td></tr>
</table>

43.2.2 SSL Inspection Profile Settings

This table lists the SSL Inspection profile setting commands.

Table 185 SSL Inspection Profile Commands

COMMAND	DESCRIPTION
`ssl-inspection profile SSI_profile_name`	Creates an SSL Inspection profile. Use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
`description description`	Enter additional information about this SSL Inspection entry. You can enter up to 60 characters ("0-9", "a-z", "A-Z", "-" and "_").
`no description`	Deletes the description in a profile.
`certificate cert_name`	Enter the default certificate or one already created for this profile.
`no certificate`	Removes the certificate from this profile.

Table 185 SSL Inspection Profile Commands

COMMAND	DESCRIPTION
`follow-real-client-routing {yes | no}`	When a new SSL session is found by SSL inspection, it will create another independent session from the Zyxel Device to get information such as the certificate chain. However, since this traffic is sent from the Zyxel Device, it may not match the same routing policy of the original SSL session and may not reach the destination server. Enable this command to allow the session sent from the Zyxel Device to follow the routing policy of the original session. The `no` command does not allow the session sent from the Zyxel Device to follow the routing policy of the original session.
`sslv2 action {pass | block} {no log | log [alert]}`	SSL Inspection supports SSLv3 and TLS1.0. This command sets the action and log for SSLv2 traffic.
`unsupported-suite action {pass | block} {no log | log [alert]}`	Sets the action and log for unsupported suite traffic.
`untrusted-cert-chain action {pass | block} {no log | log [alert]}`	As a SSL session is being established, servers send their certificate chain to clients. The Zyxel Device trusts its own certificates and imported (trusted) certificates to verify the certificate chain. This command sets the action and log for traffic from a server with an untrusted certificate chain.
`ssl-inspection profile rename` *`ssi_profile_name1 ssi_profile_name2`*	Renames an SSL Inspection profile.
`no ssl-inspection profile` *`ssi_profile_name`*	Deletes an SSL Inspection profile.
`show ssl-inspection profile [`*`ssi_profile_name`*`]`	Displays SSL Inspection profile settings.

43.2.3 SSL Inspection Certificate Cache

This table lists the SSL Inspection certificate cache commands.

Table 186 SSL Inspection Certificate Cache Commands

COMMAND	DESCRIPTION
`ssl-inspection cache flush`	Clears SSL Inspection cached entries.
`show ssl-inspection cert-list`	Displays certificates used in SSL Inspection.

43.2.4 SSL Inspection Certificate Update

Use these commands to update the latest certificates of servers using SSL connections to the Zyxel Device network. You should have Internet access and have activated SSL Inspection on the Zyxel Device at myZyxel.com.

This table lists the SSL Inspection certificate cache commands.

Table 187 SSL Inspection Certificate Update Commands

COMMAND	DESCRIPTION
`[no] ssl-inspection cert-update auto`	Zyxel Device automatically updates the certificate set when a new one becomes available on myZyxel.com.
`ssl-inspection cert-update now`	Download the latest certificate set from the myZyxel.com and updates it on the Zyxel Device.
`show ssl-inspection default-cert version`	Displays the default certificate update status.
`show ssl-inspection default-cert update`	Shows the current certificate update status.
`show ssl-inspection cert-update status`	Shows if automatically updating the certificate set is configured on the Zyxel Device.

These are some example SSL Inspection certificate update usage commands.

```
Router(config)# show ssl-inspection cert-update status
update auto     : no
Router(config)# ssl-inspection cert-update auto
Router(config)# show ssl-inspection cert-update status
update auto     : yes
Router(config)# show ssl-inspection default-cert update
/tmp/sslinsp_certs/default_trusted /
current status: Connecting to update server to get SSL certificate. at Fri Apr 10
03:47:37 2015

Router(config)# show ssl-inspection default-cert update
current status: SSL Certificate update has succeeded. (success) at Fri Apr 10
03:47:49 2015
Router(config)#
```

43.2.5 SSL Inspection Statistics

This table lists the SSL Inspection statistics commands.

Table 188 SSL Inspection Statistics Commands

COMMAND	DESCRIPTION
`[no] ssl-inspection statistics collect`	Enables SSL inspection statistics collection. The `no` command disables SSL exclusion statistics collection.
`ssl-inspection statistics flush`	Clears SSL inspection statistics.
`show ssl-inspection statistics collect`	Shows if SSL inspection statistics collection is enabled.
`show ssl-inspection statistics summary`	Shows SSL inspection statistics such as concurrent sessions, total ssl sessions, sessions inspected, decrypted Kbytes, encrypted Kbytes, sessions blocked, and sessions passed.

43.2.6 SSL Inspection Command Examples

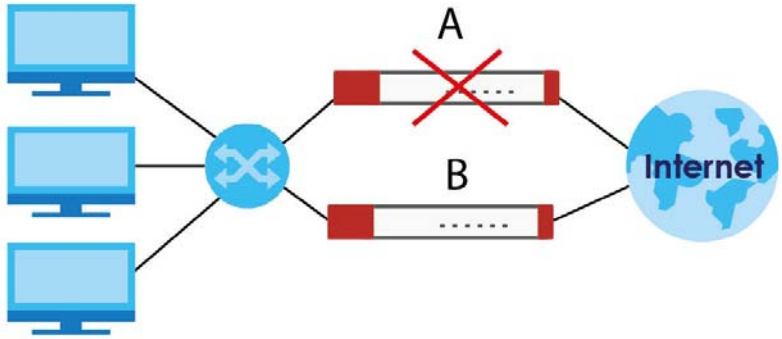
These are some other example SSL Inspection usage commands.

```
Router(config)#Router(config)# ssl-inspection exclude-list-settings
Router(ssl-inspection-exclude-list-settings)# no log
Router(ssl-inspection-exclude-list-settings)# exit
Router(config)# ssl-inspection exclude-list
Router(ssl-inspection-exclude-list)# entry 1.1.1.1
Router(ssl-inspection-exclude-list)# entry abc@zyxel.com.tw
Router(ssl-inspection-exclude-list)# exit
Router(config)# show ssl-inspection exclude-list settings
SSL Inspection Exclude List Global Information
  Log: no
Router(config)# show ssl-inspection exclude-list
No.  Exclude list of Certificate Identity
===============================================================================
0    1.1.1.1
1    abc@zyxel.com.tw
Router(config)# ssl-inspection profile dummy
Router(config-ssl-inspection-profile-dummy)# description this is a dummy profile
Router(config-ssl-inspection-profile-dummy)# certificate default
Router(config-ssl-inspection-profile-dummy)# sslv2 action block log
Router(config-ssl-inspection-profile-dummy)# unsupported-suite action block log
Router(config-ssl-inspection-profile-dummy)# untrusted-cert-chain action block log
Router(config-ssl-inspection-profile-dummy)# exit
Router(config)# show ssl-inspection profile dummy
SSL-Inspection: 3
  profile name: dummy
  description: this is a dummy profile
  Certificate: default
  Follow_real_client_routing: yes
  SSLv2_action: block
  SSLv2_log: log
  Unsupported_suite_action: block
  Unsupported_suite_log: log
  Untrusted_cert_chain_action: block
  Untrusted_cert_chain_action_log: log
  Reference: 0
Router(config)# ssl-inspection statistics collect
Router(config)# show ssl-inspection statistics collect
collect statistics: yes
collect statistics time: since 2014-06-20 05:47:37 to 2014-06-20 05:47:55
Router(config)# show ssl-inspection statistics summary
maximum concurrent sessions  : 1000
concurrent sessions          : 0

total ssl sessions           : 0
  sessions inspected         : 0
     decrypted Kbytes        : 0
     encrypted Kbytes        : 0
  sessions blocked           : 0
  sessions passed            : 0

Router(config)#
```

CHAPTER 44
Device HA

Use device HA to increase network reliability. Device HA lets a backup Zyxel Device (**B**) automatically take over if a master Zyxel Device (**A**) fails.

Figure 25 Device HA Backup Taking Over for the Master



44.1 Device HA Overview

Active-Passive Mode

- Active-passive mode lets a backup Zyxel Device take over if the master Zyxel Device fails.
- The Zyxel Devices must all support and be set to use the same device HA mode (either active-passive or legacy).

Management Access

You can configure a separate management IP address for each interface. You can use it to access the Zyxel Device for management whether the Zyxel Device is the master or a backup. The management IP address should be in the same subnet as the interface IP address.

Synchronization

Use synchronization to have a backup Zyxel Device copy the master Zyxel Device’s configuration, signatures (anti-virus, IDP/application patrol, and system protect), and certificates.

Note: Only Zyxel Devices of the same model and firmware version can synchronize.

Otherwise you must manually configure the master Zyxel Device’s settings on the backup (by editing copies of the configuration files in a text editor for example).

44.1.1 Before You Begin

- Configure a static IP address for each interface that you will have device HA monitor.

Note: Subscribe to services on the backup Zyxel Device before synchronizing it with the master Zyxel Device.

- Synchronization includes updates for services to which the master and backup Zyxel Devices are both subscribed. For example, a backup subscribed to IDP/AppPatrol, but not anti-virus, gets IDP/AppPatrol updates from the master, but not anti-virus updates. It is highly recommended to subscribe the master and backup Zyxel Devices to the same services.

44.1.2 Device HA and Device HA Pro

Refer to the Introduction chapter of the ZyWALL USG Series User's Guide for a list of device models that support Device HA Pro.

The following table shows some differences between Device HA and Device HA Pro.

Table 189 Device HA Vs Device HA Pro

FEATURE	DEVICE HA	DEVICE HA PRO
Role	Role of Master and Backup is configurable. Master takes over from Backup if the Master goes down and then becomes the Master again if it comes back online again (failback).	Role of active and passive is not configurable. The active model is the one whose heartbeat interface comes online first. passive becomes active if active goes down and stays active even if the previous active comes online again.
Firmware Upgrade	Master remains Master by default when new firmware is uploaded.	New firmware is first uploaded to the passive device and then uploaded to the active device. By default, the passive device reboots after firmware upload making it become the active device. Clear the Reboot prompt in the Web Configurator after uploading firmware to the passive device if you want the passive device to remain passive when new firmware is uploaded.
What is synchronized	Configuration file	Configuration file, device time, IPv4/v6 TCP sessions, IPSec VPN tunnels, user login/logout information, AV/IDP signatures, DHCP table, IP/MAC binding table.
Maximum Failover Count	0	5 (default) to 50. Can be reset by command.
Best case Failover delay	10~30 seconds to rebuild connections.	0~1 seconds.
Monitored Interfaces	Ethernet	Ethernet, VLAN, Bridge, LAG
Dedicated monitor port	No	Heartbeat interface. Note: Remove Ethernet, VLAN, Bridge, LAG configurations from this port first.

44.2 General Device HA Commands

This table lists the general commands for device HA.

Table 190 device-ha General Commands

COMMAND	DESCRIPTION
`show device-ha status`	Displays whether or not device HA is activated, the configured device HA mode, and the status of the monitored interfaces.
`[no] device-ha activate`	Turns device HA on or off.
`device-ha mode active-passive`	Sets the Zyxel Device to use active-passive device HA.

44.3 Active-Passive Mode Device HA

Virtual Router

The master and backup Zyxel Device form a single 'virtual router'.

Cluster ID

You can have multiple Zyxel Device virtual routers on your network. Use a different cluster ID to identify each virtual router.

Monitored Interfaces in Active-Passive Mode Device HA

You can select which interfaces device HA monitors. If a monitored interface on the Zyxel Device loses its connection, device HA has the backup Zyxel Device take over.

Enable monitoring for the same interfaces on the master and backup Zyxel Devices. Each monitored interface must have a static IP address and be connected to the same subnet as the corresponding interface on the backup or master Zyxel Device.

Virtual Router and Management IP Addresses

- If a backup takes over for the master, it uses the master's IP addresses. These IP addresses are know as the virtual router IP addresses.
- Each interface can also have a management IP address. You can connect to this IP address to manage the Zyxel Device regardless of whether it is the master or the backup.

44.4 Active-Passive Mode Device HA Commands

The following table identifies the values required for many of these commands. Other input values are discussed with the corresponding commands.

Table 191 Input Values for device-ha Commands

LABEL	DESCRIPTION
interface_name	The name of the interface. This depends on the Zyxel Device model. For some Zyxel Device models, use ge*x*, *x* = 1 ~ N, where N equals the highest numbered Ethernet interface for your Zyxel Device model. For other Zyxel Device models, use a name such as wan1, wan2, opt, lan1, or dmz. Besides, in HA AP mode, the interface can also be a bridge interface. In HA Legacy mode, the interface can also be a VLAN interface.

The following sections list the `device-ha` commands.

44.4.1 Active-Passive Mode Device HA Commands

This table lists the commands for configuring active-passive mode device HA.

Table 192 device-ha ap-mode Commands

COMMAND	DESCRIPTION
`[no] device-ha ap-mode preempt`	Turn on preempt if this Zyxel Device should become the master Zyxel Device if a lower-priority Zyxel Device is the master when this Zyxel Device is enabled.
`device-ha ap-mode role {master|backup}`	Sets the Zyxel Device to be the master or a backup in the virtual router.
`device-ha ap-mode cluster-id <1..32>`	Sets the cluster ID number. A virtual router consists of a master Zyxel Device and all of its backup Zyxel Devices. If you have multiple Zyxel Device virtual routers on your network, use a different cluster ID for each virtual router.
`device-ha ap-mode priority <1..254>`	Sets backup Zyxel Device's priority. The backup Zyxel Device with the highest value takes over the role of the master Zyxel Device if the master Zyxel Device becomes unavailable. The priority must be between 1 and 254. (The master interface has priority 255.)
`[no] device-ha ap-mode authentication {string` *`key`* `| ah-md5` *`key`*`}`	Sets the authentication method the virtual router uses. Every interface in a virtual router must use the same authentication method and password. The no command disables authentication. `string:` Use a plain text password for authentication. *`key`* - Use up to eight characters including alphanumeric characters, the underscore, and some punctuation marks (+-/*= :; .! @$&%#~ ' \ ()). `ah-md5`: Use an encrypted MD5 password for authentication. *`key`* - Use up to eight characters including alphanumeric characters, the underscore, and some punctuation marks (+-/*= :; .! @$&%#~ ' \ ()).
`[no] device-ha ap-mode` *`interface_name`* `manage-ip` *`ip subnet_mask`*	Sets the management IP address for an interface.
`[no] device-ha ap-mode` *`interface_name`* `activate`	Has device HA monitor the status of an interface's connection.

Table 192 device-ha ap-mode Commands (continued)

COMMAND	DESCRIPTION
`[no] device-ha ap-mode master sync authentication password password`	This is for a master Zyxel Device. It specifies the password to require from synchronizing backup Zyxel Devices. Every router in the virtual router must use the same password. The `no` command sets the password setting to blank (which means no backups can synchronize with this master). *password*: Use 4-63 alphanumeric characters, underscores (_), dashes (-), and `#%^*={}:,.~` characters.
`[no] device-ha ap-mode backup sync authentication password password`	Sets the password the backup Zyxel Device uses when synchronizing with the master. The `no` command sets the password setting to blank (which means this backup Zyxel Device cannot synchronize with the master). *password*: Use 4-63 alphanumeric characters, underscores (_), dashes (-), and `#%^*={}:,.~` characters.
`[no] device-ha ap-mode backup sync auto`	Turns on automatic synchronization according to the interval you specify in `device-ha ap-mode backup sync interval`. The first synchronization begins after the specified interval (not immediately).
`[no] device-ha ap-mode backup sync interval <5..1440>`	When you use automatic synchronization, this sets how often (in minutes) the Zyxel Device synchronizes with the master.
`[no] device-ha ap-mode backup sync from master_address port port`	Sets the address of the master Zyxel Device with which this backup Zyxel Device is to synchronize. *master_address*: The master Zyxel Device's IP address or fully-qualified domain name (FQDN). *port*: The master Zyxel Device's FTP port number.
`device-ha ap-mode backup sync now`	Synchronize now.
`show device-ha ap-mode interfaces`	Displays the device HA AP mode interface settings and status.
`show device-ha ap-mode next-sync-time`	Displays the next time and date (in hh:mm yyyy-mm-dd format) the Zyxel Device will synchronize with the master.
`show device-ha ap-mode status`	Displays the Zyxel Device's key device HA settings.
`show device-ha ap-mode master sync`	Displays the master Zyxel Device's synchronization settings.
`show device-ha ap-mode backup sync`	Displays the backup Zyxel Device's synchronization settings.
`show device-ha ap-mode backup sync status`	Displays the backup Zyxel Device's current synchronization status.
`show device-ha ap-mode backup sync summary`	Displays the backup Zyxel Device's synchronization settings.
`show device-ha ap-mode forwarding-port interface_name`	If you apply Device HA on a bridge interface on a backup Zyxel Device, you can use this command to see which port in the bridge interface is chosen to receive VRRP packets used to monitor if the master Zyxel Device goes down. *interface_name*: This is a bridge interface, For example, brx.
`show device-ha mode`	Displays whether this Zyxel Device is in active-passive mode.

44.4.2 Active-Passive Mode Device HA Command Example

This example configures a Zyxel Device to be a master Zyxel Device for active-passive mode device HA. There is a management IP address of 192.168.1.3 on lan1. wan1 and lan1 are monitored. The synchronization password is set to “mySyncPassword”.

```
Router(config)# device-ha ap-mode lan1 manage-ip 192.168.1.3 255.255.255.0
Router(config)# device-ha ap-mode role master
Router(config)# device-ha ap-mode master sync authentication password
mySyncPassword
Router(config)# device-ha ap-mode wan1 activate
Router(config)# device-ha ap-mode lan1 activate
Router(config)# device-ha activate
```

44.5 Device HA Pro

You need a license to use Device HA Pro. Device HA Pro is easier to deploy than Device HA, is more reliable (no risk of overloading), and faster (Device HA causes a connection break of 10~30 seconds while Device HA Pro just has 1~2 seconds). In addition to configuration file backup in Device HA, device time, TCP sessions (IPv4/IPv6), IPSec VPN sessions, login/logout information and license status can also be backed up using Device HA Pro.

Active and Passive Devices

Device HA Pro uses a dedicated heartbeat link between an active device and a passive device for dynamic syncing and backup to the passive device. On the passive device, all ports are disabled except for the port with the heartbeat link.

Note: The dedicated heartbeat link port must be the highest-numbered port on each Zyxel Device for Device HA Pro to work.

Failover from the active Zyxel Device to the passive Zyxel Device is activated when:

- A monitored interface is down
- A monitored service (daemon) is down
- The hearbeat link exceeds the failure tolerance.

After failover, the initial active Zyxel Device becomes the passive Zyxel Device after it recovers.

See Section 44.1.2 on page 329 for differences between Device HA and Device HA Pro.

44.5.1 Deploying Device HA Pro

1 Register either the active or passive Zyxel Device with a Device HA Pro license at MyZyxel.com. Check that it’s properly licensed in **Licensing > Registration > Service** in the active Zyxel Device.

2 Make sure the passive Zyxel Device is offline, then enable Device HA in **Device HA > General** in the passive Zyxel Device.

3 Must make sure the FTP port in **System > FTP** (default 21) is the same on both Zyxel Devices. FTP is used for transferring files in the event of failover from active to passive Zyxel Device.

4 Connect the passive Zyxel Device to the active Zyxel Device using the highest-numbered ports on both Zyxel Devices.

Note: If both Zyxel Devices are turned on at the same time with Device HA enabled, then they may send the heartbeat at the same time. In this case, the Zyxel Device with the bigger MAC address becomes the passive Zyxel Device.

5 When using Device HA Pro to synchronize firmware, the location of the running firmware must be the same in both active and passive Zyxel Devices. For example, if the running firmware is in partition 1 in the active Zyxel Device (standby firmware in partition 2), then the running firmware must also be in partition 1 in the passive Zyxel Device (standby firmware in partition 2).

6 When using Device HA Pro to update new firmware, the new firmware is downloaded to the active device. The active device sends a ping to the passive device to see if it is alive. If the active device receives a reply from the passive device, it uploads the new firmware to the passive device.
The passive device uploads the new firmware and then reboots. The active device then repeatedly pings the passive device again as it reboots. The active device waits from 1-3,600 seconds `check-timeout` (with 1,800 as the default) for a reply from the passive device indicating it has fully rebooted. If the active device does not receive a reply within the check-timeout, it will not update its own firmware. If it receives a reply, the active device again waits from 1-300 seconds `delay` (with 10 as the default) before updating its own firmware. The passive device becomes the active device after a successful reboot with the new firmware.

44.5.2 Device HA Pro Commands

This table lists the commands for Device HA Pro (`device-ha2`).

Table 193 `device-ha2` (Device HA Pro) Commands

COMMAND	DESCRIPTION
`[no] device-ha2 activate`	Turns Device HA Pro on or off (`no`).
`[no] device-ha2` *`interface_name`* `activate`	Turns Device HA Pro monitoring on or off (`no`) on the specified interface.
`[no] device-ha2 manage-ip` *`ip1 ip2 subnet_mask`*	Sets or removes (`no`) the IPv4 address and subnet mask of the heartbeat dedicated link port (the highest-numbered port) on the active and passive Zyxel Device. *`ip1`*: IPv4 address of the active Zyxel Device. *`ip2`*: IPv4 address of the passive Zyxel Device.
`device-ha2 sync password` *`password`*	Sets a synchronization password of between 1 and 32 single-byte printable characters.
`[no] device-ha2 sync password`	Enables or disables (`no`) being prompted for the password before synchronization takes place.
`[no] device-ha2 srv-monitor`	Enables or disables (`no`) service monitoring. When enabled, the passive Zyxel Device takes over when a monitored service daemon on the active Zyxel Device fails.
`[no] device-ha2 connchk-monitor`	Enables or disables (`no`) connection check monitoring. When enabled, the passive Zyxel Device takes over when a monitored interface on the active Zyxel Device fails.

Table 193 `device-ha2` (Device HA Pro) Commands (continued)

COMMAND	DESCRIPTION
`device-ha2 heartbeat period <1..10> fail-tolerance <1..10>`	Sets when failover is activated on the passive Zyxel Device. Zyxel Device will change to active mode if it doesn't receive a heartbeat after heartbeat period x `fail-tolerance` seconds. `heartbeat period`: the number of seconds (1-10) allowed for absence of a heartbeat signal. `fail-tolerance`: the number of heartbeat failures allowed.
`device-ha2 license-sync` *`serial_number`*	Sets the serial number of the Zyxel Device (active or passive) with the Device HA Pro subscribed license.
`device-ha2 virtual-mac` *`zynos_style_mac_address`*	Specifies the Virtual MAC address of a port on the active Zyxel Device. Virtual MAC is a shared MAC address which is owned by the active Zyxel Device. All traffic can communicate with this shared MAC address, allowing the backup Zyxel Device to pick up traffic seamlessly. *`zynos_style_mac_address`*: The first (wan0) MAC address of the Zyxel Device. A Zyxel-style MAC address must use the Zyxel OUI (Organizationally Unique Identifier) such as **00-13-49**-XX-XX-XX.
`device-ha2 failover-count <5 ..50>`	Sets the maximum number of times a Zyxel Device can change from active to passive mode. The Zyxel Device won't change to passive mode if it's already changed to passive mode `failover-count` times. This is to prevent too many changes between active and passive mode.
`device-ha2 failover reset-interval <1..30>`	Sets the time period after which the failover counter can be reset (1-30 days). The default is 5 days. For example, if the `failover-count` is 5 and the `failover reset-interval` is 30, then Zyxel Device can change from active to passive mode at most 5 times within 30 days.
`device-ha2 ap-firmware-sync`	Sets the active device to upload the latest AP firmware to the passive device after the active device discovers and downloads the latest AP firmware from the cloud server.
`device-ha2 firmware-update check-timeout`	Sets how long the active device will wait for a reply ping from the passive device indicating it has fully rebooted. `check-timeout`: 1 - 3,600 seconds with 1,800 as the current default
`device-ha2 firmware-update delay`	Sets how long the active device will wait before updating its firmware after receiving a reply ping from the passive device. `delay time`: 1 - 300 seconds with 10 as the current default
`show device-ha2 activation`	Displays whether or not Device HA Pro is activated.
`show device-ha2 mode`	Displays whether this Zyxel Device is the active or passive device. `HA mode: Active | Passive.`
`show device-ha2 device-status`	Displays if this Zyxel Device is active or passive, heartbeat link status, this Zyxel Device serial number, Virtual MAC address and synchronization progress.
`show device-ha2 passive device-status`	Displays the passive Zyxel Device heartbeat link status, the passive Zyxel Device serial number, Virtual MAC address and synchronization progress.
`show device-ha2 passive log`	Displays High Availability logs for the passive Zyxel Device.
`show device-ha2 interfaces`	Displays Device HA Pro monitored interfaces.
`show device-ha2 log`	Displays Device HA Pro logs.
`show device-ha2 mgnt-iface`	Displays the Device HA Pro management interface.
`show device-ha2 sync status`	Displays Device HA Pro synchronization status.
`show device-ha2 sync summary`	Displays Device HA Pro synchronization result.

Table 193 `device-ha2` (Device HA Pro) Commands (continued)

COMMAND	DESCRIPTION
`show device-ha2 virtual-mac`	Displays Device HA Pro virtual router MAC address. The active and passive Zyxel Devices form a single 'virtual router' with the MAC address of the active device being the virtual MAC address.
`show device-ha2 status`	Displays whether or not device HA is activated, the IP addresses of the active and passive devices, heartbeat parameters, failover parameters and monitored interfaces.
`show device-ha2 firmware-update check-timeout`	Displays how long the active device will wait for a reply ping from the passive device indicating it has fully rebooted. `check-timeout:` 1 - 3,600 seconds with 1,800 as the current default
`show device-ha2 firmware-update delay`	Displays how long the active device will wait before updating its firmware after receiving a reply ping from the passive device. `delay time`: 1 - 300 seconds with 10 as the current default
`show device-ha2 firmware-update status`	Displays the firmware update status.

44.5.3 Device HA2 Command Example

This command shows whether Device HA2 is activated and related parameters. Srv-monitor shows if a monitored service daemon on the active Zyxel Device fails. Conn-chk monitor shows if there is connection check monitoring. When enabled, the passive Zyxel Device takes over when a monitored interface on the active Zyxel Device fails.

```
Router# show device-ha2 activation
active: yes
Router# show device-ha2 status
Active: yes
Srv-monitor: no
Conn-chk monitor: no
Password: 1234
Active Device Management IP: 192.168.177.100
Passive Device Management IP: 192.168.177.101
Subnet Mask: 255.255.255.0
Heartbeat Interval: 2
Heartbeat Fail Tolerence: 2
License-Sync: S122L23030003
Max Failover Count: 5
Current Failover Count: 0
Failover Reset Interval (days): 5
Virtual mac: B0B2DC69A5FE
AP-Image-Sync: no
Router(config)#
```

CHAPTER 45
User/Group

This chapter describes how to set up user accounts, user groups, and user settings for the Zyxel Device. You can also set up rules that control when users have to log in to the Zyxel Device before the Zyxel Device routes traffic for them.

45.1 User Account Overview

A user account defines the privileges of a user logged into the Zyxel Device. User accounts are used in firewall rules and application patrol, in addition to controlling access to configuration and services in the Zyxel Device.

45.1.1 User Types

There are the types of user accounts the Zyxel Device uses.

Table 194 Types of User Accounts

TYPE	ABILITIES	LOGIN METHOD(S)
Admin Users		
Admin	Change Zyxel Device configuration (web, CLI)	WWW, TELNET, SSH, FTP
Limited-Admin	Look at Zyxel Device configuration (web, CLI) Perform basic diagnostics (CLI)	WWW, TELNET, SSH
Access Users		
User	Access network services Browse user-mode commands (CLI)	WWW, TELNET, SSH
Guest	Access network services	WWW
Ext-User	External user account	WWW
ext-group-user	External group user account	WWW

Note: The default **admin** account is always authenticated locally, regardless of the authentication method setting. (See Chapter 51 on page 368 for more information about authentication methods.)

45.2 User/Group Commands Summary

The following table identifies the values required for many `username/groupname` commands. Other input values are discussed with the corresponding commands.

Table 195 username/groupname Command Input Values

LABEL	DESCRIPTION
username	The name of the user (account). You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
groupname	The name of the user group. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive. It cannot be the same as the user name.

The following sections list the `username/groupname` commands.

45.2.1 User Commands

The first table lists the commands for users.

Table 196 username/groupname Commands Summary: Users

COMMAND	DESCRIPTION
show username [*username*]	Displays information about the specified user or about all users set up in the Zyxel Device.
username *username* nopassword user-type {admin | guest | limited-admin | user}	Creates the specified user (if necessary), disables the password, and sets the user type for the specified user.
username *username* password *password* user-type {admin | guest | limited-admin | user}	Creates the specified user (if necessary); enables and sets the password; and sets the user type for the specified user. *password*: You can use 1-63 printable ASCII characters, except double quotation marks (“) and question marks (?).
username *username* user-type ext-user	Creates the specified user (if necessary) and sets the user type to **Ext-User**.
username *username* user-type mac-address	Creates the specified user (if necessary) and sets the user type to **mac-address**.
username *username* user-type ext-group-user associated-aaa-server *server_profile* group-id *id*	Specifies the value of the AD or LDAP server's Group Membership Attribute that identifies the group to which the specified ext-group-user type user account belongs.
username username encrypted-password <*password*>	Sets the password for the specified user.
no username *username*	Deletes the specified user.
username rename *username* *username*	Renames the specified user (first *username*) to the specified username (second *username*).
username *username* [no] description *description*	Sets the description for the specified user. The no command clears the description. *description*: You can use alphanumeric and ()+/ :=?!*#@$_%- characters, and it can be up to 60 characters long.
username *username* logon-time-setting <default | manual>	Sets the account to use the factory default lease and reauthentication times or custom ones.

Table 196 username/groupname Commands Summary: Users (continued)

COMMAND	DESCRIPTION
username *username* [no] logon-lease-time <0..1440>	Sets the lease time for the specified user. Set it to zero to set unlimited lease time. The *no* command sets the lease time to five minutes (regardless of the current default setting for new users).
username *username* [no] logon-re-auth-time <0..1440>	Sets the reauthorization time for the specified user. Set it to zero to set unlimited reauthorization time. The no command sets the reauthorization time to thirty minutes (regardless of the current default setting for new users).
username *username* [no] email <1..2> *email-address*	Specifies up to two email addresses for a user account. The *no* command removes the specified email address for this account. *email-address:* Should be in the <user@domainname> format.
username *username* [no] phone *phone_number*	Sets the mobile phone number for the account. The *no* command removes the specified mobile phone number for this account. *phone_number:* 20 character length, including numbers 1~9 and characters +*#()-
username *username* vlan activate	Enables dynamic VLAN assignment for the user account. Dynamic VLAN assignment allows you to assign a user to a specific VLAN based on the user credentials.
username *username* vlan id <1..4094>	Sets the ID number of the VLAN to which this user account is assigned after authentication is successful.
[no] pwd-expiry force-to-change-pwd activate	Enforces a periodic password change. The *no* command removes the requirement.
[no] pwd-expiry expiration days <1..365>	Sets how often users must change their password when they log into the Zyxel Device. You can choose from once a day to once a year. The *no* command removes the requirement.
pwd-expiry link-to-device custom {myrouter | <FQDN> | <IPv6 Address> | <W.X.Y.X>}	Set the host part of the hyperlink in the password expiration notice email. Please note that myrouter is accessible only if the user is in the LAN of this Zyxel Device, and there are no other Zyxel gateways in between.
pwd-expiry expiration send-now	Sends a password expiration e-mail immediately.
[no] password complexity-verify	Enforces a complex user password consisting of at least 8 characters and at most 64. At least 1 character must be a number, at least 1 a lower case letter, at least 1 an upper case letter and at least one special character from the keyboard, such as `~!@#$%^&*()_+={}|;:'<,>./\"- The *no* command removes the requirement.
show pwd-expiry {all | expiration | force-to-change-pwd | link-to-device}	Displays if a password must be changed (force-to-change-pwd), when a password will expire (expiration) and the host part of the hyperlink in the password expiration notice email (link-to-device).
show password complexity-verify status	Displays if a complex user password as defined above is required.
mail-server	Enters mail-server sub-command mode for configuring e-mail server settings and notification email settings.
[no] smtp-address {*ip* | *hostname*}	Sets the SMTP mail server IP address or domain name. The *no* command removes the mail server IP address or domain name.
[no] smtp-auth activate	Enables or disables (*no* command) SMTP authentication.
[no] smtp-auth username *username* password *password*	Sets or removes (*no* command) the username and password for SMTP authentication.
[no] smtp-port <1..65535>	Sets the SMTP port. The no command deletes the setting.

Table 196 username/groupname Commands Summary: Users (continued)

COMMAND	DESCRIPTION
`[no] smtp-tls activate`	Sets the mail server to use or not use (*no* command) Transport Layer Security (TLS) for encrypted communications between the mail server and the Zyxel Device.
`[no] smtp-tls authenticate-server`	Sets the Zyxel Device to authenticates the mail server in the TLS handshake or not (*no* command).
`[no] smtp-tls starttls-off`	The mail server uses SSL or TLS for encrypted communications between the mail server and the Zyxel Device. This command turns off STARTTLS and uses the TLS protocol. The `no` command enables the default STARTTLS protocol (SSL) for encrypted communications between the mail server and the Zyxel Device.
`[no] mail-subject append system-name`	Determines whether the system name will be appended to the subject of the notification e-mails.
`[no] mail-subject append date-time`	Determines whether the sending date-time will be appended at subject of the notification e-mails.
`schedule hour <0..23> minute <00..59>`	Sets the time for sending out the notification e-mails.

45.2.2 User Group Commands

This table lists the commands for groups.

Table 197 username/groupname Commands Summary: Groups

COMMAND	DESCRIPTION
`show groupname [`*groupname*`]`	Displays information about the specified user group or about all user groups set up in the Zyxel Device.
`[no] groupname` *groupname*	Creates the specified user group if necessary and enters sub-command mode. The `no` command deletes the specified user group.
`[no] description` *description*	Sets the description for the specified user group. The `no` command clears the description for the specified user group.
`[no] groupname` *groupname*	Adds the specified user group (second *groupname*) to the specified user group (first *groupname*).
`[no] user` *username*	Adds the specified user to the specified user group.
`groupname rename` *groupname groupname*	Renames the specified user group (first *groupname*) to the specified group-name (second *groupname*).

45.2.3 User Setting Commands

This table lists the commands for user settings, except for forcing user authentication.

Table 198 username/groupname Commands Summary: Settings

COMMAND	DESCRIPTION
`show users default-setting {all | user-type {admin|user|guest|limited-admin|ext-user| ext-group-user}}`	Displays the default lease and reauthentication times for the specified type of user accounts.
`users default-setting [no] logon-lease-time <0..1440>`	Sets the default lease time (in minutes) for each new user. Set it to zero to set unlimited lease time. The `no` command sets the default lease time to five.

Table 198 username/groupname Commands Summary: Settings (continued)

COMMAND	DESCRIPTION
`users default-setting [no] logon-re-auth-time <0..1440>`	Sets the default reauthorization time (in minutes) for each new user. Set it to zero to set unlimited reauthorization time. The `no` command sets the default reauthorization time to thirty.
`users default-setting [no] user-type <admin |ext-user|guest|limited-admin|user|ext-group-user>`	Sets the default user type for each new user. The `no` command sets the default user type to user.
`users default-setting [no] user-type <admin |ext-user|guest|limited-admin|user|ext-group-user> logon-lease-time <0..1440>`	Sets the default lease time (in minutes) for each type of new user. Set it to zero for unlimited lease time. The `no` command sets the default lease time to five.
`users default-setting [no] user-type <admin |ext-user|guest|limited-admin|user|ext-group-user> logon-re-auth-time <0..1440>`	Sets the default reauthorization time (in minutes) for each type of new user. Set it to zero for unlimited reauthorization time. The `no` command sets the default reauthorization time to thirty.
`show users retry-settings`	Displays the current retry limit settings for users.
`[no] users retry-limit`	Enables the retry limit for users. The `no` command disables the retry limit.
`[no] users retry-count <1..99>`	Sets the number of failed login attempts a user can have before the account or IP address is locked out for lockout-period minutes. The `no` command sets the retry-count to five.
`[no] users lockout-period <1..65535>`	Sets the amount of time, in minutes, a user or IP address is locked out after retry-count number of failed login attempts. The `no` command sets the lockout period to thirty minutes.
`show users simultaneous-logon-settings`	Displays the current settings for simultaneous logins by users.
`[no] users simultaneous-logon {administration | access} enforce`	Enables the limit on the number of simultaneous logins by users of the specified account-type. The `no` command disables the limit, or allows an unlimited number of simultaneous logins.
`[no] users simultaneous-logon {administration | access} limit <1..1024>`	Sets the limit for the number of simultaneous logins by users of the specified account-type. The `no` command sets the limit to one.
`show users update-lease-settings`	Displays whether or not access users can automatically renew their lease time.
`[no] users update-lease automation`	Lets users automatically renew their lease time. The `no` command prevents them from automatically renewing it.
`show users idle-detection-settings`	Displays whether or not users are automatically logged out, and, if so, how many minutes of idle time must pass before they are logged out.
`[no] users idle-detection`	Enables logging users out after a specified number of minutes of idle time. The `no` command disables logging them out.
`[no] users idle-detection timeout <1..60>`	Sets the number of minutes of idle time before users are automatically logged out. The `no` command sets the idle-detection timeout to three minutes.

45.2.3.1 User Setting Command Examples

The following commands show the current settings for the number of simultaneous logins.

```
Router# configure terminal
Router(config)# show users simultaneous-logon-settings
enable simultaneous logon limitation for administration account: yes
maximum simultaneous logon per administration account          : 1
enable simultaneous logon limitation for access account        : yes
maximum simultaneous logon per access account                  : 3
```

45.2.4 MAC Auth Commands

This table lists the commands for mappings MAC addresses to MAC address user accounts.

Table 199 mac-auth Commands Summary

COMMAND	DESCRIPTION
`[no] mac-auth database mac` *`mac_address`* `type ext-mac-address mac-role` *`username`* `description` *`description`*	Maps the specified MAC address authenticated by an external server to the specified MAC role (MAC address user account). The `no` command deletes the mapping between the MAC address and the MAC role.
`[no] mac-auth database mac` *`mac_address`* `type int-mac-address mac-role` *`username`* `description` *`description`*	Maps the specified MAC address authenticated by the Zyxel Device's local user database to the specified MAC role (MAC address user account). The `no` command deletes the mapping between the MAC address and the MAC role.
`[no] mac-auth database mac` *`oui`* `type ext-oui mac-role` *`username`* `description` *`description`*	Maps the specified OUI (Organizationally Unique Identifier) authenticated by an external server to the specified MAC role (MAC address user account). The OUI is the first three octets in a MAC address and uniquely identifies the manufacturer of a network device. The `no` command deletes the mapping between the OUI and the MAC role.
`[no] mac-auth database mac` *`oui`* `type int-oui mac-role` *`username`* `description` *`description`*	Maps the specified OUI (Organizationally Unique Identifier) authenticated by the Zyxel Device's local user database to the specified MAC role (MAC address user account). The OUI is the first three octets in a MAC address and uniquely identifies the manufacturer of a network device. The `no` command deletes the mapping between the OUI and the MAC role.

45.2.4.1 MAC Auth Example

This example uses an external server to authenticate wireless clients by MAC address. After authentication the Zyxel Device maps the wireless client to a mac-address user account (MAC role). Configure user-aware features to control MAC address user access to network services.

The following commands:

- Create a MAC role (mac-address user type user account) named Zyxel-mac

- Map a wireless client's MAC address of 00:13:49:11:a0:c4 to the Zyxel-mac MAC role (MAC address user account)
- Modify the WLAN security profile named secureWLAN1 as follows:
  - Turn on MAC authentication
  - Use the authentication method named Auth1
  - Use colons to separate the two-character pairs within account MAC addresses
  - Use upper case letters in the account MAC addresses

```
Router(config)# username Zyxel-mac user-type mac-address
Router(config)# mac-auth database mac 00:13:49:11:a0:c4 type ext-mac-address
mac-role Zyxel-mac description zyxel mac

3. Modify wlan-security-profile
Router(config)# wlan-security-profile secureWLAN1
Router(config-wlan-security default)# mac-auth activate
Router(config-wlan-security default)# mac-auth auth-method Auth1
Router(config-wlan-security default)# mac-auth delimiter account colon
Router(config-wlan-security default)# mac-auth case account upper
Router(config-wlan-security default)# exit
```

45.2.5 Additional User Commands

This table lists additional commands for users.

Table 200 username/groupname Commands Summary: Additional

COMMAND	DESCRIPTION
show users {*username* | all | current}	Displays information about the users logged onto the system.
show lockout-users	Displays users who are currently locked out.
unlock lockout-users {*ip* | console| *ipv6_addr*}	Unlocks the specified IP address.
users force-logout {*username* | *ip* | *ipv6_addr*}	Logs out the specified login.

45.2.5.1 Additional User Command Examples

The following commands display the users that are currently logged in to the Zyxel Device and forces the logout of all logins from a specific IP address.

```
Router# configure terminal
Router(config)# show users all
No: 0
  Name: admin
  Type: admin
  From: console
  Service: console
  Session_Time: 25:46:00
  Idle_Time: unlimited
  Lease_Timeout: unlimited
  Re_Auth_Timeout: unlimited
  User_Info: admin
No: 1
  Name: admin
  Type: admin
  From: 192.168.1.34
  Service: http/https
  Session_Time: 00:02:26
  Idle_Time: unlimited
  Lease_Timeout: unlimited
  Re_Auth_Timeout: unlimited
  User_Info: admin
Router(config)# users force-logout 192.168.1.34
Logout user 'admin'(from 192.168.1.34 ): OK
Total 1 user has been forced logout
Router(config)# show users all
No: 0
  Name: admin
  Type: admin
  From: console
  Service: console
  Session_Time: 25:48:33
  Idle_Time: unlimited
  Lease_Timeout: unlimited
  Re_Auth_Timeout: unlimited
  User_Info: admin
```

The following commands display the users that are currently locked out and then unlocks the user who is displayed.

```
Router# configure terminal
Router(config)# show lockout-users
No.  Username Tried                  From            Lockout Time Remaining
===========================================================================
No.  From            Failed Login Attempt    Record Expired Timer
===========================================================================
1    172.16.1.5             2                       46

Router(config)# unlock lockout-users 172.16.1.5
User from 172.16.1.5 is unlocked
Router(config)# show lockout-users
No.  Username Tried                  From            Lockout Time Remaining
===========================================================================
No.  From            Failed Login Attempt    Record Expired Timer
===========================================================================
```

CHAPTER 46
Application Object

Check that you have the latest IDP and App Patrol signatures.

46.1 Application Object Commands Summary

The following table describes the values required for many application object commands. Other values are discussed with the corresponding commands.

Table 201 Input Values for Application Object Commands

LABEL	DESCRIPTION
<object>	Type the name of the object.
<description>	This is a description of the object
<sid>	This is the associated IDP and App Patrol signature ID number.

46.1.1 Application Object Commands

This table lists the application object commands.

Table 202 `application-object` Commands

COMMAND	DESCRIPTION
`show application-object <object>`	Displays information on the named application object.
`application-object <object>`	Creates an object with the specified name. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive. The `no` command disables it.
`    [no] description <description>`	Write a description of the object.
`    [no] application <sid>`	Write a valid signature ID for the object. The `no` command disables it.
`no application-object <object>`	Deletes the object with the specified name.
`application-object rename <object> <object>`	Renames the specified object with a new name.

46.1.1.1 application-object Examples

These are some example usage commands.

```
Router(config)# show application-object
Name
Description                                                  Ref
Content
==========================================================================
======
tests
New Create                                                   1
Facebook Game (access)
Router(config)# show application-object tests
Name: tests
Description: New Create
Category                        Application
Application ID
==========================================================================
======
Social Network                  Facebook Game (access)
402685702
Router(config)#
```

46.1.2 Application Object Group Commands

This table lists the application object group commands.

Table 203 object-group application Commands

COMMAND	DESCRIPTION
show object-group application <*object*>	Displays information on the named application object group.
object-group application <*object*>	Creates an object group. with the specified name. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive. The no command disables it.
[no] description <*description*>	Write a description of the object group.
[no] application-object <*object*>	Adds the named application object to the object group. The no command removes it.
[no] object-group <*object*>	Creates an object group. The no command removes it.
no object-group application <*object*>	Deletes the object group with the specified name.
object-group application rename <*object*> <*object*>	Renames the specified object group with a new name.

46.1.2.1 `object-group application` Examples

These are some example usage commands.

```
Router(config)# show object-group application
Name
Description                                                  Ref
Member
=========================================================================
======
Router(config)# object-group application may
Router(group-application)# description rinse after use
Router(group-application)# exit
Router(config)# show object-group application
Name
Description                                                  Ref
Member
=========================================================================
======
may
rinse after use                                              0
tests
Router(config)#
```

CHAPTER 47
Addresses

This chapter describes how to set up addresses and address groups for the Zyxel Device.

47.1 Address Overview

Address objects can represent a single IP address or a range of IP addresses. Address groups are composed of address objects and other address groups.

You can create IP address objects based on an interface's IP address, subnet, or gateway. The Zyxel Device automatically updates these objects whenever the interface's IP address settings change. This way every rule or setting that uses the object uses the updated IP address settings. For example, if you change the LAN1 interface's IP address, the Zyxel Device automatically updates the corresponding interface-based, LAN1 subnet address object. So any configuration that uses the LAN1 subnet address object is also updated.

Address objects and address groups are used in dynamic routes, firewall rules, application patrol, content filtering, and VPN connection policies. For example, addresses are used to specify where content restrictions apply in content filtering. Please see the respective sections for more information about how address objects and address groups are used in each one.

Address groups are composed of address objects and address groups. The sequence of members in the address group is not important.

47.2 Address Commands Summary

The following table describes the values required for many address object and address group commands. Other values are discussed with the corresponding commands.

Table 204 Input Values for Address Commands

LABEL	DESCRIPTION
object_name	The name of the address. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
group_name	The name of the address group. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
interface_name	The name of the interface. This depends on the Zyxel Device model. For some models, use ge*x*, *x* = 1 ~ N, where N equals the highest numbered Ethernet interface for your Zyxel Device model. For other models, use a name such as wan1, wan2, opt, lan1, or dmz.

The following sections list the address object and address group commands.

47.2.1 Address Object Commands

There are the types of address objects:

- **HOST** - the object uses an **IP Address to define a** host address
- **RANGE** - the object uses a range address defined by a **Starting IP Address** and an **Ending IP Address**
- **SUBNET** - the object uses a network address defined by a **Network** IP address and **Netmask** subnet mask
- **INTERFACE IP** - the object uses the IP address of one of the Zyxel Device's interfaces
- **INTERFACE SUBNET** - the object uses the subnet mask of one of the Zyxel Device's interfaces
- **INTERFACE GATEWAY** - the object uses the gateway IP address of one of the Zyxel Device's interfaces
- **GEOGRAPHY** - the object uses the IP addresses of a country to represent a country
- **FQDN** - the object uses a FQDN (Fully Qualified Domain Name). An FQDN consists of a host and domain name. For example, www.zyxel.com is a fully qualified domain name. FQDN in address objects can be used in Security Policy, Policy Route, BWM and Web Authentication profiles as source and destination criteria. FQDN with a wildcard (for example, *.zyxel.com) can be used in these profiles as destination criteria only. An FQDN is resolved to its IP address using the DNS server configured on the Zyxel Device. If the Zyxel Device receives a DNS query for an FQDN and the Zyxel Device has an FQDN cache entry, the Zyxel Device can map the IP address in a DNS response without having to query a DNS name server.

This table lists the commands for address objects.

Table 205 address-object and address6-object Commands

COMMAND	DESCRIPTION
`show {address-object	address6-object	service-object	schedule-object} [`*`object_name`*`]`	Displays information about the specified object or all the objects of the specified type.
`address-object` *`object_name`* `{`*`ip`*`	`*`ip_range`*`	`*`ip_subnet`*`	fqdn `*`fqdn`*`| geography `*`country code`*`| interface-ip	interface-subnet	interface-gateway} {`*`interface_name`*`	`*`virtual interface name`*`}`	Creates the specified IPv4 address object using the specified parameters. *`ip`* <W.X.Y.Z> Enter an IPv4 address. *`ip_range`* <W.X.Y.Z>-<W.X.Y.Z> Enter an IPv4 address range. *`ip_subnet`* <W.X.Y.Z>/<1..32> Enter an IPv4 subnet. For example, 192.168.1.0/32. `fqdn` Enter a fully-qualified domain name. *`country code`* Enter a country code (represents an IP address for that country). interface-gateway / `interface-ip /interface-subnet Enter an `*`interface_name`*` or a `*`virtual_interface_name`*
`no address-object `*`object_name`*	Deletes the specified address object.
`address-object rename `*`object_name object_name`*	Renames the specified address (first *`object_name`*) to the second *`object_name`*.

Table 205 address-object and address6-object Commands (continued)

COMMAND	DESCRIPTION
`[no] address6-object` *`object_name`* `{`*`ipv6_address`* `|` *`ipv6_range`* `|` *`ipv6_subnet`*`}`	Creates the specified IPv6 address object using the specified parameters. The `no` command removes the specified address object. *`ipv6_address`*: IPv6 address *`ipv6_range`*: IPv6 address range. For example: fe80:1234::1-fe80:1234::ffff *`ipv6_subnet`*: IPv6 prefix format. For example: fe80::211:85ff:fe0e:dec/128
`[no] address6-object OBJECT_NAME interface-ip interface {dhcpv6 | link-local | slaac | static} {addr_index}`	Creates the specified IPv6 address object based on the specified interface object. Specify whether it is a DHCPv6 server, link-local IP address, StateLess Address Auto Configuration IP address (`slaac`), or static IPv6 address. The `no` command removes the specified address object.
`[no] address6-object` *`object_name`* `interface-subnet` *`interface`* `{dhcpv6 | slaac | static} {`*`addr_index`*`}`	Creates the specified IPv6 address object based on the specified interface subnet object. Specify whether it is a DHCPv6 server, SLAAC, or static IPv6 address. The `no` command removes the specified address object.
`[no]address6-object` *`object_name`* `interface-gateway` *`interface`* `{slaac | static} {`*`addr_index`*`}`	Creates the specified IPv6 address object based on the specified interface gateway object. Specify whether it is a SLAAC or static IPv6 address. The `no` command removes the specified address object.
`fqdn-object query-period` *`<1..1440>`*	Configures how long (1-1440 seconds) the Zyxel Device should wait for a reply from the DNS server configured on the Zyxel Device in order to update FQDN - IP cache entries.
`fqdn-object sync-period` *`<1..5>`*	Configures how often (1-5 seconds) the Zyxel Device should query the DNS server configured on the Zyxel Device to update FQDN - IP cache entries.
`fqdn-object test` *`fqdn`*	*`fqdn`* Tests an FQDN object by entering a fully-qualified domain name.
`show fqdn-object all`	Displays all FQDN objects with IPv4 addresses configured on the Zyxel Device.
`show fqdn-object6 all`	Displays all FQDN objects with IPv6 addresses configured on the Zyxel Device.
`show fqdn`	Displays the FQDN host name and domain name configured on the Zyxel Device.
`show fqdn-object query-period`	Displays how often (1-5 seconds) the Zyxel Device should query the DNS server configured on the Zyxel Device to update FQDN - IP cache entries.
`show fqdn-object sync-period`	Displays how often (1-5 seconds) the Zyxel Device should query the DNS server configured on the Zyxel Device to update FQDN - IP cache entries.

47.2.1.1 Address Object Command Examples

The following example creates three IPv4 address objects and then deletes one.

```
Router# configure terminal
Router(config)# address-object A0 192.168.1.1
Router(config)# address-object A1 192.168.1.1-192.168.1.20
Router(config)# address-object A2 192.168.1.0/24
Router(config)# show address-object
Object name                     Type    Address                         Ref.
=====================================================================
A0                              HOST    192.168.1.1                      0
A1                              RANGE   192.168.1.1-192.168.1.20      0
A2                              SUBNET 192.168.1.0/24                  0
Router(config)# no address-object A2
Router(config)# show address-object
Object name                     Type    Address                         Ref.
=====================================================================
A0                              HOST    192.168.1.1                      0
A1                              RANGE   192.168.1.1-192.168.1.20      0
```

The following example shows FQDN command usage.

```
Router# show fqdn
host name  : usg110
domain name: none
FQDN       : usg110
Router# show fqdn-object query-period
FQDN Object Query Period: 2
Router# show fqdn-object sync-period
FQDN Object Sync Period: 1
Router(config)# fqdn-object test usg110
FQDN: usg110
Address
===========================================================================
127.0.0.1

Router(config)#
```

The following example creates host, range, subnet, and link local IPv6 address objects and then deletes the subnet IPv6 address object.

```
> enable
Router# configure terminal
Router(config)# address6-object B0 fe80::211:85ff:fe0e:cdec
Router(config)# address6-object B1 fe80::211:85ff:fe0e:1-fe80::211:85ff:fe0e:ff
Router(config)# address6-object B2 fe80::211:85ff:fe0e:cdec/128
Router(config)# address6-object B3 interface-ip ge1 link-local
Router(config)# show address6-object
Object name                     Type              Address Type               Index
Address
Note            Ref.
========================================================================
B0                              HOST
fe80::211:85ff:fe0e:cdec
                0
B1                              RANGE
fe80::211:85ff:fe0e:1-fe80::211:85ff:fe0e:ff
                0
B2                              SUBNET
fe80::211:85ff:fe0e:cdec/128
                0
B3                              INTERFACE IP       LINK LOCAL                 1
fe80::213:49ff:feaa:cb88
ge1             0

Router(config)# no address6-object B2
Router(config)# show address6-object
Object name                     Type              Address Type               Index
Address
Note            Ref.
========================================================================
B0                              HOST
fe80::211:85ff:fe0e:cdec
                0
B1                              RANGE
fe80::211:85ff:fe0e:1-fe80::211:85ff:fe0e:ff
                0
B3                              INTERFACE IP       LINK LOCAL                 1
fe80::213:49ff:feaa:cb88
ge1             0
```

47.2.2 Address Group Commands

This table lists the commands for address groups.

Table 206 object-group Commands: Address Groups

COMMAND	DESCRIPTION
`show object-group {address	address6} [`*`group_name`*`]`	Displays information about the specified address group or about all address groups.
`[no] object-group address `*`group_name`*	Creates the specified address group if necessary and enters sub-command mode. The `no` command deletes the specified address group.

Table 206 object-group Commands: Address Groups (continued)

COMMAND	DESCRIPTION
`[no] address-object` *`object_name`*	Adds the specified address to the specified address group. The `no` command removes the specified address from the specified group.
`[no] object-group` *`group_name`*	Adds the specified address group (second *`group_name`*) to the specified address group (first *`group_name`*). The `no` command removes the specified address group from the specified address group.
`[no] description` *`description`*	Sets the description to the specified value. The `no` command clears the description. *`description`*: You can use alphanumeric and `()+/:=?!*#@$_%-` characters, and it can be up to 60 characters long.
`object-group address rename` *`group_name group_name`*	Renames the specified address group from the first *`group_name`* to the second *`group_name`*.

47.2.2.1 Address Group Command Examples

The following commands create three address objects A0, A1, and A2 and add A1 and A2 to address group RD.

```
Router# configure terminal
Router(config)# address-object A0 192.168.1.1
Router(config)# address-object A1 192.168.1.2-192.168.2.20
Router(config)# address-object A2 192.168.3.0/24
Router(config)# object-group address RD
Router(group-address)# address-object A1
Router(group-address)# address-object A2
Router(group-address)# exit
Router(config)# show object-group address
Group name                      Reference
Description
===========================================================================
TW_TEAM                         5

RD                              0

Router(config)# show object-group address RD
Object/Group name               Type   Reference
===========================================================================
A1                              Object 1
A2                              Object 1

```

47.2.3 FQDN Object

If the Zyxel Device receives a DNS query for an FQDN and the Zyxel Device has an FQDN cache entry, the Zyxel Device can map the IP address in a DNS response without having to query a DNS name server.

FQDN can be used in Security Policy, Policy Route, BWM and Web Authentication profiles as source and destination criteria. FQDN with a wildcard (for example, *.zyxel.com) can be used in these profiles as destination criteria only.

47.2.4 Geo IP

Use these commands to update the database of country-to-IP address mappings and manually configure custom country-to-IP address mappings in geographic address objects. You can then use geographic address objects in security policies to forward or deny traffic to whole countries or regions.

Note: You need to have a registered Content Filter 2.0 Service license to use the country-to-IP-address database.

47.2.5 FQDN / Geo IP Commands

You must be in configuration mode (`configure terminal`) to use the indented commands shown below.

Table 207 `FQDN / Geo IP` Commands

COMMAND	DESCRIPTION
`[no] geo-ip database update auto`	Enables the Zyxel Device to automatically check for the latest country-to-IP-address database version on myZyxel.com and allows it to be automatically updated when there is newer version available. The `no` command disallows the Zyxel Device automatically checking for the latest country-to-IP-address database version on myZyxel.com.
`geo-ip database update country`	Updates the country-to-IP-address database for all countries.
`geo-ip database update weekly {fri | mon | sat | sun | thu | tue | wed} <0..23>`	Specifies the weekly day and time the Zyxel Device should check for the latest country-to-IP-address database version on myZyxel.com if automatic checking is enabled.
`geo-ip [no] geography <country_code> all address {ipv4 | ip6}`	Creates a new geography-to-IP-address mapping for the specified country. Use `show geo-ip country-code` to see the 2-letter abbreviation for each country. The no command removes the new geography-to-IP-address mapping for the specified country.
`show geo-ip database update`	Shows if the country-to-IP address database is automatically updated and the schedule.
`show geo-ip database version`	`Shows the latest and current country-to-IP-address database version.`
`show geo-ip database version country`	`Shows the latest and current country-to-IP-address database version.`
`show geo-ip country-code`	`Shows the 2-letter abbreviation for each country.`
`show geo-ip geography`	`Shows customized country-to-IPv4-address mappings.`
`show geo-ip geography6`	`Shows customized country-to-IPv6-address mappings.`

47.2.6 Geo IP Command Examples

The following shows Geo IP command examples.

```
Router(config)# geo-ip database update auto
Router(config)# geo-ip database update weekly thu 17
Router(config)# exit
Router# show geo-ip database update
auto: yes
schedule: weekly at Thursday 17 o'clock
Router# show geo-ip database version
country latest version : 20150921
country current version : 20150921
Router# show geo-ip database version country
country latest version : 20150921
country current version : 20150921
Router# show geo-ip geography
Customize IPv4 to Geolocation:
Geolocation     Type       Address
Note
===============================================================================
Router# show geo-ip geography6
Customize IPv6 to Geolocation:
Geolocation     Type       Address
Note
===============================================================================
Router#
```

CHAPTER 48 Services

Use service objects to define TCP applications, UDP applications, and ICMP messages. You can also create service groups to refer to multiple service objects in other features.

48.1 Services Overview

See the appendices in the web configurator's User Guide for a list of commonly-used services.

48.2 Services Commands Summary

The following table describes the values required for many service object and service group commands. Other values are discussed with the corresponding commands.

Table 208 Input Values for Service Commands

LABEL	DESCRIPTION
group_name	The name of the service group. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
object_name	The name of the service. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.

The following sections list the service object and service group commands.

48.2.1 Service Object Commands

The first table lists the commands for service objects.

Table 209 service-object Commands: Service Objects

COMMAND	DESCRIPTION
`show service-object [`*object_name*`]`	Displays information about the specified service or about all the services.
`no service-object `*object_name*	Deletes the specified service.
`service-object `*object_name*` {tcp | udp} {eq <1..65535> | range <1..65535> <1..65535>}`	Creates the specified TCP service or UDP service using the specified parameters.

Table 209 service-object Commands: Service Objects (continued)

COMMAND	DESCRIPTION
`service-object` *`object_name`* `icmp` *`icmp_value`*	Creates the specified ICMP message using the specified parameters. *`icmp_value`*: <0..255> | alternate-address | conversion-error | echo | echo-reply | information-reply | information-request | mask-reply | mask-request | mobile-redirect | parameter-problem | redirect | router-advertisement | router-solicitation | source-quench | time-exceeded | timestamp-reply | timestamp-request | unreachable
`service-object` *`object_name`* `protocol <1..255>`	Creates the specified user-defined service using the specified parameters.
`service-object rename` *`object_name object_name`*	Renames the specified service from the first `object_name` to the second *`object_name`*.
`service-object` *`object_name`* `icmpv6 {<0..255> | neighbor-solicitation | router-advertisement | echo | packet-toobig | router-solicitation | echo-reply | parameter-problem | time-exceeded | neighbor-advertisement | redirect | unreachable}`	Creates the specified ICMPv6 message using the specified parameters.

48.2.1.1 Service Object Command Examples

The following commands create four services, displays them, and then removes one of them.

```
Router# configure terminal
Router(config)# service-object TELNET tcp eq 23
Router(config)# service-object FTP tcp range 20 21
Router(config)# service-object ICMP_ECHO icmp echo
Router(config)# service-object MULTICAST protocol 2
Router(config)# show service-object
Object name                 Protocol         Minmum port  Maxmum port  Ref.
=====================================================================TELNET
TCP               23            23            0
FTP                          TCP              20             21            0
ICMP_ECHO                   ICMP             0              0             0
MULTICAST                   2                 0              0             0
Router(config)# no service-object ICMP_ECHO
Router(config)# show service-object
Object name                 Protocol         Minmum port  Maxmum port  Ref.
=====================================================================TELNET
TCP               23            23            0
FTP                          TCP              20             21            0
MULTICAST                   2                 0              0             0
```

48.2.2 Service Group Commands

The first table lists the commands for service groups.

Table 210 object-group Commands: Service Groups

COMMAND	DESCRIPTION
`show object-group service` *`group_name`*	Displays information about the specified service group.
`[no] object-group service` *`group_name`*	Creates the specified service group if necessary and enters sub-command mode. The `no` command removes the specified service group.
`[no] service-object` *`object_name`*	Adds the specified service to the specified service group. The `no` command removes the specified service from the specified group.
`[no] object-group` *`group_name`*	Adds the specified service group (second *`group_name`*) to the specified service group (first *`group_name`*). The `no` command removes the specified service group from the specified service group.
`[no] description` *`description`*	Sets the description to the specified value. The `no` command removes the description. *`description`*: You can use alphanumeric and `()+/:=?!*#@$_%-` characters, and it can be up to 60 characters long.
`object-group service rename` *`group_name group_name`*	Renames the specified service group from the first *`group_name`* to the second *`group_name`*.

48.2.2.1 Service Group Command Examples

The following commands create service ICMP_ECHO, create service group SG1, and add ICMP_ECHO to SG1.

```
Router# configure terminal
Router(config)# service-object ICMP_ECHO icmp echo
Router(config)# object-group service SG1
Router(group-service)# service-object ICMP_ECHO
Router(group-service)# exit
Router(config)# show service-object ICMP_ECHO
Object name                   Protocol        Minmum port  Maxmum port  Ref.
===========================================================================
ICMP_ECHO                       ICMP             8            8            1
Router(config)# show object-group service SG1
Object/Group name               Type   Reference
===========================================================================
ICMP_ECHO                       Object 1
```

CHAPTER 49 Schedules

Use schedules to set up one-time and recurring schedules for policy routes, firewall rules, application patrol, and content filtering.

49.1 Schedule Overview

The Zyxel Device supports two types of schedules: one-time and recurring. One-time schedules are effective only once, while recurring schedules usually repeat.

Note: Schedules are based on the current date and time in the Zyxel Device.

One-time schedules begin on a specific start date and time and end on a specific stop date and time. One-time schedules are useful for long holidays and vacation periods.

Recurring schedules begin at a specific start time and end at a specific stop time on selected days of the week (Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, and Saturday). Recurring schedules always begin and end in the same day. Recurring schedules are useful for defining the workday and off-work hours.

49.2 Schedule Commands Summary

The following table describes the values required for many schedule commands. Other values are discussed with the corresponding commands.

Table 211 Input Values for Schedule Commands

LABEL	DESCRIPTION
object_name	The name of the schedule. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
time	24-hour time, hours and minutes; <0..23>:<0..59>.

The following table lists the schedule commands.

Table 212 schedule Commands

COMMAND	DESCRIPTION
`show schedule-object`	Displays information about the schedules in the Zyxel Device.
`no schedule-object` *object_name*	Deletes the schedule object.

Table 212 schedule Commands (continued)

COMMAND	DESCRIPTION
`schedule-object` *`object_name date time date time`*	Creates or updates a one-time schedule. *`date`*: yyyy-mm-dd date format; yyyy-<01..12>-<01..31>
`schedule-object` *`object_name time time`* [*`day`*] [*`day`*] [*`day`*] [*`day`*] [*`day`*] [*`day`*] [*`day`*]	Creates or updates a recurring schedule. *`day`*: 3-character day of the week; sun | mon | tue | wed | thu | fri | sat

49.2.1 Schedule Command Examples

The following commands create recurring schedule SCHEDULE1 and one-time schedule SCHEDULE2 and then delete SCHEDULE1.

```
Router# configure terminal
Router(config)# schedule-object SCHEDULE1 11:00 12:00 mon tue wed thu fri
Router(config)# schedule-object SCHEDULE2 2006-07-29 11:00 2006-07-31 12:00
Router(config)# show schedule-object
Object name                   Type      Start/End                       Ref.
============================================================================
SCHEDULE1                      Recurring 11:00/12:00 ===MonTueWedThuFri=== 0
SCHEDULE2                      Once      2006-07-29 11:00/2006-07-31 12:00 0

Router(config)# no schedule-object SCHEDULE1
Router(config)# show schedule-object
Object name                   Type      Start/End                       Ref.
============================================================================
SCHEDULE2                      Once      2006-07-29 11:00/2006-07-31 12:00 0
```

CHAPTER 50
AAA Server

This chapter introduces and shows you how to configure the Zyxel Device to use external authentication servers.

50.1 AAA Server Overview

You can use an AAA (Authentication, Authorization, Accounting) server to provide access control to your network.

The following lists the types of authentication server the Zyxel Device supports.

- Local user database

  The Zyxel Device uses the built-in local user database to authenticate administrative users logging into the Zyxel Device's web configurator or network access users logging into the network through the Zyxel Device. You can also use the local user database to authenticate VPN users.
- Directory Service (LDAP/AD)

  LDAP (Lightweight Directory Access Protocol)/AD (Active Directory) is a directory service that is both a directory and a protocol for controlling access to a network. The directory consists of a database specialized for fast information retrieval and filtering activities. You create and store user profile and login information on the external server.
- RADIUS

  RADIUS (Remote Authentication Dial-In User Service) authentication is a popular protocol used to authenticate users by means of an external or built-in RADIUS server. RADIUS authentication allows you to validate a large number of users from a central location.

50.2 Authentication Server Command Summary

This section describes the commands for authentication server settings.

50.2.1 ad-server Commands

The following table lists the `ad-server` commands you use to set the default AD server.

Table 213 ad-server Commands

COMMAND	DESCRIPTION
`show ad-server`	Displays the default AD server settings.
`[no] ad-server basedn` *`basedn`*	Sets a base distinguished name (DN) for the default AD server. A base DN identifies an AD directory. The `no` command clears this setting.

Table 213 ad-server Commands (continued)

COMMAND	DESCRIPTION
`[no] ad-server binddn` *`binddn`*	Sets the user name the Zyxel Device uses to log into the default AD server. The `no` command clears this setting.
`[no] ad-server cn-identifier` *`uid`*	Sets the unique common name (cn) to identify a record. The `no` command clears this setting.
`[no] ad-server host` *`ad_server`*	Sets the AD server address. Enter the IP address (in dotted decimal notation) or the domain name. The `no` command clears this setting.
`[no] ad-server password` *`password`*	Sets the bind password. This password will be encrypted when you use the `show ad-server` command to display. The `no` command clears this setting.
`[no] ad-server password-encrypted` *`password`*	Sets the encrypted password (less than 32 alphanumerical characters) in order to hide the real password from people behind you when you are configuring AD server password. This password is displayed as what you typed when you use the `show ad-server` command.
`[no] ad-server port` *`port_no`*	Sets the AD port number. Enter a number between 1 and 65535. The default is 389. The `no` command clears this setting.
`[no] ad-server search-time-limit` *`time`*	Sets the search timeout period (in seconds). Enter a number between 1 and 300. The `no` command clears this setting.
`[no] ad-server ssl`	Enables the Zyxel Device to establish a secure connection to the AD server. The `no` command disables this feature.

50.2.2 ldap-server Commands

The following table lists the `ldap-server` commands you use to set the default LDAP server.

Table 214 ldap-server Commands

COMMAND	DESCRIPTION
`show ldap-server`	Displays current LDAP server settings.
`[no] ldap-server basedn` *`basedn`*	Sets a base distinguished name (DN) for the default LDAP server. A base DN identifies an LDAP directory. The `no` command clears this setting.
`[no] ldap-server binddn` *`binddn`*	Sets the user name the Zyxel Device uses to log into the default LDAP server. The `no` command clears this setting.
`[no] ldap-server cn-identifier` *`uid`*	Sets the unique common name (cn) to identify a record. The `no` command clears this setting.
`[no] ldap-server host` *`ldap_server`*	Sets the LDAP server address. Enter the IP address (in dotted decimal notation) or the domain name. The `no` command clears this setting.
`[no] ldap-server password` *`password`*	Sets the bind password. The `no` command clears this setting.
`[no] ldap-server password-encrypted` *`password`*	Sets an encrypted bind password. The `no` command clears this setting.
`[no] ldap-server port` *`port_no`*	Sets the LDAP port number. Enter a number between 1 and 65535. The default is 389. The `no` command clears this setting.
`[no] ldap-server search-time-limit` *`time`*	Sets the search timeout period (in seconds). Enter a number between 1 and 300. The `no` command clears this setting.
`[no] ldap-server ssl`	Enables the Zyxel Device to establish a secure connection to the LDAP server. The `no` command disables this feature.

50.2.3 radius-server Commands

The following table lists the `radius-server` commands you use to set the default RADIUS server.

Table 215 radius-server Commands

COMMAND	DESCRIPTION
`show radius-server`	Displays the default RADIUS server settings.
`[no] radius-server host` *`radius_server`* `auth-port` *`auth_port`*	Sets the RADIUS server address and service port number. Enter the IP address (in dotted decimal notation) or the domain name of a RADIUS server. The `no` command clears the settings.
`[no] radius-server key` *`secret`*	Sets a password (up to 15 alphanumeric characters) as the key to be shared between the RADIUS server and the Zyxel Device. The `no` command clears this setting.
`[no] radius-server timeout` *`time`*	Sets the search timeout period (in seconds). Enter a number between 1 and 300. The `no` command clears this setting.

50.2.4 radius-server Command Example

The following example sets the secret key and timeout period of the default RADIUS server (172.23.10.100) to “87643210” and 80 seconds.

```
Router# configure terminal
Router(config)# radius-server host 172.23.10.100 auth-port 1812
Router(config)# radius-server key 876543210
Router(config)# radius-server timeout 80
Router(config)# show radius-server
host                : 172.23.10.100
authentication port: 1812
key                 : 876543210
timeout             : 80
Router(config)#
```

50.2.5 aaa group server ad Commands

The following table lists the `aaa group server ad` commands you use to configure a group of AD servers.

Table 216 aaa group server ad Commands

COMMAND	DESCRIPTION
`clear aaa group server ad [`*`group-name`*`]`	Deletes all AD server groups or the specified AD server group. Note: You can NOT delete a server group that is currently in use.
`show aaa group server ad` *`group-name`*	Displays the specified AD server group settings.
`[no] aaa group server ad` *`group-name`*	Sets a descriptive name for an AD server group. Use this command to enter the sub-command mode. The `no` command deletes the specified server group.
`aaa group server ad rename` *`group-name group-name`*	Changes the descriptive name for an AD server group.
`aaa group server ad` *`group-name`*	Enter the sub-command mode to configure an AD server group.

Table 216 aaa group server ad Commands (continued)

COMMAND	DESCRIPTION
`[no] case-sensitive`	Specify whether or not the server checks the username case. Set this to be the same as the server's behavior.
`[no] server alternative-cn-identifier uid`	Sets the second type of identifier that the users can use to log in if any. For example "name" or "e-mail address". The `no` command clears this setting.
`[no] server basedn basedn`	Sets the base DN to point to the AD directory on the AD server group. The `no` command clears this setting.
`[no] server binddn binddn`	Sets the user name the Zyxel Device uses to log into the AD server group. The `no` command clears this setting.
`[no] server cn-identifier uid`	Sets the user name the Zyxel Device uses to log into the AD server group. The `no` command clears this setting.
`[no] server description description`	Sets the descriptive information for the AD server group. You can use up to 60 printable ASCII characters. The `no` command clears the setting.
`[no] server group-attribute group-attribute`	Sets the name of the attribute that the Zyxel Device is to check to determine to which group a user belongs. The value for this attribute is called a group identifier; it determines to which group a user belongs. You can add ext-group-user user objects to identify groups based on these group identifier values. For example you could have an attribute named "memberOf" with values like "sales", "RD", and "management". Then you could also create an ext-group-user user object for each group. One with "sales" as the group identifier, another for "RD" and a third for "management". The `no` command clears the setting.
`[no] server host ad_server`	Enter the IP address (in dotted decimal notation) or the domain name of an AD server to add to this group. The `no` command clears this setting.
`[no] server password password`	Sets the bind password (up to 15 alphanumerical characters). The `no` command clears this setting.
`[no] server port port_no`	Sets the AD port number. Enter a number between 1 and 65535. The default is 389. The `no` command clears this setting.
`[no] server search-time-limit time`	Sets the search timeout period (in seconds). Enter a number between 1 and 300. The `no` command clears this setting and set this to the default setting of 5 seconds.
`[no] server ssl`	Enables the Zyxel Device to establish a secure connection to the AD server. The `no` command disables this feature.

50.2.6 aaa group server ldap Commands

The following table lists the `aaa group server ldap` commands you use to configure a group of LDAP servers.

Table 217 aaa group server ldap Commands

COMMAND	DESCRIPTION
`clear aaa group server ldap [group-name]`	Deletes all LDAP server groups or the specified LDAP server group. Note: You can NOT delete a server group that is currently in use.
`show aaa group server ldap group-name`	Displays the specified LDAP server group settings.
`[no] aaa group server ldap group-name`	Sets a descriptive name for an LDAP server group. Use this command to enter the sub-command mode. The `no` command deletes the specified server group.

Table 217   aaa group server ldap Commands (continued)

COMMAND	DESCRIPTION
`aaa group server ldap rename` *`group-name group-name`*	Changes the descriptive name for an LDAP server group.
`aaa group server ldap` *`group-name`*	Enter the sub-command mode.
`[no] case-sensitive`	Specify whether or not the server checks the username case. Set this to be the same as the server's behavior.
`[no] server alternative-cn-identifier` *`uid`*	Sets the second type of identifier that the users can use to log in if any. For example "name" or "e-mail address". The `no` command clears this setting.
`[no] server basedn` *`basedn`*	Sets the base DN to point to the LDAP directory on the LDAP server group. The `no` command clears this setting.
`[no] server binddn` *`binddn`*	Sets the user name the Zyxel Device uses to log into the LDAP server group. The `no` command clears this setting.
`[no] server cn-identifier` *`uid`*	Sets the user name the Zyxel Device uses to log into the LDAP server group. The `no` command clears this setting.
`[no] server description` *`description`*	Sets the descriptive information for the LDAP server group. You can use up to 60 printable ASCII characters. The `no` command clears this setting.
`[no] server group-attribute` *`group-attribute`*	Sets the name of the attribute that the Zyxel Device is to check to determine to which group a user belongs. The value for this attribute is called a group identifier; it determines to which group a user belongs. You can add ext-group-user user objects to identify groups based on these group identifier values. For example you could have an attribute named "memberOf" with values like "sales", "RD", and "management". Then you could also create an ext-group-user user object for each group. One with "sales" as the group identifier, another for "RD" and a third for "management". The `no` command clears the setting.
`[no] server host` *`ldap_server`*	Enter the IP address (in dotted decimal notation) or the domain name of an LDAP server to add to this group. The `no` command clears this setting.
`[no] server password` *`password`*	Sets the bind password (up to 15 characters). The `no` command clears this setting.
`[no] server port` *`port_no`*	Sets the LDAP port number. Enter a number between 1 and 65535. The default is 389. The `no` command clears this setting.
`[no] server search-time-limit` *`time`*	Sets the search timeout period (in seconds). Enter a number between 1 and 300. The `no` command clears this setting and set this to the default setting of 5 seconds.
`[no] server ssl`	Enables the Zyxel Device to establish a secure connection to the LDAP server. The `no` command disables this feature.

50.2.7 aaa group server radius Commands

The following table lists the `aaa group server radius` commands you use to configure a group of RADIUS servers.

Table 218   aaa group server radius Commands

COMMAND	DESCRIPTION
`clear aaa group server radius` *`group-name`*	Deletes all RADIUS server groups or the specified RADIUS server group. Note: You can NOT delete a server group that is currently in use.
`show aaa group server radius` *`group-name`*	Displays the specified RADIUS server group settings.

Table 218 aaa group server radius Commands (continued)

COMMAND	DESCRIPTION
`[no] aaa group server radius` *`group-name`*	Sets a descriptive name for the RADIUS server group. The `no` command deletes the specified server group.
`aaa group server radius rename {`*`group-name-old`*`}` *`group-name-new`*	Sets the server group name.
`aaa group server radius` *`group-name`*	Enter the sub-command mode.
`[no] case-sensitive`	Specify whether or not the server checks the username case. Set this to be the same as the server's behavior.
`[no] server description` *`description`*	Sets the descriptive information for the RADIUS server group. You can use up to 60 printable ASCII characters. The `no` command clears the setting.
`[no] server group-attribute <1-255>`	Sets the value of an attribute that the Zyxel Device is used to determine to which group a user belongs. This attribute's value is called a group identifier. You can add **ext-group-user** user objects to identify groups based on different group identifier values. For example, you could configure attributes 1,10 and 100 and create a **ext-group-user** user object for each of them. The `no` command clears the setting.
`[no] server host` *`radius_server`*	Enter the IP address (in dotted decimal notation) or the domain name of a RADIUS server to add to this server group. The `no` command clears this setting.
`[no] server key` *`secret`*	Sets a password (up to 15 alphanumeric characters) as the key to be shared between the RADIUS server(s) and the Zyxel Device. The `no` command clears this setting.
`[no] server timeout` *`time`*	Sets the search timeout period (in seconds). Enter a number between 1 and 300. The `no` command clears this setting and set this to the default setting of 5 seconds.

50.2.8 aaa group server Command Example

The following example creates a RADIUS server group with two members and sets the secret key to "12345678" and the timeout to 100 seconds. Then this example also shows how to view the RADIUS group settings.

```
Router# configure terminal
Router(config)# aaa group server radius RADIUSGroup1
Router(group-server-radius)# server host 192.168.1.100 auth-port 1812
Router(group-server-radius)# server host 172.23.22.100 auth-port 1812
Router(group-server-radius)# server key 12345678
Router(group-server-radius)# server timeout 100
Router(group-server-radius)# exit
Router(config)# show aaa group server radius RADIUSGroup1
key                : 12345678
timeout            : 100
description        :
group attribute    : 11

No.  Host Member                                                    Auth. Port

===========================================================================
1    192.168.1.100                                                    1812

2    172.23.22.100                                                    1812
```

CHAPTER 51
Authentication Objects

This chapter shows you how to select different authentication methods for user authentication using the AAA servers or the internal user database.

51.1 Authentication Objects Overview

After you have created the AAA server objects, you can specify the authentication objects (containing the AAA server information) that the Zyxel Device uses to authenticate users (using VPN or managing through HTTP/HTTPS).

51.2 aaa authentication Commands

The following table lists the `aaa authentication` commands you use to configure an authentication profile.

Table 219 aaa authentication Commands

COMMAND	DESCRIPTION
`aaa authentication rename` *`profile-name-old profile-name-new`*	Changes the profile name. *`profile-name`*: You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
`clear aaa authentication` *`profile-name`*	Deletes all authentication profiles or the specified authentication profile. Note: You can NOT delete a profile that is currently in use.
`show aaa authentication {`*`group-name`*`|default}`	Displays the specified authentication server profile settings.
`[no] aaa authentication` *`profile-name`*	Sets a descriptive name for the authentication profile. The `no` command deletes a profile.
`aaa authentication default` *`member1`* `[`*`member2`*`] [`*`member3`*`] [`*`member4`*`]`	Sets the default profile to use the authentication method(s) in the order specified. *`member`* = group ad, group ldap, group radius, or local. Note: You must specify at least one member for each profile. Each type of member can only be used once in a profile.

Table 219 aaa authentication Commands (continued)

COMMAND	DESCRIPTION
aaa authentication *profile-name member1* [*member2*] [*member3*] [*member4*]	Sets the profile to use the authentication method(s) in the order specified. *member* = group ad, group ldap, group radius, or local. Note: You must specify at least one member for each profile. Each type of member can only be used once in a profile.
aaa authentication [no] match-default-group	Enable this to treat a user successfully authenticated by a remote auth server as a defat-ext-user. If the remote authentication server is LDAP, the default-ext-user account is an ldap-user. If the remote authentication server is AD, the default-ext-user account is an ad-user. If the remote authentication server is RADIUS, the default-ext-user account is a radius-user.

51.2.1 aaa authentication Command Example

The following example creates an authentication profile to authentication users using the LDAP server group and then the local user database.

```
Router# configure terminal
Router(config)# aaa authentication LDAPuser group ldap local
Router(config)# show aaa authentication LDAPuser
No.  Method
===========================================================================
0    ldap
1    local
Router(config)#
```

51.3 test aaa Command

The following table lists the `test aaa` command you use to teat a user account on an authentication server.

Table 220 test aaa Command

COMMAND	DESCRIPTION
test aaa {server|secure-server} {ad|ldap} host {*hostname*|*ipv4-address*} [host {*hostname*|*ipv4-address*}] port <1..65535> base-dn *base-dn-string* [bind-dn *bind-dn-string* password *password*] login-name-attribute *attribute* [alternative-login-name-attribute *attribute*] account *account-name*	Tests whether a user account exists on the specified authentication server.

51.3.1 Test a User Account Command Example

The following example shows how to test whether a user account named userABC exists on the AD authentication server which uses the following settings:

- IP address: 172.16.50.1
- Port: 389
- Base-dn: DC=Zyxel,DC=com
- Bind-dn: zyxel\engineerABC
- Password: abcdefg
- Login-name-attribute: sAMAccountName

The result shows the account exists on the AD server. Otherwise, the Zyxel Device responds an error.

```
Router> test aaa server ad host 172.16.50.1 port 389 base-dn DC=Zyxel,DC=com
bind-dn zyxel\engineerABC password abcdefg login-name-attribute
sAMAccountName account userABC

dn:: Q049MTIzNzco546L5aOr56uRKSxPVT1XaXRoTWFpbCxEQz1aeVhFTCxEQz1jb20=
objectClass: top
objectClass: person
objectClass: organizationalPerson
objectClass: user
cn:: MTIzNzco546L5aOr56uRKQ==
sn: User
l: 2341100
--------------------------SNIP!---------------------------------------------
```

51.4 Two-Factor Authentication Commands

Use two-factor authentication to have double-layer security to access a secured network behind the Zyxel Device via a VPN tunnel. The first layer is the VPN client user name / password and the second layer is an authorized SMS (via mobile phone number) or email address.

1. A user runs a VPN client and logs in with the user name and password for this VPN tunnel.

2. The VPN tunnel is created from the VPN client device to the Zyxel Device.

3. The Zyxel Device requests the user’s user-name, password and mobile phone number or email address from the Active Directory, RADIUS server or local Zyxel Device database in order to authenticate this user's use of the VPN tunnel (factor 1). If they are not found, then the Zyxel Device terminates the VPN tunnel.

4. If all correct credentials are found, then the Zyxel Device will request the Cloud SMS system to send an authorization SMS or email to the client requesting VPN access (factor 2).

5. The client should access the authorization link sent via SMS or email by the Cloud SMS system within a specified deadline (`valid-time`).

6 If the authorization is correct and received on time, then the client can have VPN access to the secured network. If the authorization deadline has expired, then the client will have to run the VPN client again. If authorization credentials are incorrect or if the SMS/email was not received, then the client must check with the network administrator.

Pre-configuration

Before configuration, you must:

- Set up the user's user-name, password and email address or mobile number in the Active Directory, RADIUS server or local Zyxel Device database
- Configure the VPN tunnel for this user on the Zyxel Device
- Have an account with ViaNett to be able to send SMS authorization requests
- Enable HTTP and/or HTTPS
- Configure SMS and a mail server**.**

Two-Factor authentication may fail if one of the above is not configured or one of the below occurred.

- The user did not receive the authorization SMS or email. Check if the mobile telephone number or email address of the user in the Active Directory, RADIUS Server or local Zyxel Device database is configured correctly.
- ViaNett Authentication failed and no SMS was sent. Check that SMS is enabled on the Zyxel Device and credentials are correct.
- Mail server authentication failed. Check if the Mail Server settings are correct on the Zyxel Device.
- The authorization timed out. Extend the `valid-time`.

Use `configure terminal` to enter configuration mode. You can use the `show` command in enable mode.

Table 221 two-factor Authentication Commands

COMMAND	**DESCRIPTION**
`[no] two-factor-auth activate`	Enables double-layer security to access a secured network behind the Zyxel Device via a VPN tunnel. The `no` command disables double-layer security.
`[no] two-factor-auth valid-time <1..15>`	Sets the maximum time (1-15 minutes) that the VPN client user must click or tap the authorization link in the SMS or email in order to get authorization for the VPN connection. The `no` command sets the maximum time to 3.
`two-factor-auth server interface` *`interface_name`*	Sets the Zyxel Device WAN interface to be used for two-factor authentication. This is part of the link that the VPN client user will receive in the SMS or email. The VPN client user must be able to access the link. *`interface_name:`* See Section 14.2 on page 100 for information about interface names.
`two-factor-auth server user-defined {`*`ipv4`*`|`*`domain_name`*`}`	Sets the WAN IPv4 address or domain name to be used for two-factor authentication. This is part of the link that the VPN client user will receive in the SMS or email. The VPN client user must be able to access the link. *`domain_name`*: This name can be up to 254 alphanumeric characters long. Spaces are not allowed, but dashes "-" and underscores "_" are accepted. *`ipv4`*: IPv4 address <W.X.Y.Z>

Table 221   two-factor Authentication Commands (continued)

COMMAND	DESCRIPTION
`two-factor-auth sms message {message_quoted | message}`	Sets the SMS message the VPN client user will receive by SMS for two-factor authentication. Use <user>, <host>, <url>, and <time> (in angular brackets) as variables to display dynamic information. The message must contain the <url> variable. *message_quoted:* Put the actual message in quotes. *message:* Put the name of a file with the message. The message file must be named '2FA-msg.txt' and be in UTF-8 format.
`two-factor-auth message {message_quoted | message}`	Sets the SMS message the VPN client user will receive by email for two-factor authentication. Use <user>, <host>, <url>, and <time> (in angular brackets) as variables to display dynamic information. The message must contain the <url> variable. *message_quoted:* Put the actual message in quotes. *message:* Put the name of a file with the message. The message file must be named '2FA-msg.txt' and be in UTF-8 format.
`two-factor-auth message-type {default | file}`	Sets which message to be used for two-factor authentication. `default`: a message edited using the `two-factor-auth message` command or via the web configurator. `file`: a message file uploaded from your computer using the `two-factor-auth message` command or via the web configurator.
`[no] two-factor-auth deliver-method {sms | email}`	Sets the method to be used for two-factor authentication delivery to the VPN client user. The `no` command removes the method. • `SMS`: must contain a valid mobile telephone number. A valid mobile telephone number can be up to 20 characters in length, including the numbers 1~9 and the following characters in the square brackets [+*#()-]. • `email`: must contain a valid email address. A valid email address must contain the @ character. For example, this is a valid email address: abc@example.com.
`[no] two-factor-auth service {sslvpn|ipsec|l2tp}`	Sets which kinds of VPN tunnels require Two-Factor Authentication. You should have configured the VPN tunnel first. The `no` command removes the VPN tunnel type. • SSL VPN Access • IPSec VPN Access • L2TP/IPSec VPN Access
`[no] two-factor-auth user username`	Sets the users or user groups that require two-factor authentication. The user or user group accounts should be already created. The `no` command removes the users or user groups that require two-factor authentication.
`two-factor-auth allow-access-url-thru-tunnel [activate | deactivate]`	Allows access to the link that the user will receive in the SMS or email. The user must be able to access the link and the Zyxel Device must have http/https enabled with a WAN interface/IP address/domain-name defined. The `no` command removes access to the link.
`[no] two-factor-auth http activate`	Enables the VPN client user to access the two-factor authorization page using the http protocol. Use the `no` command to require the VPN client user to access the two-factor authorization page using the https protocol.
`show two-factor-auth`	Displays current two-factor command settings

51.4.1 Two-Factor Command Example

The following example shows current two-factor command settings.

```
Router# show two-factor-auth
 Activate : yes
 Valid Time : 3
 Auth Server Type : interface
 Auth Server : wan1
 Send Http Link : no
 Allow Access URL thru Tunnel : enable
 Deliver-Method-SMS : enable
 Deliver-Method-Email : enable
 Message-Type : default
 Message : <user>. You have initiated a VPN connection to a secured network
behind the <host>. Please click or tap the following link within <time>
minutes to get authorization for the VPN connection.
 Service : ipsec,sslvpn,l2tp
 Allowed User : any,
Router#
```

CHAPTER 52
Authentication Server

This chapter shows you how to configure the Zyxel Device as an authentication server for access points.

52.1 Authentication Server Overview

The Zyxel Device can also work as a RADIUS server to exchange messages with other APs for user authentication and authorization.

52.2 Authentication Server Commands

The following table lists the authentication server commands you use to configure the Zyxel Device's built-in authentication server settings.

Table 222 Command Summary: Authentication Server

COMMAND	DESCRIPTION
[no] auth-server activate	Sets the Zyxel Device to act as an authentication server for other RADIUS clients, such as APs. The no command sets the Zyxel Device to not act as an authentication server for other APs.
auth-server authentication *auth_method*	Specifies an authentication method used by the authentication server.
no auth-server authentication	Resets the authentication method used by the authentication server to the factory default (default).
[no] auth-server cert *certificate_name*	Specifies a certificate used by the authentication server (Zyxel Device). The no command resets the certificate used by the authentication server to the factory default (default). *certificate_name*: The name of the certificate. You can use up to 31 alphanumeric and ;'~!@#$%^&()_+[]{}',.=- characters.
[no] auth-server trusted-client *profile_name*	Creates a trusted RADIUS client profile. The no command deletes the specified profile. *profile-name*: You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
[no] activate	Enables the client profile. The no command disables the profile.
[no] ip address *ip subnet_mask*	Sets the client's IP address and subnet mask. The no command clears this setting.
[no] secret *secret*	Sets a password as the key to be shared between the Zyxel Device and the client. The no command clears this setting.

Table 222 Command Summary: Authentication Server (continued)

COMMAND	DESCRIPTION
`[no] description` *`description`*	Sets the description for the profile. The `no` command clears this setting. *`description`*: You can use alphanumeric and `()+/:=?!*#@$_%-` characters, and it can be up to 60 characters long.
`show auth-server status`	Displays the Zyxel Device's authentication server settings.
`show auth-server trusted-client`	Displays all RADIUS client profile settings.
`show auth-server trusted-client` *`profile_name`*	Displays the specified RADIUS client profile settings.

52.2.1 Authentication Server Command Examples

The following example shows you how to enable the authentication server feature on the Zyxel Device and sets a trusted RADIUS client profile. This example also shows you the authentication server and client profile settings.

```
Router# configure terminal
Router(config)# auth-server activate
Router(config)# auth-server trusted-client AP-1
Router(config-trusted-client-AP-1)# activate
Router(config-trusted-client-AP-1)# ip address 10.10.1.2 255.255.255.0
Router(config-trusted-client-AP-1)# secret 12345678
Router(config-trusted-client-AP-1)# exit
Router(config)# show auth-server status
activation: yes
authentication method: default
certificate: default
Router(config)# show auth-server trusted-client AP-1
Client: AP-1
  Activation: yes
  Description:
  IP: 10.10.1.2
  Netmask: 255.255.255.0
  Secret: VQEq907jWB8=
Router(config)#
```

CHAPTER 53 Certificates

This chapter explains how to use the **Certificates**.

53.1 Certificates Overview

The Zyxel Device can use certificates (also called digital IDs) to authenticate users. Certificates are based on public-private key pairs. A certificate contains the certificate owner's identity and public key. Certificates provide a way to exchange public keys for use in authentication.

A Certification Authority (CA) issues certificates and guarantees the identity of each certificate owner. There are commercial certification authorities like CyberTrust or VeriSign and government certification authorities. You can use the Zyxel Device to generate certification requests that contain identifying information and public keys and then send the certification requests to a certification authority.

53.2 Certificate Commands

This section describes the commands for configuring certificates.

53.3 Certificates Commands Input Values

The following table explains the values you can input with the `certificate` commands.

Table 223 Certificates Commands Input Values

LABEL	DESCRIPTION
certificate_name	The name of a certificate. You can use up to 31 alphanumeric and ;‘~!@#$%^&()_+[]{}’,.=- characters.
cn_address	A common name IP address identifies the certificate's owner. Type the IP address in dotted decimal notation.
cn_domain_name	A common name domain name identifies the certificate's owner. The domain name is for identification purposes only and can be any string. The domain name can be up to 255 characters. You can use alphanumeric characters, the hyphen and periods.
cn_email	A common name e-mail address identifies the certificate's owner. The e-mail address is for identification purposes only and can be any string. The e-mail address can be up to 63 characters. You can use alphanumeric characters, the hyphen, the @ symbol, periods and the underscore.
organizational_unit	Identify the organizational unit or department to which the certificate owner belongs. You can use up to 31 characters. You can use alphanumeric characters, the hyphen and the underscore.

Table 223 Certificates Commands Input Values (continued)

LABEL	DESCRIPTION
organization	Identify the company or group to which the certificate owner belongs. You can use up to 31 characters. You can use alphanumeric characters, the hyphen and the underscore.
country	Identify the nation where the certificate owner is located. You can use up to 31 characters. You can use alphanumeric characters, the hyphen and the underscore.
key_length	Type a number to determine how many bits the key should use (512, 768, 1024, 1536, 2048, 4096). The longer the key, the more secure it is. A longer key also uses more PKI storage space.
password	When you have the Zyxel Device enroll for a certificate immediately online, the certification authority may want you to include a key (password) to identify your certification request. Use up to 31 of the following characters. a-zA-Z0-9;|`~!@#$%^&*()_+\{}':,./<>=-
ca_name	When you have the Zyxel Device enroll for a certificate immediately online, you must have the certification authority's certificate already imported as a trusted certificate. Specify the name of the certification authority's certificate. It can be up to 31 alphanumeric and ;'~!@#$%^&()_+[]{}',.=- characters.
url	When you have the Zyxel Device enroll for a certificate immediately online, enter the IP address (or URL) of the certification authority server. You can use up to 511 of the following characters. a-zA-Z0-9'()+,/:.=?;!*#@$_%-
ipv4	Enter an IPv4 address.
ipv6	Enter an IPv6 address.

53.4 Certificates Commands Summary

The following table lists the commands that you can use to display and manage the Zyxel Device's summary list of certificates and certification requests. You can also create certificates or certification requests. Use the `configure terminal` command to enter the configuration mode to be able to use these commands.

Table 224 ca Commands Summary

COMMAND	DESCRIPTION
ca generate pkcs10 name *certificate_name* cn-type {ip cn *ipv4* | ipv6 cn *ipv6* |fqdn cn *cn_domain_name*|mail cn *cn_email*} [ou *organizational_unit*] [o *organization*] [c *country*] key-type {rsa|dsa|rsa-sha256|rsa-sha512|dsa-sha256} key-len *key_length*	Generates a PKCS#10 certification request.
ca generate pkcs12 name *name* password *password*	Generates a PKCS#12 certificate.
ca generate x509 name *certificate_name* cn-type {ip cn *ipv4* | ipv6 cn *ipv6* | fqdn cn *cn_domain_name* | mail cn *cn_email*} [ou *organizational_unit*] [o *organization*] [c *country*] key-type {rsa|dsa|rsa-sha256|rsa-sha512|dsa-sha256} key-len *key_length*	Generates a self-signed x509 certificate.
ca rename category {local|remote} *old_name* *new_name*	Renames a local (my certificates) or remote (trusted certificates) certificate.
ca validation *remote_certificate*	Enters the sub command mode for validation of certificates signed by the specified remote (trusted) certificates.

Table 224 ca Commands Summary (continued)

COMMAND	DESCRIPTION
cdp {activate|deactivate}	Turns certificate revocation on or off. When it is turned on, the Zyxel Device validates a certificate by getting a Certificate Revocation List (CRL) through HTTP or LDAP (can be configured after activating the LDAP checking option) and online responder (can be configured after activating the OCSP checking option). You also need to configure the OSCP or LDAP server details.
ldap {activate|deactivate}	Has the Zyxel Device check (or not check) incoming certificates that are signed by this certificate against a Certificate Revocation List (CRL) on a LDAP (Lightweight Directory Access Protocol) directory server.
ldap ip {*ip*|*fqdn*} port <1..65535> [id *name* password *password*] [deactivate]	Sets the validation configuration for the specified remote (trusted) certificate where the directory server uses LDAP. *ip*: Type the IP address (in dotted decimal notation) or the domain name of the directory server. The domain name can use alphanumeric characters, periods and hyphens. Up to 255 characters. port: Specify the LDAP server port number. You must use the same server port number that the directory server uses. 389 is the default server port number for LDAP. The Zyxel Device may need to authenticate itself in order to access the CRL directory server. Type the login name (up to 31 characters) from the entity maintaining the server (usually a certification authority). You can use alphanumeric characters, the underscore and the dash. Type the password (up to 31 characters) from the entity maintaining the CRL directory server (usually a certification authority). You can use the following characters: a-zA-Z0-9;|`~!@#$%^&*()_+\{}':,./<>=-
ocsp {activate|deactivate}	Has the Zyxel Device check (or not check) incoming certificates that are signed by this certificate against a directory server that uses OCSP (Online Certificate Status Protocol).
ocsp url *url* [id *name* password *password*] [deactivate]	Sets the validation configuration for the specified remote (trusted) certificate where the directory server uses OCSP. *url*: Type the protocol, IP address and pathname of the OCSP server. name: The Zyxel Device may need to authenticate itself in order to access the OCSP server. Type the login name (up to 31 characters) from the entity maintaining the server (usually a certification authority). You can use alphanumeric characters, the underscore and the dash. password: Type the password (up to 31 characters) from the entity maintaining the OCSP server (usually a certification authority). You can use the following characters: a-zA-Z0-9;|`~!@#$%^&*()_+\{}':,./<>=-
no ca category {local|remote} *certificate_name*	Deletes the specified local (my certificates) or remote (trusted certificates) certificate.
no ca validation *name*	Removes the validation configuration for the specified remote (trusted) certificate.
show ca category {local|remote} name *certificate_name* certpath	Displays the certification path of the specified local (my certificates) or remote (trusted certificates) certificate.

Table 224 ca Commands Summary (continued)

COMMAND	DESCRIPTION
`show ca category {local|remote} [name` *`certificate_name`* `format {text|pem}]`	Displays a summary of the certificates in the specified category (local for my certificates or remote for trusted certificates) or the details of a specified certificate.
`show ca validation name` *`name`*	Displays the validation configuration for the specified remote (trusted) certificate.
`show ca spaceusage`	Displays the storage space in use by certificates.

53.5 Certificates Commands Examples

The following example creates a self-signed X.509 certificate with IP address 10.0.0.58 as the common name. It uses the RSA key type with a 512 bit key. Then it displays the list of local certificates. Finally it deletes the pkcs12request certification request.

```
Router# configure terminal
Router(config)# ca generate x509 name test_x509 cn-type ip cn 10.0.0.58 key-
type rsa key-len 512
Router(config)# show ca category local
certificate: default
  type: SELF
  subject: CN=ZyWALL-1050_Factory_Default_Certificate
  issuer: CN=ZyWALL-1050_Factory_Default_Certificate
  status: VALID
  ID: ZyWALL-1050_Factory_Default_Certificate
    type: EMAIL
  valid from: 2003-01-01 00:38:30
  valid to: 2022-12-27 00:38:30
certificate: test
  type: REQ
  subject: CN=1.1.1.1
  issuer: none
  status: VALID
  ID: 1.1.1.1
    type: IP
  valid from: none
  valid to: none
certificate: pkcs12request
  type: REQ
  subject: CN=1.1.1.2
  issuer: none
  status: VALID
  ID: 1.1.1.2
    type: IP
  valid from: none
  valid to: none
certificate: test_x509
  type: SELF
  subject: CN=10.0.0.58
  issuer: CN=10.0.0.58
  status: VALID
  ID: 10.0.0.58
    type: IP
  valid from: 2006-05-29 10:26:08
  valid to: 2009-05-28 10:26:08
Router(config)# no ca category local pkcs12request
```

CHAPTER 54
ISP Accounts

Use ISP accounts to manage Internet Service Provider (ISP) account information for PPPoE, PPTP and cellular interfaces.

54.1 ISP Accounts Overview

An ISP account is a profile of settings for Internet access using PPPoE, PPTP, or cellular.

54.1.1 PPPoE and PPTP Account Commands

The following table lists the PPPoE and PPTP ISP account commands.

Table 225 PPPoE and PPTP ISP Account Commands

COMMAND	DESCRIPTION
`show account [pppoe profile_name | pptp profile_name]`	Displays information about the specified account(s).
`[no] account {pppoe | pptp} profile_name`	Creates a new ISP account with name *profile_name* if necessary and enters sub-command mode. The no command deletes the specified ISP account. *profile_name*: use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
`encrypted-password ciphertext`	Sets a encrypted secret for the specified account. *ciphertext*:
`[no] user username`	Sets the username for the specified ISP account. The no command clears the username. *username*: You can use alphanumeric, underscores (_), dashes (-), commas (,), and /@$ characters, and it can be up to 64 characters long.
`[no] password password`	Sets the password for the specified ISP account. The no command clears the password. *password*: You can use up to 63 printable ASCII characters. Spaces are not allowed.
`[no] authentication {chap-pap | chap | pap | mschap | mschap-v2}`	Sets the authentication for the specified ISP account. The no command sets the authentication to chap-pap.
`[no] compression {yes | no}`	Turns compression on or off for the specified ISP account. The no command turns off compression.
`[no] idle <0..360>`	Sets the idle timeout for the specified ISP account. The no command sets the idle timeout to zero.

Table 225 PPPoE and PPTP ISP Account Commands (continued)

COMMAND	DESCRIPTION
`[no] service-name {ip | hostname | service_name}`	Sets the service name for the specified PPPoE ISP account. The `no` command clears the service name. *hostname*: You may up to 63 alphanumeric characters, dashes (-), or periods (.), but the first character cannot be a period. *service_name*: You can use up to 63 alphanumeric characters, underscores (_), dashes (-), and @$./ characters.
`[no] server ip`	Sets the PPTP server for the specified PPTP ISP account. The `no` command clears the server name.
`[no] encryption {nomppe | mppe-40 | mppe-128}`	Sets the encryption for the specified PPTP ISP account. The `no` command sets the encryption to nomppe.
`[no] connection-id connection_id`	Sets the connection ID for the specified PPTP ISP account. The `no` command clears the connection ID. *connection_id*: You can use up to 31 alphanumeric characters, underscores (_), dashes (-), and colons (:).

54.1.2 Cellular Account Commands

The following table lists the cellular ISP account commands.

Table 226 Cellular Account Commands

COMMAND	DESCRIPTION
`show account cellular profile_name`	Displays information about the specified account.
`[no] account cellular profile_name`	Creates a new cellular ISP account with name *profile_name* if necessary and enters sub-command mode. The `no` command deletes the specified ISP account. *profile_name*: the cellular ISP account name format is “cellularx” where “x” is a number. For example, cellular1.
`[no] apn access_point_name`	Sets the Access Point Name (APN) for the cellular ISP account. The `no` command clears the APN. *access_point_name*: Use up to 63 alphanumeric characters and underscores (_), dashes (-), periods (.), and /@\$#.
`[no] dial-string isp_dial_string`	Sets the dial string for the specified ISP account. The `no` command clears the dial-string. *isp_dial_string*: Use up to 63 alphanumeric characters and underscores (_), dashes (-), periods (.), and /@\$#.
`[no] user username`	Sets the username for the specified ISP account. The `no` command clears the username. *username*: Use up to 64 alphanumeric characters and underscores (_), dashes (-), periods (.), and /@\$#.
`[no] password password`	Sets the password for the specified ISP account. The `no` command clears the password. *password*: Use up to 63 printable ASCII characters. Spaces are not allowed.
`[no] authentication {none | pap | chap}`	Sets the authentication for the cellular account. The `no` command sets the authentication to none.
`[no] idle <0..360>`	Sets the idle timeout for the cellular account. Zero disables the idle timeout. The `no` command sets the idle timeout to zero.

CHAPTER 55
SSL Application

This chapter describes how to configure SSL application objects for use in SSL VPN.

55.1 SSL Application Overview

Configure an SSL application object to specify a service and a corresponding IP address of the server on the local network. You can apply one or more SSL application objects in the **VPN > SSL VPN** screen for a user account/user group.

55.1.1 SSL Application Object Commands

This table lists the commands for creating SSL application objects. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 227 SSL Application Object Commands

COMMAND	DESCRIPTION
`show sslvpn application [`*`application_object`*`]`	Displays SSL VPN application objects.
`[no] sslvpn application `*`application_object`*	Enters the sub-command mode to create an SSL VPN application object.
`server-type {file-sharing | owa | web-server} url URL [entry-point `*`entry_point`*`]`	Specify the type of service for this SSL application. `file-sharing`: create a file share application for SSL VPN. `owa`: (Outlook Web Access) to allow users to access e-mails, contacts, calenders via an Microsoft Outlook-like interface using supported web browsers. The Zyxel Device supports one OWA object. `web-server`: to allow access to the specified web site hosted on the local network. `url`: Enter the fully qualified domain name (FQDN) or IP address of the application server. You must enter the “http://” or “https://” prefix. Remote users are restricted to access only files in this directory. For example, if you enter “\remote\” in this field, remote users can only access files in the “remote” directory. *`entry-point`*: optional. Specify the name of the directory or file on the local server as the home page or home directory on the user screen.

Table 227 SSL Application Object Commands

COMMAND	DESCRIPTION
`server-type file-sharing share-path` *`share-path`*	Specifies the IP address, domain name or NetBIOS name (computer name) of the file server and the name of the share to which you want to allow user access. Enter the path in one of the following formats. "\\<IP address>\<share name>" "\\<domain name>\<share name>" "\\<computer name>\<share name>" For example, if you enter "\\my-server\Tmp", this allows remote users to access all files and/or folders in the "\Tmp" share on the "my-server" computer.
`server-type rdp server-address` *`server-address`* `[starting-port <1..65535> ending-port <1..65535>] [program-path` *`program-path`*`]`	Creates an SSL application object to allow users to manage LAN computers that have Remote Desktop Protocol remote desktop server software installed. Specify the listening ports of the LAN computer(s) running remote desktop server software. The Zyxel Device uses a port number from this range to send traffic to the LAN computer that is being remotely managed. *`program-path`*: specify an application to open when a remote user logs into the remote desktop application.
`server-type vnc server-address` *`server-address`* `[starting-port <1..65535> ending-port <1..65535>]`	Creates an SSL application object to allow users to manage LAN computers that have Virtual Network Computing remote desktop server software installed. Specify the listening ports of the LAN computer(s) running remote desktop server software. The Zyxel Device uses a port number from this range to send traffic to the LAN computer that is being remotely managed.
`server-type weblink url` *`url`*	Sets this to create a link to a web site you specified that you expect the SSL VPN users to commonly use. *`url`*: Enter the fully qualified domain name (FQDN) or IP address of the application server. You must enter the "http://" or "https://" prefix. For example, `https://1.2.3.4`. SSL VPN users are restricted to access only web pages or files in this directory. For example, if you enter "\remote\" in this field, remote users can only access web pages or files in the "remote" directory. If a link contains a file that is not within this domain, then SSL VPN users cannot access it.
`no server-type`	Remove the type of service configuration for this SSL application.
`[no] webpage-encrypt`	Turn on web encrypt to prevent users from saving the web content.

55.1.2 SSL Application Command Examples

The following commands create and display a server-type SSL application object named ZW5 for a web server at IP address 192.168.1.12.

```
Router(config)# sslvpn application ZW5
Router(sslvpn application)# server-type web-server url http://192.168.1.12
Router(sslvpn application)# exit
Router(config)# show sslvpn application
SSL Application: ZW5
  Server Type: web-server
  URL: http://192.168.1.12
  Entry Point:
  Encrypted URL: ~aHR0cDovLzE5Mi4xNjguMS4xMi8=/
  Web Page Encryption: yes
  Reference: 1
```

CHAPTER 56
DHCPv6 Objects

This chapter describes how to configure and view DHCPv6 request and lease objects.

56.1 DHCPv6 Object Commands Summary

The following table identifies the values required for many DHCPv6 object commands. Other input values are discussed with the corresponding commands.

Table 228 DHCPv6 Object Command Input Values

LABEL	DESCRIPTION
dhcp6_profile	The name of a DHCPv6 request object. Use a string of less than 31 characters.
interface_name	The name of the interface. This depends on the Zyxel Device model. For some models, use ge*x*, *x* = 1 ~ N, where N equals the highest numbered Ethernet interface for your Zyxel Device model. For other models, use a name such as wan1, wan2, opt, lan1, or dmz.

The following sections list the DHCPv6 object commands.

56.1.1 DHCPv6 Object Commands

This table lists the commands for DHCPv6 objects. Use the `configure terminal` command to enter the configuration mode to be able to use the commands that configure settings.

Table 229 DHCPv6 Object Commands

COMMAND	DESCRIPTION
`show ipv6 dhcp6 binding`	Displays the server side IPv6/DUID binding lease.
`show dhcp6 interface`	Displays all DHCPv6 server, client and relay interfaces.
`show dhcp6 lease-object [`*`dhcp6_profile`*`]`	Displays the specified DHCPv6 lease object or all of them.
`show dhcp6 object-binding `*`interface_name`*	Displays the DHCPv6 object bound to the specified interface.
`show dhcp6 request-object [`*`dhcp6_profile`*`]`	Displays the specified DHCPv6 request object or all of them.
`dhcp6-lease-object `*`dhcp6_profile`*` address `*`ipv6_addr`*` duid `*`duid`*	Creates or edits the specified DHCP lease object with the specified IPv6 address and DHCP Unique IDentifier (DUID).
`dhcp6-lease-object `*`dhcp6_profile`*` prefix-delegation `*`ipv6_addr_prefix`*` duid `*`duid`*	Creates or edits the specified pre-fix delegation DHCP lease object with the specified IPv6 address prefix and DUID.
`dhcp6-lease-object `*`dhcp6_profile`*` address-`*`ipv6_addr ipv6_addr`*	Creates or edits the specified DHCP lease object address with the specified IPv6 address range.

Table 229 DHCPv6 Object Commands (continued)

COMMAND	DESCRIPTION
dhcp6-lease-object *dhcp6_profile* { sip-server | ntp-server | dns-server } { *ipv6_addr* | *dhcp6_profile* }	Creates or edits the specified SIP server, NTP server, or DNS server DHCP lease object with the specified IPv6 address. When you assign a request object, the lease object value will be the request object value retrieved from the DHCPv6 server.
dhcp6-lease-object rename *dhcp6_profile* *dhcp6_profile*	Renames the specified DHCPv6 lease object to the specified name.
no dhcp6-lease-object *dhcp6_profile*	Deletes the specified DHCPv6 lease object.
dhcp6-request-object *dhcp6_profile* { dns-server | ntp-server | prefix-delegation | sip-server }	Creates or edits the specified SIP server, DNS server, NTP server, prefix-delegation, or SIP server DHCP request object.
dhcp6-request-object rename *dhcp6_profile* *dhcp6_profile*	Renames the specified DHCPv6 request object to the specified name.
no dhcp6-request-object *dhcp6_profile*	Deletes the specified DHCPv6 request object.

56.1.2 DHCPv6 Object Command Examples

This example creates and displays a DHCPv6 lease object named “test1” for IPv6 address 2003::1 with DUID 00:01:02:03:04:05:06:07.

```
Router(config)# dhcp6-lease-object test1 address 2003::1 duid
00:01:02:03:04:05:06:07
Router(config)# show dhcp6 lease-object
DHCP6 Lease Object: test1
  Object Type: address
  Object Value: 2003::1
  DUID: 00:01:02:03:04:05:06:07
  Bind Iface:
  REFERENCE: 0
```

This example makes “test1” into a DHCPv6 address lease object for IPv6 addresses 2004::10 to 2004::40.

```
Router(config)# dhcp6-lease-object test1 address- 2004::10 2004::40
Router(config)# show dhcp6 lease-object
DHCP6 Lease Object: test1
  Object Type: address-
  Object Value: 2004::10
  Ext Object Value: 2004::40
  Bind Iface:
  REFERENCE: 0
```

This example creates and displays a DHCPv6 prefix delegation lease object named “pfx” for IPv6 address prefix 2005::/64 and DUID 00:01:02:03:04:05:06:07, then renames it to “pd”.

```
Router(config)# dhcp6-lease-object pfx prefix-delegation 2005::/64 duid
00:01:02:03:04:05:06:07
Router(config)# show dhcp6 lease-object pfx
DHCP6 Lease Object: pfx
  Object Type: prefix-delegation
  Object Value: 2005::/64
  DUID: 00:01:02:03:04:05:06:07
  Bind Iface:
  REFERENCE: 0
Router(config)# dhcp6-lease-object rename pfx pd
Router(config)# show dhcp6 lease-object pd
DHCP6 Lease Object: pd
  Object Type: prefix-delegation
  Object Value: 2005::/64
  DUID: 00:01:02:03:04:05:06:07
  Bind Iface:
  REFERENCE: 0
```

This example deletes the “test1” DHCPv6 lease object.

```
Router(config)# no dhcp6-lease-object test1
```

This example creates a DHCPv6 prefix delegation request object named “pfx” and displays its settings.

```
Router(config)# dhcp6-request-object pfx prefix-delegation
Router(config)# show dhcp6 request-object
DHCP6 Request Object: pfx
  Object Type: prefix-delegation
  Object Value: 2089:3::/48
  Bind Iface: ge2
  REFERENCE: 1
```

CHAPTER 57
Dynamic Guest Accounts

57.1 Dynamic Guest Accounts Overview

Dynamic guest accounts are guest accounts, but are created dynamically and stored in the Zyxel Device's local user database. A dynamic guest account has a dynamically-created user name and password. A dynamic guest account user can access the Zyxel Device's services only within a given period of time and will become invalid after the expiration date/time.

There are three types of dynamic guest accounts depending on how they are created or authenticated: billing-users, ua-users and trial-users.

billing-users are guest account created with the `dynamic-guest generate` command or the guest manager account or an external printer and paid by cash or created and paid via the on-line payment service.

ua-users are users that log in from the user agreement page.

trial-users are free guest accounts that are created with the `dynamic-guest generate-freeuser` command or the Free Time function.

57.2 Dynamic-guest Commands

This table lists the `dynamic-guest` commands. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 230 dynamic-guest Commands

COMMAND	DESCRIPTION
`dynamic-guest freeuser` *`user_name`*	Creates a free dynamic guest account (trial-user) with the specified user name and enters the dynamic-guest sub-command mode to set the password and timeout settings. See Table 231 on page 389 for the sub-commands.
`dynamic-guest generate`	Sets the Zyxel Device to automatically create a dynamic guest account (billing-user) and enters the dynamic-guest sub-command mode to set the password and timeout settings. See Table 231 on page 389 for the sub-commands.
`dynamic-guest generate-freeuser`	Sets the Zyxel Device to automatically create a free dynamic guest account (trial-user) and enters the dynamic-guest sub-command mode to set the password and timeout settings. See Table 231 on page 389 for the sub-commands.
`[no] dynamic-guest` *`user_name`*	Creates a dynamic guest account (billing-user) with the specified user name and enters the dynamic-guest sub-command mode to set the password and timeout settings. See Table 231 on page 389 for the sub-commands. The `no` command removes the specified dynamic-guest account.
`show dynamic-guest log`	Displays all the dynamic guest accounts which are either active or expired.

Table 230 dynamic-guest Commands (continued)

COMMAND	DESCRIPTION
show dynamic-guest log create-time begin *yyyy-mm-dd hh:mm* end *yyyy-mm-dd hh:mm*	Displays all the active and/or expired dynamic guest accounts that were generated within a specified period of time.
show dynamic-guest users	Displays all the active dynamic guest accounts on the Zyxel Device.

57.2.1 dynamic-guest Sub-commands

The following table describes the sub-commands for several `dynamic-guest` commands. Note that not all rule commands use all the sub-commands listed here.

Table 231 dynamic-guest Sub-commands

COMMAND	DESCRIPTION
bandwidth {upload | download} <0..1048576> priority <1..7>	Specifies the maximum bandwidth allowed for the user account in kilobits per second and types a number between 1 and 7 to set the priority for the user's traffic. The smaller the number, the higher the priority. `upload` refers to the traffic the Zyxel Device sends out from a user. `download` refers to the traffic the Zyxel Device sends to a user.
[no] bandwidth activate	Turns on bandwidth management for the user account. The `no` command disables bandwidth management for the user account.
charge *price*	Sets the account's price, up to 99999999.99, per time unit.
create-time *yyyy-mm-dd hh:mm*	Sets the date and time the account is created.
expire-time *yyyy-mm-dd hh:mm*	Sets the date and time the account becomes invalid.
password *password*	Sets the password for the account.
payment-info {cash | payment-service}	Sets the method of payment for the account.
phone *phone_number*	Sets the mobile phone number for the account.
quota {total | upload | download} megabytes <0..1023>	Sets how much downstream and/or upstream data in Megabytes can be transmitted through the external interface before the account expires. 0 means there is no data limit for the user account.
quota {total | upload | download} gigabytes <0..100>	Sets how much downstream and/or upstream data in Gigabytes can be transmitted through the external interface before the account expires. 0 means there is no data limit for the user account.
quota type {total | upload-download}	Sets a limit for the user account. This only applies to user's traffic that is received or transmitted through the external interface. Note: When the limit is exceeded, the user is not allowed to access the Internet through the Zyxel Device. `total`: set a limit on the total traffic in both directions. `upload-download`: set a limit on the upstream traffic and downstream traffic respectively.
remaining-time <1..25920000>	Sets the amount of Internet access time (in seconds) remaining for the account.
time-period <1..432000>	Sets the total account of time (in minutes) the account can use to access the Internet through the Zyxel Device.
replenish enable	Reloads the quota of a specific dynamic user's account.

57.2.2 Dynamic-guest Command Example

This example shows how to create a dynamic guest account, configure the account related settings and displays the account information.

```
Router# configure terminal
Router(config)# dynamic-guest generate
[dynamic guest] username:gn0ti7, password:ihzun7
Router(config-dynamic-guest)# charge 5
Router(config-dynamic-guest)# expire-time 2013-06-26 14:00
Router(config-dynamic-guest)# payment-info cash
Router(config-dynamic-guest)# phone 0912345678
Router(config-dynamic-guest)# time-period 1440
Router(config-dynamic-guest)# remaining-time 86400
Router(config-dynamic-guest)# create-time 2013-06-25 14:03
Router(config-dynamic-guest)# exit
Router(config)# show dynamic-guest users
No.   Status     Username   Create Time            Expiration Time
     Time Period          Remaining Time       Charge        ayment Info
Phone Num
     User Role
===========================================================================
=========
1     Unused     gn0ti7    2013-06-25 14:03        2013-06-26 14:00
     1day 00:00:00        1day 00:00:00        eur 5,00        cash
0912345678
     billing-users
Router(config)#
```

CHAPTER 58 System

This chapter provides information on the commands that correspond to what you can configure in the system screens.

58.1 System Overview

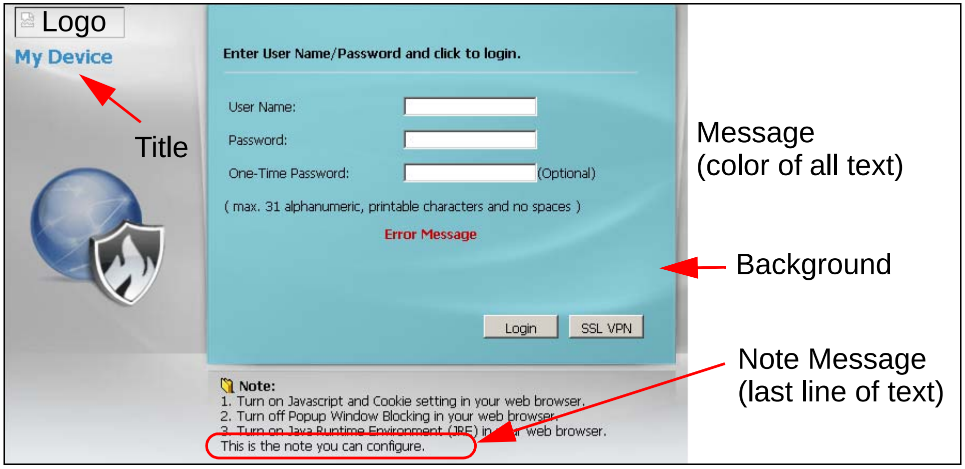
Use these commands to configure general Zyxel Device information, the system time and the console port connection speed for a terminal emulation program. They also allow you to configure DNS settings and determine which services/protocols can access which Zyxel Device zones (if any) from which computers.

58.2 Customizing the WWW Login Page

Use these commands to customize the Web Configurator login screen. You can also customize the page that displays after an access user logs into the Web Configurator to access network services like the Internet. See Chapter 45 on page 337 for more on access user accounts.

The following figures identify the parts you can customize in the login and access pages.

Figure 26 Login Page Customization



Enter User Name/Password and click to login.

User Name:

Password:

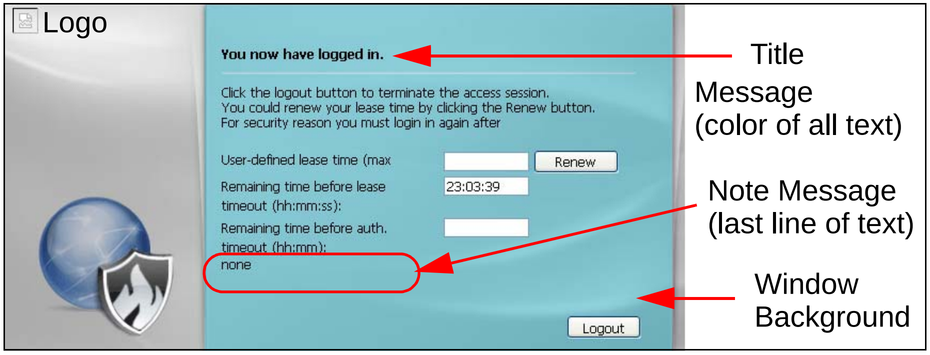
One-Time Password: (Optional)

(max. 31 alphanumeric, printable characters and no spaces)

Error Message

Note:
1. Turn on Javascript and Cookie setting in your web browser.
2. Turn off Popup Window Blocking in your web browser.
3. Turn on Java Runtime Environment (JRE) in your web browser.
This is the note you can configure.

Figure 27 Access Page Customization



You now have logged in.

Click the logout button to terminate the access session.
You could renew your lease time by clicking the Renew button.
For security reason you must login in again after

User-defined lease time (max

Remaining time before lease timeout (hh:mm:ss): 23:03:39

Remaining time before auth. timeout (hh:mm):

none

You can specify colors in one of the following ways:

- *`color-rgb`*: Enter red, green, and blue values in parenthesis and separate by commas. For example, use “rgb(0,0,0)” for black.
- *`color-name`*: Enter the name of the desired color.
- *`color-number`*: Enter a pound sign (#) followed by the six-digit hexadecimal number that represents the desired color. For example, use “#000000” for black.

The following table describes the commands available for customizing the Web Configurator login screen and the page that displays after an access user logs into the Web Configurator to access network services like the Internet. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 232   Command Summary: Customization

COMMAND	**DESCRIPTION**
`[no] access-page color-window-background`	Sets whether or not the access page uses a colored background.
`access-page message-color {`*`color-rgb`*` | `*`color-name`*` | `*`color-number`*`}`	Sets the color of the message text on the access page.
`[no] access-page message-text `*`message`*	Sets a note to display below the access page’s title. Use up to 64 printable ASCII characters. Spaces are allowed.
`access-page title `*`title`*	Sets the title for the top of the access page. Use up to 64 printable ASCII characters. Spaces are allowed.
`access-page window-color {`*`color-rgb`*` | `*`color-name`*` | `*`color-number`*`}`	Sets the color of the access page’s colored background.
`login-page background-color {`*`color-rgb`*` | `*`color-name`*` | `*`color-number`*`}`	Sets the color of the login page’s background.
`[no] login-page color-background`	Sets the login page to use a solid colored background.
`[no] login-page color-window-background`	Sets the login page’s window to use a solid colored background.
`login-page message-color {`*`color-rgb`*` | `*`color-name`*` | `*`color-number`*`}`	Sets the color of the message text on the login page.
`[no] login-page message-text % `*`message`*	Sets a note to display at the bottom of the login screen. Use up to 64 printable ASCII characters. Spaces are allowed.
`login-page title `*`title`*	Sets the title for the top of the login screen. Use up to 64 printable ASCII characters. Spaces are allowed.
`login-page title-color {`*`color-rgb`*` | `*`color-name`*` | `*`color-number`*`}`	Sets the title text color of the login page.

Table 232 Command Summary: Customization (continued)

COMMAND	DESCRIPTION
`login-page window-color {`*`color-rgb`*` | `*`color-name`*` | `*`color-number`*`}`	Sets the color of the login page's window border.
`logo background-color {`*`color-rgb`*` | `*`color-name`*` | `*`color-number`*`}`	Sets the color of the logo banner across the top of the login screen and access page.
`show access-page settings`	Lists the current access page settings.
`show login-page default-title`	Lists the factory default title for the login page.
`show login-page settings`	Lists the current login page settings.
`show logo settings`	Lists the current logo background (banner) and floor (line below the banner) settings.
`show page-customization`	Lists whether the Zyxel Device is set to use custom login and access pages or the default ones.

58.3 Host Name Commands

The following table describes the commands available for the hostname and domain name. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 233 Command Summary: Host Name

COMMAND	DESCRIPTION
`[no] domainname `*`domain_name`*	Sets the domain name. The `no` command removes the domain name. *`domain_name`*: This name can be up to 254 alphanumeric characters long. Spaces are not allowed, but dashes "-" and underscores "_" are accepted.
`[no] hostname `*`hostname`*	Sets a descriptive name to identify your Zyxel Device. The `no` command removes the host name.
`show fqdn`	Displays the fully qualified domain name.

58.4 Time and Date

For effective scheduling and logging, the Zyxel Device system time must be accurate. The Zyxel Device's Real Time Chip (RTC) keeps track of the time and date. There is also a software mechanism to set the time manually or get the current time and date from an external server.

58.4.1 Date/Time Commands

The following table describes the commands available for date and time setup. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 234 Command Summary: Date/Time

COMMAND	DESCRIPTION
`clock date` *yyyy-mm-dd* `time` *hh:mm:ss*	Sets the new date in year, month and day format manually and the new time in hour, minute and second format.
`[no] clock daylight-saving`	Enables daylight savings. The `no` command disables daylight saving.
`[no] clock saving-interval begin {apr|aug|dec|feb|jan|jul|jun|mar|may|nov|oct|sep} {1|2|3|4|last} {fri|mon|sat|sun|thu|tue|wed}` *hh:mm* `end {apr|aug|dec|feb|jan|jul|jun|mar|may|nov|oct|sep} {1|2|3|4|last} {fri|mon|sat|sun|thu|tue|wed}` *hh:mm* `offset`	Configures the day and time when daylight saving time starts and ends. The `no` command removes the day and time when daylight savings time starts and ends. offset: a number from 1 to 5.5 (by 0.5 increments)
`clock time` *hh:mm:ss*	Sets the new time in hour, minute and second format.
`[no] clock time-zone {-|+`*hh:mm*`} [+|-]HH:MM.`	Sets your time zone where `hh: hour 0-14, mm: minute 0-59)`. The `no` command removes time zone settings.
`[no] ntp`	Saves your date and time and time zone settings and updates the data and time every 24 hours. The `no` command stops updating the data and time every 24 hours.
`[no] ntp server {`*fqdn*`|`*w.x.y.z*`}`	Sets the IP address or URL of your NTP time server. The `no` command removes time server information.
`ntp sync`	Gets the time and date from an NTP time server.
`[no] clock auto-sync-timezone`	Allows the Zyxel Device to automatically update its time zone from the cloud server after the set and get commands below are issued. The `no` command disables the Zyxel Device from automatically updating its time zone from the cloud server.
`[no] clock auto-sync-daylight-saving`	Allows the Zyxel Device to automatically update its daylight savings adjusted time from the cloud server after the set and get commands below are issued. The `no` command disables the Zyxel Device from automatically updating daylight savings adjusted time from the cloud server.
`myzyxel-service get-cloud-timezone`	Sends a query to the cloud server to get both time-zone and daylight-savings information for where the Zyxel Device is located. The Zyxel Device keeps the result in a temporary file.
`myzyxel-service set-timezone-according-cloud`	Applies time-zone and daylight-savings settings according the information received from `myzyxel-service get-cloud-timezone` and if `clock auto-sync-timezone` and/ or `clock auto-sync-daylight-saving` were issued. For example, if `clock auto-sync-timezone` was not issued, then Zyxel Device will not automatically update the time-zone.
`show myzyxel-service get-cloud-timezone`	Displays the time-zone, daylight savings time start-date, daylight savings time end-date and daylight savings time offset from the cloud server.

Table 234 Command Summary: Date/Time (continued)

COMMAND	DESCRIPTION
`show clock date`	Displays the current date of your Zyxel Device.
`show clock status`	Displays your time zone and daylight saving settings.
`show clock time`	Displays the current time of your Zyxel Device.
`show ntp server`	Displays time server settings.

58.5 Console Port Speed

This section shows you how to set the console port speed when you connect to the Zyxel Device via the console port using a terminal emulation program. The following table describes the console port commands. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 235 Command Summary: Console Port Speed

COMMAND	DESCRIPTION
`[no] console baud` *`baud_rate`*	Sets the speed of the console port. The no command resets the console port speed to the default (115200). *`baud_rate`*: 9600, 19200, 38400, 57600 or 115200.
`show console`	Displays console port speed.

58.6 DNS Overview

DNS (Domain Name System) is for mapping a domain name to its corresponding IP address and vice versa. The DNS server is extremely important because without it, you must know the IP address of a machine before you can access it.

58.6.1 Domain Zone Forwarder

A domain zone forwarder contains a DNS server's IP address. The Zyxel Device can query the DNS server to resolve domain zones for features like VPN, DDNS and the time server. A domain zone is a fully qualified domain name without the host. For example, zyxel.com.tw is the domain zone for the www.zyxel.com.tw fully qualified domain name.

A name query begins at a client computer and is passed to a resolver, a DNS client service, for resolution. The Zyxel Device can be a DNS client service. The Zyxel Device can resolve a DNS query locally using cached Resource Records (RR) obtained from a previous query (and kept for a period of time). If the Zyxel Device does not have the requested information, it can forward the request to DNS servers. This is known as recursion.

The Zyxel Device can ask a DNS server to use recursion to resolve its DNS client requests. If recursion on the Zyxel Device or a DNS server is disabled, they cannot forward DNS requests for resolution.

A Domain Name Server (DNS) amplification attack is a kind of Distributed Denial of Service (DDoS) attack that uses publicly accessible open DNS servers to flood a victim with DNS response traffic. An open DNS server is a DNS server which is willing to resolve recursive DNS queries from anyone on the Internet.

In a DNS amplification attack, an attacker sends a DNS name lookup request to an open DNS server with the source address spoofed as the victim's address. When the DNS server sends the DNS record response, it is sent to the victim. Attackers can request as much information as possible to maximize the amplification effect.

58.6.2 DNS Commands

The following table identifies the values required for many of these commands. Other input values are discussed with the corresponding commands.

Table 236 Input Values for General DNS Commands

LABEL	DESCRIPTION
address_object	The name of the IP address (group) object. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
interface_name	The name of the interface. Ethernet interface: For some Zyxel Device models, use ge*x*, *x* = 1 - N, where N equals the highest numbered Ethernet interface for your Zyxel Device model. For other Zyxel Device models, use a name such as wan1, wan2, opt, lan1, or dmz. virtual interface on top of Ethernet interface: add a colon (:) and the number of the virtual interface. For example: ge*x*:*y*, *x* = 1 - N, *y* = 1 - 4 VLAN interface: vlan*x*, *x* = 0 - 4094 virtual interface on top of VLAN interface: vlan*x*:*y*, *x* = 0 - 4094, *y* = 1 - 12 bridge interface: br*x*, *x* = 0 - N, where N depends on the number of bridge interfaces your Zyxel Device model supports. virtual interface on top of bridge interface: br*x*:*y*, *x* = the number of the bridge interface, *y* = 1 - 4 PPPoE/PPTP interface: ppp*x*, *x* = 0 - N, where N depends on the number of PPPoE/PPTP interfaces your Zyxel Device model supports.

The following table describes the commands available for DNS. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 237 Command Summary: DNS

COMMAND	DESCRIPTION
`[no] ip dns server a-record` *`fqdn w.x.y.z`*	Sets an A record that specifies the mapping of a fully qualified domain name (FQDN) to an IP address. The `no` command deletes an A record.
`ip dns server cache-flush`	Clears the DNS.
`[no] ip dns server mx-record` *`domain_name`* `{`*`w.x.y.z`*`|`*`fqdn`*`}`	Sets a MX record that specifies a mail server that is responsible for handling the mail for a particular domain. The `no` command deletes a MX record.
`ip dns server rule {<1..32>|append|insert <1..32>} access-group {ALL|`*`address_object`*`} zone {ALL|`*`address_object`*`} action {accept|deny}`	Sets a service control rule for DNS requests.

Table 237 Command Summary: DNS (continued)

COMMAND	DESCRIPTION
`ip dns server rule move <1..32> to <1..32>`	Changes the number of a service control rule.
`[no] ip dns server zone-forwarder {<1..32>|append|insert <1..32>} {`*`domain_zone_name`*`|*} interface `*`interface_name`*	Sets a domain zone forwarder record that specifies a fully qualified domain name. You can also use a star (*) if all domain zones are served by the specified DNS server(s). *`domain_zone_name`*: This is a domain zone, not a host. For example, zyxel.com.tw is the domain zone for the www.zyxel.com.tw fully qualified domain name. For example, whenever the Zyxel Device receives needs to resolve a zyxel.com.tw domain name, it can send a query to the recorded name server IP address. *`interface_name`*: This is the interface through which the ISP provides a DNS server. The interface should be activated and set to be a DHCP client. The `no` command deletes a zone forwarder record.
`ip dns server zone-forwarder {<1..32>|append|insert <1..32>} {`*`domain_zone_name`*`|*} user-defined `*`w.x.y.z {ip_type}`*` [private | interface {`*`interface_name`*` | auto}]`	Sets a domain zone forwarder record that specifies a DNS server's IP address. `private | interface`: Use `private` if the Zyxel Device connects to the DNS server through a VPN tunnel. Otherwise, use the `interface` command to set the interface through which the Zyxel Device sends DNS queries to a DNS server. The `auto` means any interface that the Zyxel Device uses to send DNS queries to a DNS server according to the routing rule.
`ip dns server zone-forwarder move <1..32> to <1..32>`	Changes the index number of a zone forwarder record.
`no ip dns server rule <1..32>`	Deletes a service control rule.
`show ip dns server`	Displays all DNS entries.
`show ip dns server database`	Displays all configured records.
`show ip dns server status`	Displays whether this service is enabled or not.
`show ip dns security-options all`	Displays security options configured for the customized and default rules.
`ip dns server aaaa-record {FQDN_DNS | FQDN_WILDCARD_DNS} IPv6`	An address record contains the mapping of a Fully-Qualified Domain Name (FQDN) to an IP address. Type a Fully-Qualified Domain Name (FQDN) of a server. An FQDN starts with a host name and continues all the way up to the top-level domain name. For example, www.zyxel.com.tw is a fully qualified domain name, where “www” is the host, “zyxel” is the third-level domain, “com” is the second-level domain, and “tw” is the top level domain. Underscores are not allowed. Use "*." as a prefix in the FQDN for a wildcard domain name (for example, *.example.com).
`ip dns server cname-record {FQDN_DNS | FQDN_WILDCARD_DNS} {FQDN_DNS}`	A Canonical Name Record or CNAME record is a type of resource record in the Domain Name System (DNS) that specifies that the domain name is an alias of another, canonical domain name. Type a Fully-Qualified Domain Name (FQDN) of a server. An FQDN starts with a host name and continues all the way up to the top-level domain name. For example, www.zyxel.com.tw is a fully qualified domain name, where “www” is the host, “zyxel” is the third-level domain, “com” is the second-level domain, and “tw” is the top level domain. Underscores are not allowed. Use "*." as a prefix in the FQDN for a wildcard domain name (for example, *.example.com).

Table 237 Command Summary: DNS (continued)

COMMAND	DESCRIPTION
`ip dns security-options {default | 1}]`	Selects to use the default security option or profile '1'. The default allows `any` address to use `additional-from-cache` and `recursion`.
`name DNS_OPTIONS_NAME`	Names the DNS security options profile.
`no address-object-group {any | PROFILE}`	Sets the address object to be `any` or a previously created one. `no` removes the address object from this DNS security options profile.
`no additional-from-cache activate`	Activated allows the Zyxel Device to reply to queries with previously cached DNS requests. Deactivated (`no`) does not.
`no recursion activate`	Activated recursion allows the Zyxel Device to forward queries it can't find in its DNS database. Deactivated (`no`) does not.

58.6.3 DNS Command Examples

This command sets an A record that specifies the mapping of a fully qualified domain name (www.abc.com) to an IP address (210.17.2.13).

```
Router# configure terminal
Router(config)# ip dns server a-record www.abc.com 210.17.2.13
```

This command displays security options configured for the customized and default rules.

```
Router# configure terminal
Router(config)# show ip dns security-options all
security option rule: 1
   Name: Customize
   Address Object: RFC1918_1, RFC1918_2, RFC1918_3
   Additional Info from Cache: allow
   Recursion Query: deny
security option rule: default
   Name: Default
   Address Object: any
   Additional Info from Cache: allow
   Recursion Query: allow
Router(config)#
```

58.7 Authentication Server Overview

The Zyxel Device can also work as a RADIUS server to exchange messages with other APs for user authentication and authorization.

58.7.1 Authentication Server Commands

The following table lists the authentication server commands you use to configure the Zyxel Device's built-in authentication server settings.

Table 238 Command Summary: Authentication Server

COMMAND	DESCRIPTION
[no] auth-server activate	Sets the Zyxel Device to act as an authentication server for other RADIUS clients, such as APs. The no command sets the Zyxel Device to not act as an authentication server for other APs.
auth-server authentication *auth_method*	Specifies an authentication method used by the authentication server.
no auth-server authentication	Resets the authentication method used by the authentication server to the factory default (default).
[no] auth-server cert *certificate_name*	Specifies a certificate used by the authentication server (Zyxel Device). The no command resets the certificate used by the authentication server to the factory default (default). *certificate_name*: The name of the certificate. You can use up to 31 alphanumeric and ;'~!@#$%^&()_+[]{}',.=- characters.
[no] auth-server trusted-client *profile_name*	Creates a trusted RADIUS client profile. The no command deletes the specified profile. *profile-name*: You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
[no] activate	Enables the client profile. The no command disables the profile.
[no] ip address *ip subnet_mask*	Sets the client's IP address and subnet mask. The no command clears this setting.
[no] secret *secret*	Sets a password as the key to be shared between the Zyxel Device and the client. The no command clears this setting.
[no] description *description*	Sets the description for the profile. The no command clears this setting. *description*: You can use alphanumeric and ()+/:=?!*#@$_%- characters, and it can be up to 60 characters long.
show auth-server status	Displays the Zyxel Device's authentication server settings.
show auth-server trusted-client	Displays all RADIUS client profile settings.
show auth-server trusted-client *profile_name*	Displays the specified RADIUS client profile settings.

58.7.2 Authentication Server Command Examples

The following example shows you how to enable the authentication server feature on the Zyxel Device and sets a trusted RADIUS client profile. This example also shows you the authentication server and client profile settings.

```
Router# configure terminal
Router(config)# auth-server activate
Router(config)# auth-server trusted-client AP-1
Router(config-trusted-client-AP-1)# activate
Router(config-trusted-client-AP-1)# ip address 10.10.1.2 255.255.255.0
Router(config-trusted-client-AP-1)# secret 12345678
Router(config-trusted-client-AP-1)# exit
Router(config)# show auth-server status
activation: yes
authentication method: default
certificate: default
Router(config)# show auth-server trusted-client AP-1
Client: AP-1
  Activation: yes
  Description:
  IP: 10.10.1.2
  Netmask: 255.255.255.0
  Secret: VQEq907jWB8=
Router(config)#
```

58.8 Language Commands

Use the `language` commands to display what language the web configurator is using or change it. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 239 Command Summary: Language

COMMAND	DESCRIPTION
`language <English | Simplified_Chinese | Traditional_Chinese>`	Specifies the language used in the web configurator screens.
`show language {setting | all}`	`setting` displays the current display language in the web configurator screens. `all` displays the available languages.

58.9 IPv6 Commands

Use the `ipv6` commands to enable or disable IPv6 support. You must use the `configure terminal` command to enter the configuration mode before you can use the commands that configure settings.

Table 240 Command Summary: IPv6

COMMAND	DESCRIPTION
`[no] ipv6 activate`	Enables or disables IPv6 support.
`show ipv6 status`	Displays whether IPv6 support is enabled or disabled.

58.10 ZON Overview

The Zyxel One Network (ZON) utility uses the Zyxel Discovery Protocol (ZDP) for discovering and configuring ZDP-aware Zyxel devices in the same broadcast domain as the computer on which ZON is installed.

The ZON Utility issues requests via ZDP and in response to the query, the Zyxel device responds with basic information including IP address, firmware version, location, system and model name. The information is then displayed in the ZON Utility screen and you can perform tasks like basic configuration of the devices and batch firmware upgrade in it. You can download the ZON Utility at www.zyxel.com and install it on a computer.

58.10.1 LLDP

LLDP is a layer-2 protocol that allows a network device to advertise its identity and capabilities on the local network. It also allows the device to maintain and store information from adjacent devices which are directly connected to the network device. This helps you discover network changes and perform necessary network reconfiguration and management.

58.10.2 ZON Commands

The following table describes the commands available for ZON. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 241 Command Summary: ZON

COMMAND	DESCRIPTION
`zon lldp server`	Activates LLDP discovery on the Zyxel Device. This allows you to use Link Layer Discovery Protocol (LLDP) for discovering and configuring LLDP-aware devices in the same broadcast domain as the Zyxel Device that you are logged into using the web configurator.
`zon lldp server tx-hold <1..10>`	Sets the multiplier used to calculate the TTL (Time To Live) value for the transmitted LLDP packets. The TTL value determines how long the device information can be saved on the neighbors. LLDP TTL = the multi pl er * the LLDP transmission interval
`zon lldp server tx-interval <1..600>`	Sets the interval (in seconds) at which the Zyxel Device sends a LLDP packet to the neighbor.

Table 241 Command Summary: ZON (continued)

COMMAND	DESCRIPTION
`zon zdp server`	Activates ZDP discovery on the Zyxel Device.
`show zon lldp neighbors`	Displays the Zyxel Device's neighboring devices via LLDP.
`show zon lldp server config`	Displays the LLDP settings.
`show zon lldp server statistics`	Displays the LLDP traffic statistics.
`show zon lldp server status`	Displays whether LLDP discovery is enabled.
`show zon zdp server status`	Displays whether ZDP discovery is enabled.

58.10.3 ZON Examples

This example enables LLDP discovery and displays whether LLDP discovery is enabled on the Zyxel Device.

```
Router(config)# zon lldp server
Router(config)# zon lldp server status
status: active
Router(config)#
```

CHAPTER 59 System Remote Management

This chapter shows you how to determine which services/protocols can access which Zyxel Device zones (if any) from which computers.

Note: To access the Zyxel Device from a specified computer using a service, make sure no service control rules or to-Zyxel Device firewall rules block that traffic.

59.1 Remote Management Overview

You may manage your Zyxel Device from a remote location via:

- Internet (WAN only)
- LAN only
- ALL (LAN&WAN&DMZ)
- DMZ only

To disable remote management of a service, deselect **Enable** in the corresponding service screen.

59.1.1 Remote Management Limitations

Remote management will not work when:

1 You have disabled that service in the corresponding screen.

2 The accepted IP address in the **Service Control** table does not match the client IP address. If it does not match, the Zyxel Device will disconnect the session immediately.

3 There is a firewall rule that blocks it.

59.1.2 System Timeout

There is a lease timeout for administrators. The Zyxel Device automatically logs you out if the management session remains idle for longer than this timeout period. The management session does not time out when a statistics screen is polling.

Each user is also forced to log in the Zyxel Device for authentication again when the reauthentication time expires.

59.2 Common System Command Input Values

The following table identifies the values required for many of these commands. Other input values are discussed with the corresponding commands.

Table 242 Input Values for General System Commands

LABEL	DESCRIPTION
address_object	The name of the IP address (group) object. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
rule_number	The number of a service control rule. 1 - *X* where *X* is the highest number of rules the Zyxel Device model supports.
zone_object	The name of the zone. For some Zyxel Device models, use up to 31 characters (a-zA-Z0-9_-). The name cannot start with a number. This value is case-sensitive. For other Zyxel Device models, use pre-defined zone names like DMZ, LAN1, SSL VPN, IPSec VPN, OPT, and WAN.

59.3 HTTP/HTTPS Commands

The following table describes the commands available for HTTP/HTTPS. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 243 Command Summary: HTTP/HTTPS

COMMAND	DESCRIPTION
`[no] ip http authentication` *`auth_method`*	Sets an authentication method used by the HTTP/HTTPS server. The `no` command resets the authentication method used by the HTTP/HTTPS server to the factory default (`default`). *`auth_method`*: The name of the authentication method. You may use 1-31 alphanumeric characters, underscores (_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
`[no] ip http content-security-policy`	Sets the content-security-policy header to **frame-ancestors 'none'**. It prevents loading the web page in an iframe from any source. The content-security-policy HTTP response header is a security header that can help avoid clickjacking attacks by defining which resources are allowed to loaded or executed. The `no` command removes the header directive. Note: This security is provided only for browsers that support content-security-policy (CSP).
`[no] ip http port <1..65535>`	Sets the HTTP service port number. The `no` command resets the HTTP service port number to the factory default (80).
`[no] ip http secure-port <1..65535>`	Sets the HTTPS service port number. The `no` command resets the HTTPS service port number to the factory default (443).
`[no] ip http secure-server`	Enables HTTPS access to the Zyxel Device web configurator. The `no` command disables HTTPS access to the Zyxel Device web configurator.

Table 243   Command Summary: HTTP/HTTPS (continued)

COMMAND	DESCRIPTION
[no] ip http secure-server auth-client	Sets the client to authenticate itself to the HTTPS server. The no command sets the client not to authenticate itself to the HTTPS server.
[no] ip http secure-server cert *certificate_name*	Specifies a certificate used by the HTTPS server. The no command resets the certificate used by the HTTPS server to the factory default (default). *certificate_name*: The name of the certificate. You can use up to 31 alphanumeric and ;‘~!@#$%^&()_+[]{}’,.=- characters.
[no] ip http secure-server force-redirect	Redirects all HTTP connection requests to a HTTPS URL. The no command disables forwarding HTTP connection requests to a HTTPS URL.
[no] ip http secure-server sslv3	Turns on SSLv3 support in the HTTP server. The no command turns SSLv3 support off.
ip http secure-server table {admin|user} rule {*rule_number*|append|insert *rule_number*} access-group {ALL|*address_object*} zone {ALL|*zone_object*} action {accept|deny}	Sets a service control rule for HTTPS service.
ip http secure-server table {admin|user} rule move *rule_number* to *rule_number*	Changes the index number of a HTTPS service control rule.
ip http secure-server cipher-suite {*cipher_algorithm*} [*cipher_algorithm*] [*cipher_algorithm*] [*cipher_algorithm*]	Sets the encryption algorithms (up to four) that the Zyxel Device uses for the SSL in HTTPS connections and the sequence in which it uses them. The *cipher_algorithm* can be any of the following. rc4: RC4 (RC4 may impact the Zyxel Device’s CPU performance since the Zyxel Device’s encryption accelerator does not support it). aes: AES des: DES 3des: Triple DES.
no ip http secure-server cipher-suite {*cipher_algorithm*}	Has the Zyxel Device not use the specified encryption algorithm for the SSL in HTTPS connections.
[no] ip http server	Allows HTTP access to the Zyxel Device web configurator. The no command disables HTTP access to the Zyxel Device web configurator.
ip http server table {admin|user} rule {*rule_number*|append|insert *rule_number*} access-group {ALL|*address_object*} zone {ALL|*zone_object*} action {accept|deny}	Sets a service control rule for HTTP service.
ip http server table {admin|user} rule move *rule_number* to *rule_number*	Changes the number of a HTTP service control rule.
no ip http secure-server table {admin|user} rule *rule_number*	Deletes a service control rule for HTTPS service.
no ip http server table {admin|user} rule *rule_number*	Deletes a service control rule for HTTP service.
ip http skip-csrf-check	Omits cross-site request forgery (CSRF) checking. CSRF exploits the trust that a site has in a user's browser to transmit unauthorized commands as if they are from a user that the website trusts.

Table 243 Command Summary: HTTP/HTTPS (continued)

COMMAND	DESCRIPTION
`no ip http skip-csrf-check`	Performs cross-site request forgery (CSRF) checking.
`[no] ip http x-frame-options`	Sets the x-frame-options header to **SAMEORIGIN**. The web page can only be displayed in a frame on the same origin (from the site/host which is the same as the one serving the page). The x-frame-options HTTP response header is a security header that can help avoid clickjacking attacks by indicating whether a browser is allowed to load a page in a frame. The `no` command removes the header directive. Note: This security is provided only for browsers that support x-frame-options.
`show ip http server status`	Displays HTTP settings.
`show ip http server secure status`	Displays HTTPS settings.
`show ip http skip-csrf-check`	Shows whether cross-site request forgery (CSRF) checking is done or not.

59.3.1 HTTP/HTTPS Command Examples

This following example adds a service control rule that allowed an administrator from the computers with the IP addresses matching the Marketing address object to access the WAN zone using HTTP service.

```
Router# configure terminal
Router(config)# ip http server table admin rule append access-group
Marketing zone WAN action accept
```

This command sets an authentication method Example used by the HTTP/HTTPS server to authenticate the client(s).

```
Router# configure terminal
Router(config)# ip http authentication Example
```

This following example sets a certificate named MyCert used by the HTTPS server to authenticate itself to the SSL client.

```
Router# configure terminal
Router(config)# ip http secure-server cert MyCert
```

59.4 SSH

Unlike Telnet or FTP, which transmit data in clear text, SSH (Secure Shell) is a secure communication protocol that combines authentication and data encryption to provide secure encrypted communication between two hosts over an unsecured network.

59.4.1 SSH Implementation on the Zyxel Device

Your Zyxel Device supports SSH versions 1 and 2 using RSA authentication and four encryption methods (AES, 3DES, Archfour, and Blowfish). The SSH server is implemented on the Zyxel Device for remote management on port 22 (by default).

59.4.2 Requirements for Using SSH

You must install an SSH client program on a client computer (Windows or Linux operating system) that is used to connect to the Zyxel Device over SSH.

59.4.3 SSH Commands

The following table describes the commands available for SSH. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 244 Command Summary: SSH

<table>
<tr><th>COMMAND</th><th>DESCRIPTION</th></tr>
<tr><td>ssh {user@W.X.Y.Z | or W.X.Y.Z)</td><td>Sets the user name where W.X.Y.Z is an IPv4 address or domain of an SSH client.</td></tr>
<tr><td>[no] ip ssh server</td><td>Allows SSH access to the Zyxel Device CLI. The no command disables SSH access to the Zyxel Device CLI.</td></tr>
<tr><td>[no] ip ssh server cert <i>certificate_name</i></td><td>Sets a certificate whose corresponding private key is to be used to identify the Zyxel Device for SSH connections. The no command resets the certificate used by the SSH server to the factory default (default).
<i>certificate_name</i>: The name of the certificate. You can use up to 31 alphanumeric and ;‘~!@#$%^&()_+[]{}’,.=- characters.</td></tr>
<tr><td>[no] ip ssh server port <1..65535&gt;</td><td>Sets the SSH service port number. The no command resets the SSH service port number to the factory default (22).</td></tr>
<tr><td>ip ssh server rule {<i>rule_number</i>|append|insert <i>rule_number</i>} access-group {ALL|<i>address_object</i>} zone {ALL|<i>zone_object</i>} action {accept|deny}</td><td>Sets a service control rule for SSH service.
<i>address_object</i>: The name of the IP address (group) object. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
<i>zone_object</i>: The name of the zone. For some Zyxel Device models, use up to 31 characters (a-zA-Z0-9_-). The name cannot start with a number. This value is case-sensitive.
For other Zyxel Device models, use pre-defined zone names like DMZ, LAN1, SSL VPN, IPSec VPN, OPT, and WAN.</td></tr>
<tr><td>ip ssh server rule move <i>rule_number</i> to <i>rule_number</i></td><td>Changes the index number of a SSH service control rule.</td></tr>
</table>

Table 244 Command Summary: SSH (continued)

COMMAND	DESCRIPTION
`[no] ip ssh server v1`	Enables remote management using SSH v1. The `no` command stops the Zyxel Device from using SSH v1.
`no ip ssh server rule` *`rule_number`*	Deletes a service control rule for SSH service.
`show ip ssh server status`	Displays SSH settings.

59.4.4 SSH Command Examples

This command sets a service control rule that allowed the computers with the IP addresses matching the specified address object to access the specified zone using SSH service.

```
Router# configure terminal
Router(config)# ip ssh server rule 2 access-group Marketing zone WAN action
accept
```

This command sets a certificate (Default) to be used to identify the Zyxel Device.

```
Router# configure terminal
Router(config)# ip ssh server cert Default
```

59.5 Telnet

You can configure your Zyxel Device for remote Telnet access.

59.6 Telnet Commands

The following table describes the commands available for Telnet. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 245 Command Summary: Telnet

COMMAND	DESCRIPTION
`[no] ip telnet server`	Allows Telnet access to the Zyxel Device CLI. The `no` command disables Telnet access to the Zyxel Device CLI.
`[no] ip telnet server port <1..65535>`	Sets the Telnet service port number. The `no` command resets the Telnet service port number back to the factory default (23).

Table 245 Command Summary: Telnet (continued)

COMMAND	DESCRIPTION
`ip telnet server rule {`*rule_number*`|append|insert` *rule_number*`} access-group {ALL|`*address_object*`} zone {ALL|`*zone_object*`} action {accept|deny}`	Sets a service control rule for Telnet service. *address_object*: The name of the IP address (group) object. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive. *zone_object*: The name of the zone. For some Zyxel Device models, use up to 31 characters (a-zA-Z0-9_-). The name cannot start with a number. This value is case-sensitive. For other Zyxel Device models, use pre-defined zone names like DMZ, LAN1, SSL VPN, IPSec VPN, OPT, and WAN.
`ip telnet server rule move` *rule_number* `to` *rule_number*	Changes the index number of a service control rule.
`no ip telnet server rule` *rule_number*	Deletes a service control rule for Telnet service.
`show ip telnet server status`	Displays Telnet settings.

59.6.1 Telnet Commands Examples

This command sets a service control rule that allowed the computers with the IP addresses matching the specified address object to access the specified zone using Telnet service.

```
Router# configure terminal
Router(config)# ip telnet server rule 11 access-group RD zone LAN action
accept
```

This command displays Telnet settings.

```
Router# configure terminal
Router(config)# show ip telnet server status
active     : yes
port       : 23
service control:
No.  Zone                        Address                    Action
========================================================================
Router(config)#
```

59.7 Configuring FTP

You can upload and download the Zyxel Device's firmware and configuration files using FTP. To use this feature, your computer must have an FTP client.

59.7.1 FTP Commands

The following table describes the commands available for FTP. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 246 Command Summary: FTP

COMMAND	DESCRIPTION
`[no] ip ftp server`	Allows FTP access to the Zyxel Device. The `no` command disables FTP access to the Zyxel Device.
`[no] ip ftp server cert` *`certificate_name`*	Sets a certificate to be used to identify the Zyxel Device. The `no` command resets the certificate used by the FTP server to the factory default.
`[no] ip ftp server port <1..65535>`	Sets the FTP service port number. The `no` command resets the FTP service port number to the factory default (21).
`[no] ip ftp server tls-required`	Allows FTP access over TLS. The `no` command disables FTP access over TLS.
`ip ftp server rule {`*`rule_number`*`|append|insert` *`rule_number`*`} access-group {ALL|`*`address_object`*`} zone {ALL|`*`zone_object`*`} action {accept|deny}`	Sets a service control rule for FTP service. *`address_object`*: The name of the IP address (group) object. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive. *`zone_object`*: The name of the zone. For some Zyxel Device models, use up to 31 characters (a-zA-Z0-9_-). The name cannot start with a number. This value is case-sensitive. For other Zyxel Device models, use pre-defined zone names like DMZ, LAN1, SSL VPN, IPSec VPN, OPT, and WAN.
`ip ftp server rule move` *`rule_number`* `to` *`rule_number`*	Changes the index number of a service control rule.
`no ip ftp server rule` *`rule_number`*	Deletes a service control rule for FTP service.
`show ip ftp server status`	Displays FTP settings.

59.7.2 FTP Commands Examples

This command sets a service control rule that allowed the computers with the IP addresses matching the specified address object to access the specified zone using FTP service.

```
Router# configure terminal
Router(config)# ip ftp server rule 4 access-group Sales zone WAN action
accept
```

This command displays FTP settings.

```
Router# configure terminal
Router(config)# show ip ftp server status
active     : yes
port       : 21
certificate: default
TLS        : no
service control:
No.  Zone                      Address                      Action
========================================================================

```

59.8 SNMP

Simple Network Management Protocol is a protocol used for exchanging management information between network devices. Your Zyxel Device supports SNMP agent functionality, which allows a manager station to manage and monitor the Zyxel Device through the network. The Zyxel Device supports SNMP version one (SNMPv1) version two (SNMPv2c) and version 3 (SNMPv3).

SNMP v3 enhances security for SNMP management using authentication and encryption. SNMP managers can be required to authenticate with agents before conducting SNMP management sessions.

Security can be further enhanced by encrypting the SNMP messages sent from the managers. Encryption protects the contents of the SNMP messages. When the contents of the SNMP messages are encrypted, only the intended recipients can read them.

59.8.1 Supported MIBs

The Zyxel Device supports MIB II that is defined in RFC-1213 and RFC-1215. The Zyxel Device also supports private MIBs (zywall.mib and zyxel-zywall-ZLD-Common.mib) to collect information about CPU and memory usage and VPN total throughput. The focus of the MIBs is to let administrators collect statistical data and monitor status and performance. You can download the Zyxel Device's MIBs from www.zyxel.com.

59.8.2 SNMP Traps

The Zyxel Device will send traps to the SNMP manager when any one of the following events occurs:

Table 247 SNMP Traps

OBJECT LABEL	OBJECT ID	DESCRIPTION
Cold Start	1.3.6.1.6.3.1.1.5.1	This trap is sent when the Zyxel Device is turned on or an agent restarts.
linkDown	1.3.6.1.6.3.1.1.5.3	This trap is sent when the Ethernet link is down.
linkUp	1.3.6.1.6.3.1.1.5.4	This trap is sent when the Ethernet link is up.
authenticationFailure	1.3.6.1.6.3.1.1.5.5	This trap is sent when an SNMP request comes from non-authenticated hosts.

Table 247 SNMP Traps (continued)

OBJECT LABEL	OBJECT ID	DESCRIPTION
vpnTunnelDisconnected	1.3.6.1.4.1.890.1.6.22.2.3	This trap is sent when an IPSec VPN tunnel is disconnected.
vpnTunnelName	1.3.6.1.4.1.890.1.6.22.2.2.1.1	This trap is sent along with the vpnTunnelDisconnected trap. This trap carries the disconnected tunnel's IPSec SA name.
vpnIKEName	1.3.6.1.4.1.890.1.6.22.2.2.1.2	This trap is sent along with the vpnTunnelDisconnected trap. This trap carries the disconnected tunnel's IKE SA name.
vpnTunnelSPI	1.3.6.1.4.1.890.1.6.22.2.2.1.3	This trap is sent along with the vpnTunnelDisconnected trap. This trap carries the security parameter index (SPI) of the disconnected VPN tunnel.

59.8.3 SNMP Commands

The following table describes the commands available for SNMP. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 248 Command Summary: SNMP

COMMAND	DESCRIPTION
`[no] snmp-server`	Allows SNMP access to the Zyxel Device. The `no` command disables SNMP access to the Zyxel Device.
`[no] snmp-server community` *`community_string`* `{ro|rw}`	Enters up to 64 characters to set the password for read-only (ro) or read-write (rw) access. The `no` command resets the password for read-only (`ro`) or read-write (`rw`) access to the default.
`[no] snmp-server contact` *`description`*	Sets the contact information (of up to 60 characters) for the person in charge of the Zyxel Device. The `no` command removes the contact information for the person in charge of the Zyxel Device.
`[no] snmp-server enable {informs|traps}`	Enables all SNMP notifications (informs or traps). The `no` command disables all SNMP notifications (informs or traps).
`[no] snmp-server host {`*`w.x.y.z|fqdn|ipv6 address`*`} [`*`community_string`*`]`	Sets the IPv4 or IPv6 address of the host that receives the SNMP notifications. The `no` command removes the host that receives the SNMP notifications.
`[no] snmp-server location` *`description`*	Sets the geographic location (of up to 60 characters) for the Zyxel Device. The `no` command removes the geographic location for the Zyxel Device.
`[no] snmp-server port <1..65535>`	Sets the SNMP service port number. The `no` command resets the SNMP service port number to the factory default (`161`).
`snmp-server rule {`*`rule_number`*`|append|insert` *`rule_number`*`} access-group {ALL|`*`address_object`*`} zone {ALL|`*`zone_object`*`} action {accept|deny}`	Sets a service control rule for SNMP service. *`address_object`*: The name of the IP address (group) object. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive. *`zone_object`*: The name of the zone. For some Zyxel Device models, use up to 31 characters (a-zA-Z0-9_-). The name cannot start with a number. This value is case-sensitive. For other Zyxel Device models, use pre-defined zone names like DMZ, LAN1, SSL VPN, IPSec VPN, OPT, and WAN.
`snmp-server rule move` *`rule_number`* `to` *`rule_number`*	Changes the index number of a service control rule.
`no snmp-server rule` *`rule_number`*	Deletes a service control rule for SNMP service.

Table 248 Command Summary: SNMP (continued)

COMMAND	DESCRIPTION
`snmp-server v3user username` *`description`* `authentication {md5 | sha} privacy {none | des | aes} privilege {ro | rw}`	Sets the authentication, privacy and privilege for an SNMPv3 user.
`snmp-server version {v2c | v3}`	Sets the SNMP version for the Zyxel Device. The SNMP version on the Zyxel Device must match the version on the SNMP manager.
`show snmp status`	Displays SNMP Settings.
`show snmp-server v3user status`	Displays authentication, privacy and privilege for configured SNMPv3 users.

59.8.4 SNMP Commands Examples

The following command sets a service control rule that allowed the computers with the IP addresses matching the specified address object to access the specified zone using SNMP service.

```
Router# configure terminal
Router(config)# snmp-server rule 11 access-group Example zone WAN action
accept
```

The following command sets the password (secret) for read-write (`rw`) access.

```
Router# configure terminal
Router(config)# snmp-server community secret rw
```

The following command sets the IP address of the host that receives the SNMP notifications to 172.23.15.84 and the password (sent with each trap) to qwerty.

```
Router# configure terminal
Router(config)# snmp-server host 172.23.15.84 qwerty
```

The following commands create an SNMPv3 rule and then displays the configured settings.

```
Router# configure terminal
Router(config)# snmp-server v3user username john authentication md5 privacy
none privilege rw
Router(config)# show snmp-server v3user status
SNMPv3 user profile: 1
  username: john
  authentication: md5
  privacy: none
  privilege: rw
Router(config)#
```

59.9 ICMP Filter

The ip icmp-filter commands are obsolete. See Chapter 27 on page 190 to configure secure policy rules for ICMP traffic going to the Zyxel Device to discard or reject ICMP packets destined for the Zyxel Device.

Configure the ICMP filter to help keep the Zyxel Device hidden from probing attempts. You can specify whether or not the Zyxel Device is to respond to probing for unused ports.

You must use the configure terminal command to enter the configuration mode before you can use these commands.

Table 249 Command Summary: ICMP Filter

COMMAND	DESCRIPTION
[no] ip icmp-filter activate	Turns the ICMP filter on or off.
ip icmp-filter rule {<1..32>|append|insert <1..32>} access-group {ALL|ADDRESS_OBJECT} zone {ALL|ZONE_OBJECT} icmp-type {ALL |echo-reply |destination-unreachable |source-quench|redirect|echo-request| router-advertisement|router-solicitation |time-exceeded | parameter-problem| timestamp-request|timestamp-reply| address-mask-request| address-mask-reply} action {accept|deny}	Sets an ICMP filter rule. ADDRESS_OBJECT: The name of the IP address (group) object. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive. ZONE_OBJECT: The name of the zone. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
no ip icmp-filter rule <1..64>	Deletes an ICMP filter rule.
ip icmp-filter rule move <1..64> to <1..64>	Changes the index number of an ICMP filter rule.
show ip icmp-filter status	Displays ICMP filter settings.

CHAPTER 60
File Manager

This chapter covers how to work with the Zyxel Device's firmware, certificates, configuration files, custom IDP signatures, packet trace results, shell scripts and temporary files.

60.1 File Directories

The Zyxel Device stores files in the following directories.

Table 250 FTP File Transfer Notes

DIRECTORY	FILE TYPE	FILE NAME EXTENSION
[A]	Firmware (upload only)	bin
cert	Non-PKCS#12 certificates	cer
conf	Configuration files	conf
idp	IDP custom signatures	rules
packet_trace	Packet trace results (download only)	
script	Shell scripts	.zysh
tmp	Temporary system maintenance files and crash dumps for technical support use (download only)	

A. After you log in through FTP, you do not need to change directories in order to upload the firmware.

60.2 Configuration Files and Shell Scripts Overview

You can store multiple configuration files and shell script files on the Zyxel Device.

When you apply a configuration file, the Zyxel Device uses the factory default settings for any features that the configuration file does not include. Shell scripts are files of commands that you can store on the Zyxel Device and run when you need them. When you run a shell script, the Zyxel Device only applies the commands that it contains. Other settings do not change.

You can edit configuration files or shell scripts in a text editor and upload them to the Zyxel Device. Configuration files use a .conf extension and shell scripts use a .zysh extension.

These files have the same syntax, which is also identical to the way you run CLI commands manually. An example is shown below.

Figure 28 Configuration File / Shell Script: Example

```
# enter configuration mode
configure terminal
# change administrator password
username admin password 4321 user-type admin
# configure ge3
interface ge3
ip address 172.23.37.240 255.255.255.0
ip gateway 172.23.37.254 metric 1
exit
# create address objects for remote management / to-ZyWALL firewall rules
# use the address group in case we want to open up remote management later
address-object TW_SUBNET 172.23.37.0/24
object-group address TW_TEAM
address-object TW_SUBNET
exit
# enable Telnet access (not enabled by default, unlike other services)
ip telnet server
# open WAN-to-ZyWALL firewall for TW_TEAM for remote management
secure-policy insert 4
from WAN
to ZyWALL
sourceip TW_TEAM
service TELNET
action allow
exit
write
```

While configuration files and shell scripts have the same syntax, the Zyxel Device applies configuration files differently than it runs shell scripts. This is explained below.

Table 251 Configuration Files and Shell Scripts in the Zyxel Device

Configuration Files (.conf)	Shell Scripts (.zysh)
• Resets to default configuration. • Goes into CLI **Configuration** mode. • Runs the commands in the configuration file.	• Goes into CLI **Privilege** mode. • Runs the commands in the shell script.

You have to run the example in Table 28 on page 416 as a shell script because the first command is run in **Privilege** mode. If you remove the first command, you have to run the example as a configuration file because the rest of the commands are executed in **Configuration** mode. (See Section 1.5 on page 30 for more information about CLI modes.)

60.2.1 Comments in Configuration Files or Shell Scripts

In a configuration file or shell script, use “#” or “!” as the first character of a command line to have the Zyxel Device treat the line as a comment.

Your configuration files or shell scripts can use “exit” or a command line consisting of a single “!” to have the Zyxel Device exit sub command mode.

Note: "exit" or "!'" must follow sub commands if it is to make the Zyxel Device exit sub command mode.

Line 3 in the following example exits sub command mode.

```
interface ge1
ip address dhcp
!
```

Lines 1 and 3 in the following example are comments and line 4 exits sub command mode.

```
!
interface ge1
# this interface is a DHCP client
!
```

Lines 1 and 2 are comments. Line 5 exits sub command mode.

```
! this is from Joe
# on 2006/06/05
interface ge1
ip address dhcp
!
```

60.2.2 Errors in Configuration Files or Shell Scripts

When you apply a configuration file or run a shell script, the Zyxel Device processes the file line-by-line. The Zyxel Device checks the first line and applies the line if no errors are detected. Then it continues with the next line. If the Zyxel Device finds an error, it stops applying the configuration file or shell script and generates a log.

You can change the way a configuration file or shell script is applied. Include `setenv stop-on-error off` in the configuration file or shell script. The Zyxel Device ignores any errors in the configuration file or shell script and applies all of the valid commands. The Zyxel Device still generates a log for any errors.

60.2.3 Zyxel Device Configuration File Details

You can store multiple configuration files on the Zyxel Device. You can also have the Zyxel Device use a different configuration file without the Zyxel Device restarting.

- When you first receive the Zyxel Device, it uses the **system-default.conf** configuration file of default settings.
- When you change the configuration, the Zyxel Device creates a **startup-config.conf** file of the current configuration.
- The Zyxel Device checks the **startup-config.conf** file for errors when it restarts. If there is an error in the **startup-config.conf** file, the Zyxel Device copies the **startup-config.conf** configuration file to the **startup-config-bad.conf** configuration file and tries the existing **lastgood.conf** configuration file.

- When the Zyxel Device reboots, if the **startup-config.conf** file passes the error check, the Zyxel Device keeps a copy of the **startup-config.conf** file as the **lastgood.conf** configuration file for you as a back up file. If you upload and apply a configuration file with an error, you can apply **lastgood.conf** to return to a valid configuration.

60.2.4 Configuration File Flow at Restart

If there is not a **startup-config.conf** when you restart the Zyxel Device (whether through a management interface or by physically turning the power off and back on), the Zyxel Device uses the **system-default.conf** configuration file with the Zyxel Device's default settings.

If there is a **startup-config.conf**, the Zyxel Device checks it for errors and applies it. If there are no errors, the Zyxel Device uses it and copies it to the **lastgood.conf** configuration file. If there is an error, the Zyxel Device generates a log and copies the **startup-config.conf** configuration file to the **startup-config-bad.conf** configuration file and tries the existing **lastgood.conf** configuration file. If there isn't a **lastgood.conf** configuration file or it also has an error, the Zyxel Device applies the **system-default.conf** configuration file.

You can change the way the **startup-config.conf** file is applied. Include the `setenv-startup stop-on-error off` command. The Zyxel Device ignores any errors in the **startup-config.conf** file and applies all of the valid commands. The Zyxel Device still generates a log for any errors.

60.3 File Manager Commands Input Values

The following table explains the values you can input with the file manager commands.

Table 252 File Manager Command Input Values

LABEL	DESCRIPTION
file_name	The name of a file. Use up to 25 characters (including a-zA-Z0-9;'~!@#$%^&()_+[]{}',.=-).

60.4 File Manager Commands Summary

The following table lists the commands that you can use for file management.

Table 253 File Manager Commands Summary

COMMAND	DESCRIPTION
`apply /conf/file_name.conf [ignore-error] [rollback]`	Has the Zyxel Device use a specific configuration file. You must still use the `write` command to save your configuration changes to the flash ("non-volatile" or "long term") memory. Use this command without specify both `ignore-error` and `rollback`: this is not recommended because it would leave the rest of the configuration blank. If the interfaces were not configured before the first error, the console port may be the only way to access the device. Use `ignore-error` without `rollback`: this applies the valid parts of the configuration file and generates error logs for all of the configuration file's errors. This lets the Zyxel Device apply most of your configuration and you can refer to the logs for what to fix. Use both `ignore-error` and `rollback`: this applies the valid parts of the configuration file, generates error logs for all of the configuration file's errors, and starts the Zyxel Device with a fully valid configuration file. Use `rollback` without `ignore-error`: this gets the Zyxel Device started with a fully valid configuration file as quickly as possible. You can use the "`apply /conf/system-default.conf`" command to reset the Zyxel Device to go back to its system defaults.
`copy {/conf | /idp | /packet_trace | /script | /tmp}file_name-a.conf {/conf | /idp | /packet_trace | /script | /tmp}/file_name-b.conf`	Saves a duplicate of a file on the Zyxel Device from the source file name to the target file name. Specify the directory and file name of the file that you want to copy and the directory and file name to use for the duplicate. Always copy the file into the same directory.
`copy running-config startup-config`	Saves your configuration changes to the flash ("non-volatile" or "long term") memory. The Zyxel Device immediately uses configuration changes made via commands, but if you do not use this command or the write command, the changes will be lost when the Zyxel Device restarts.
`copy running-config /conf/file_name.conf`	Saves a duplicate of the configuration file that the Zyxel Device is currently using. You specify the file name to which to copy.
`delete {/conf | /idp | /packet_trace | /script | /tmp}/file_name`	Removes a file. Specify the directory and file name of the file that you want to delete.
`dir {/conf | /idp | /packet_trace | /script | /tmp}`	Displays the list of files saved in the specified directory.
`rename {/conf | /idp | /packet_trace | /script | /tmp}/old-file_name {/conf | /idp | /packet_trace | /script | /tmp}/new-file_name`	Changes the name of a file. Specify the directory and file name of the file that you want to rename. Then specify the directory again followed by the new file name.
`rename /script/old-file_name /script/new-file_name`	Changes the name of a shell script.
`run /script/file_name.zysh`	Has the Zyxel Device execute a specific shell script file. You must still use the `write` command to save your configuration changes to the flash ("non-volatile" or "long term") memory.

Table 253 File Manager Commands Summary (continued)

COMMAND	DESCRIPTION
`schedule-run 1 file_name.zysh {daily | monthly | weekly} time {date | sun | mon | tue | wed | thu | fri | sat}`	Has the Zyxel Device execute the specified specific shell script file at the the specified time. You must still use the `write` command to save your configuration changes to the flash (“non-volatile” or “long term”) memory.
`show running-config`	Displays the settings of the configuration file that the system is using.
`setenv-startup stop-on-error off`	Has the Zyxel Device ignore any errors in the startup-config.conf file and apply all of the valid commands.
`show setenv-startup`	Displays whether or not the Zyxel Device is set to ignore any errors in the startup-config.conf file and apply all of the valid commands.
`write`	Saves your configuration changes to the flash (“non-volatile” or “long term”) memory. The Zyxel Device immediately uses configuration changes made via commands, but if you do not use the `write` command, the changes will be lost when the Zyxel Device restarts.

60.5 File Manager Dual Firmware Commands

The following table lists the commands that you can use for managing dual firmware. Firmware uploaded using FTP goes to the Running partition. Use the web configurator to upload firmware to the Standby partition. The Zyxel Device reboots automatically when you upload firmware to the Running partition.

Table 254 File Manager Dual Firmware Commands

COMMAND	DESCRIPTION
`set firmware boot option <0..1>`	Sets the behavior of the Zyxel Device when firmware is uploaded to the Standby partition. (This command does not upload firmware.) Use 0 to have the Zyxel Device reboot immediately after firmware is uploaded to the Standby partition and become the Running firmware. Use 1 to not have the Zyxel Device reboot immediately after a firmware is uploaded to the Standby partition.
`show firmware image boot option`	Shows the behavior of the Zyxel Device when firmware is uploaded to the Standby partition.
`set firmware boot number <1..2>`	Reboots the Zyxel Device immediately with firmware in partition 1 or 2. If 2 is the Standby partition, then it becomes the Running partition after reboot. Use `show version` to see which partition is Standby and which is Running.

60.6 File Manager Command Examples

These are examples of the dual firmware commands .

```
Router(config)# set firmware boot option 0
Router(config)#
Router(config)# show firmware image boot option
boot option: 0
Router(config)#
Router(config)# set firmware boot number 2

Welcome to USG110

Username:
Terminate All Processes: OK
kill_process_and_umountfs() returns -7
Restarting system.

<snipped>

Welcome to USG110
Username: admin
Password:
Router> configure terminal
Router(config)# show version
Zyxel Communications Corp.
image number model                  firmware version
build date           boot status
===============================================================================
1        USG110                  V4.11(AAPH.0)b3s1
2015-01-11 21:53:44  Standby
2        USG110                   V4.11(AAPH.0)
2015-03-13 03:47:52  Running
```

This example saves a back up of the current configuration before applying a shell script file.

```
Router(config)# copy running-config /conf/backup.conf
Router(config)# run /script/vpn_setup.zysh
```

These commands run the aaa.zysh script at noon every day, on the first day of every month, and on every Monday, Wednesday, and Friday.

```
Router> configure terminal
Router(config)# schedule-run 1 aaa.zysh daily 12:00
Router(config)# schedule-run 1 aaa.zysh monthly 12:00 01
Router(config)# schedule-run 1 aaa.zysh weekly 12:00 mon wed fri
Router(config)#
```

60.7 FTP File Transfer

You can use FTP to transfer files to and from the Zyxel Device for advanced maintenance and support.

60.7.1 Command Line FTP File Upload

1. Connect to the Zyxel Device.
2. Enter "bin" to set the transfer mode to binary.
3. You can upload the firmware after you log in through FTP. To upload other files, use "cd" to change to the corresponding directory.
4. Use "put" to transfer files from the computer to the Zyxel Device.[1] For example:

   In the conf directory, use "put config.conf today.conf" to upload the configuration file (config.conf) to the Zyxel Device and rename it "today.conf".

   "put 1.00(XL.0).bin" transfers the firmware (1.00(XL.0).bin) to the Zyxel Device.

The firmware update can take up to five minutes. Do not turn off or reset the Zyxel Device while the firmware update is in progress! If you lose power during the firmware upload, you may need to refer to Section 60.10 on page 428 to recover the firmware.

60.7.2 Command Line FTP Configuration File Upload Example

The following example transfers a configuration file named tomorrow.conf from the computer and saves it on the Zyxel Device as next.conf.

Note: Uploading a custom signature file named "custom.rules", overwrites all custom signatures on the ZyWALL.

[1] When you upload a custom signature, the Zyxel Device appends it to the existing custom signatures stored in the "custom.rules" file.

Figure 29 FTP Configuration File Upload Example

```
C:\>ftp 192.168.1.1
Connected to 192.168.1.1.
220 FTP Server (ZyWALL) [192.168.1.1]
User (192.168.1.1:(none)): admin
331 Password required for admin.
Password:
230 User admin logged in.
ftp> cd conf
250 CWD command successful
ftp> bin
200 Type set to I
ftp> put tomorrow.conf next.conf
200 PORT command successful
150 Opening BINARY mode data connection for next.conf
226-Post action ok!!
226 Transfer complete.
ftp: 20231 bytes sent in 0.00Seconds 20231000.00Kbytes/sec.
```

60.7.3 Command Line FTP File Download

1. Connect to the Zyxel Device.
2. Enter “bin” to set the transfer mode to binary.
3. Use “cd” to change to the directory that contains the files you want to download.
4. Use “dir” or “ls” if you need to display a list of the files in the directory.
5. Use "get” to download files. For example:

   “get vpn_setup.zysh vpn.zysh” transfers the vpn_setup.zysh configuration file on the Zyxel Device to your computer and renames it “vpn.zysh.”

60.7.4 Command Line FTP Configuration File Download Example

The following example gets a configuration file named today.conf from the Zyxel Device and saves it on the computer as current.conf.

Figure 30 FTP Configuration File Download Example

```
C:\>ftp 192.168.1.1
Connected to 192.168.1.1.
220 FTP Server (ZyWALL) [192.168.1.1]
User (192.168.1.1:(none)): admin
331 Password required for admin.
Password:
230 User admin logged in.
ftp> bin
200 Type set to I
ftp> cd conf
250 CWD command successful
ftp> get today.conf current.conf
200 PORT command successful
150 Opening BINARY mode data connection for conf/today.conf
(20220 bytes)
226 Transfer complete.
ftp: 20220 bytes received in 0.03Seconds 652.26Kbytes/sec.
```

60.8 Cloud Helper Commands

Cloud Helper lets you know if there is a later firmware available on the Cloud Helper server and lets you download it if you did. You must register your Zyxel Device at myZyxel.com first.

Table 255 Cloud Helper Commands

COMMAND	DESCRIPTION
`show cloud-helper firmware`	Displays latest firmware information available on the Cloud Helper server.
`show cloud-helper autoupdate firmware`	Shows if automatically updating firmware is enabled, the schedule and if automatically rebooting the Zyxel Device is enabled (meaning the uploaded firmware becomes the running firmware.
`show cloud-helper retry`	Shows the number of retry_times, retry_period and retry_fail_period. `retry_times`: The number of attempts allowed to download items. `retry_period`: The length of time between download attempts. `retry_fail_period`: The retry interval after retry attempts have expired.
`cloud-helper check all`	Sends a query to the Cloud Helper Server to get the latest firmware, Geo IP, IDP signature and SSL CA certificate information.
`cloud-helper check firmware`	Sends a query to the Cloud Helper Server to get the latest firmware information.
`cloud-helper check geoip`	Sends a query to the Cloud Helper Server to get the latest Geo IP information.
`cloud-helper check idp`	Sends a query to the Cloud Helper Server to get the latest IDP signature information.
`cloud-helper check sslca`	Sends a query to the Cloud Helper Server to get the latest SSL CA certificate information.
`cloud-helper get firmware <1..2>`	Downloads the latest firmware on the Cloud Helper server to the specified system space on the Zyxel Device.
`cloud-helper get idp`	Downloads the latest IDP signature on the Cloud Helper server to the Zyxel Device.
`cloud-helper get sslca`	Downloads the latest SSL certificate on the Cloud Helper server to the Zyxel Device.

Table 255 Cloud Helper Commands (continued)

COMMAND	DESCRIPTION
`cloud-helper set {[retry_times <1..10>]} {[retry_period <2..60>]} {[retry_fail_period <180..720>]}`	Specifies criteria for how the Zyxel Device should download firmware, IDP signatures or SSL certificates from the Cloud Helper server. `retry_times:` Up to 10 attempts are allowed to download items. `retry_period:` The retry interval must be between 2 and 60 seconds. `retry_fail_period:` The retry interval after retry attempts have expired must be between 180 and 720 seconds.
`cloud-helper clean-download firmware`	Stops and removes a firmware being downloaded to the Zyxel Device.
`cloud-helper pause-download firmware <1..2>`	Temporarily stops a firmware being downloaded to the specified system space on the Zyxel Device.
`cloud-helper update firmware <1..2>`	Resumes a firmware being downloaded to the specified system space on the Zyxel Device.
`[no] cloud-helper firmware update auto`	Lets the Zyxel Device automatically check for and download new firmware to the standby partition at the time and day specified. The `no` command disallows the Zyxel Device automatically checking for and downloading new firmware.
`cloud-helper firmware update daily <0..23> reboot {no | yes}`	Has the Zyxel Device check for new firmware every day at the specified time. The time format is the 24 hour clock, so '0' means midnight, 01 means 1AM and so on. Configure `reboot yes` to have the Zyxel Device automatically restart making the newly downloaded firmware in the standby partition become the running firmware.
`cloud-helper firmware update weekly {fri | mon | sat | sun | thu | tue | wed} <0..23> reboot {no | yes}`	Has the Zyxel Device check for new firmware once a week on the day and at the time specified. Configure `reboot yes` to have the Zyxel Device automatically restart making the newly downloaded firmware in the standby partition become the running firmware. If you configure both weekly and daily commands, then the command that takes effect is the last one configured.

60.8.1 Cloud Helper Command Examples

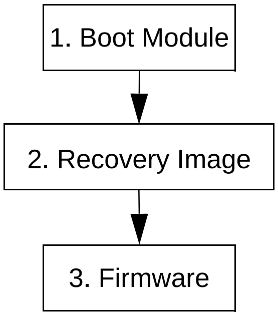
These are examples of Cloud Helper commands.

```
Router(config)#
Router(config)# cloud-helper check firmware
===============================================================================
Cloud status      : NORMAL
firmware version  : 4.20(AAPL.0)b5
firmware release  : 2016-07-15T02:29:11Z
firmware md5      : 752ed3f2d8296e669ea2146c29523bda
firmware news file: YES
firmware note file: YES
firmware message file: NO
boot status      : Running
===============================================================================
Cloud status      : NORMAL
firmware version  : 4.20(AAPL.0)b5
firmware release  : 2016-07-15T02:29:11Z
firmware md5      : 752ed3f2d8296e669ea2146c29523bda
firmware news file: YES
firmware note file: YES
firmware message file: NO
boot status      : Standby
Router(config)#
Router(config)#
Router# show cloud-helper autoupdate firmware
auto: no
schedule: daily at 18 o'clock
autoreboot: no
Router(config)# cloud-helper set retry_times 5 retry_period 6 retry_fail_period 200
Router# show cloud-helper retry
retry_times: 5
retry_period: 6 min
retry_fail_period: 200 min
Router(config)#
Router# show cloud-helper firmware
WARNING: can not get fw fw_md5 info
================================================================================
Cloud status      : NORMAL
firmware version  : 4.20(AAKZ.2)
firmware release  : 2016-11-29T01:42:39Z
firmware md5      :
firmware news file: YES
firmware note file: YES
firmware message file: YES
boot status      : Running
WARNING: can not get fw fw_md5 info
================================================================================
Cloud status      : NORMAL
firmware version  : 4.20(AAKZ.2)
firmware release  : 2016-11-29T01:42:39Z
firmware md5      :
firmware news file: YES
firmware note file: YES
firmware message file: YES
boot status      : Standby
Router(config)#
```

60.9 Zyxel Device File Usage at Startup

The Zyxel Device uses the following files at system startup.

Figure 31 Zyxel Device File Usage at Startup



1 The boot module performs a basic hardware test. You cannot restore the boot module if it is damaged. The boot module also checks and loads the recovery image. The Zyxel Device notifies you if the recovery image is damaged.

2 The recovery image checks and loads the firmware. The Zyxel Device notifies you if the firmware is damaged.

60.10 Notification of a Damaged Recovery Image or Firmware

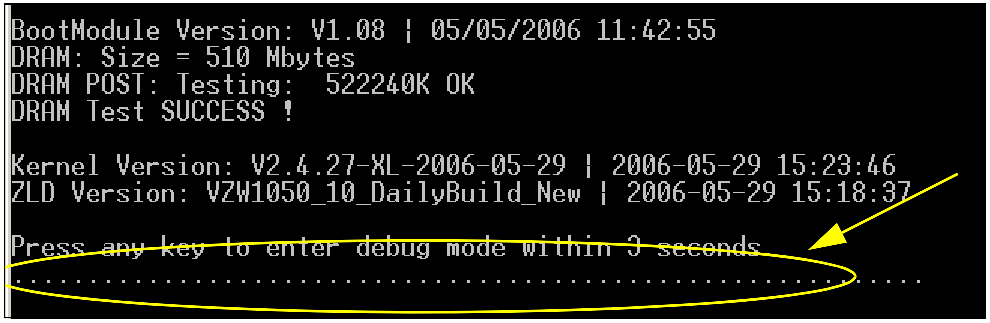
The Zyxel Device's recovery image and/or firmware could be damaged, for example by the power going off during a firmware upgrade. This section describes how the Zyxel Device notifies you of a damaged recovery image or firmware file. Use this section if your device has stopped responding for an extended period of time and you cannot access or ping it. Note that the Zyxel Device does not respond while starting up. It takes less than five minutes to start up with the default configuration, but the start up time increases with the complexity of your configuration.

1 Use a console cable and connect to the Zyxel Device via a terminal emulation program (such as HyperTerminal). Your console session displays the Zyxel Device's startup messages. If you cannot see any messages, check the terminal emulation program's settings (see Section 1.2.1 on page 24) and restart the Zyxel Device.

2 The system startup messages display followed by "Press any key to enter debug mode within 3 seconds."

Note: Do not press any keys at this point. Wait to see what displays next.

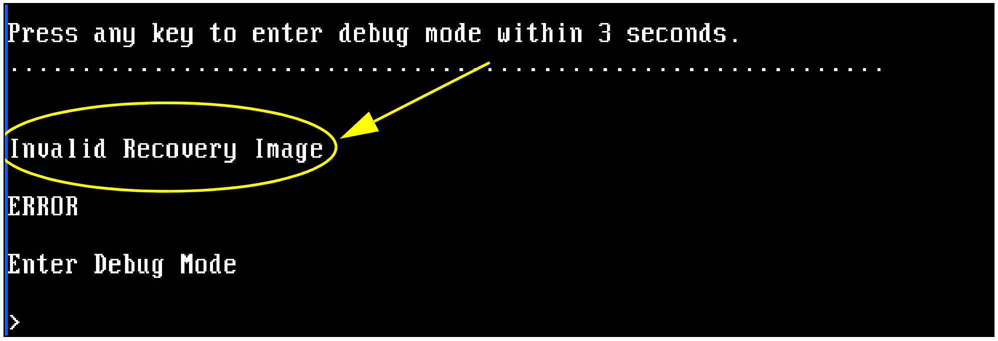
Figure 32 System Startup Stopped



```
BootModule Version: V1.08 | 05/05/2006 11:42:55
DRAM: Size = 510 Mbytes
DRAM POST: Testing:  522240K OK
DRAM Test SUCCESS !

Kernel Version: V2.4.27-XL-2006-05-29 | 2006-05-29 15:23:46
ZLD Version: VZW1050_10_DailyBuild_New | 2006-05-29 15:18:37

Press any key to enter debug mode within 3 seconds
..............................................................
```

3 If the console session displays "Invalid Firmware", or "Invalid Recovery Image", or the console freezes at "Press any key to enter debug mode within 3 seconds" for more than one minute, go to Section 60.11 on page 429 to restore the recovery image.

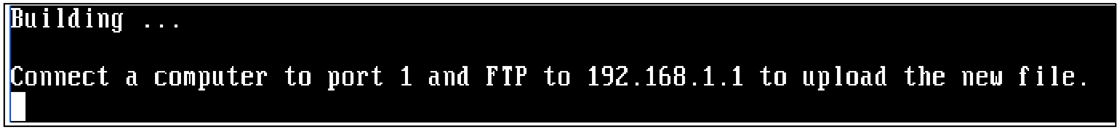
Figure 33 Recovery Image Damaged



```
Press any key to enter debug mode within 3 seconds.
..............................................................

Invalid Recovery Image

ERROR

Enter Debug Mode

>
```

4 If "Connect a computer to port 1 and FTP to 192.168.1.1 to upload the new file" displays on the screen, the firmware file is damaged. Use the procedure in Section 60.12 on page 431 to restore it. If the message does not display, the firmware is OK and you do not need to use the firmware recovery procedure.

Figure 34 Firmware Damaged



```
Building ...

Connect a computer to port 1 and FTP to 192.168.1.1 to upload the new file.
```

60.11 Restoring the Recovery Image

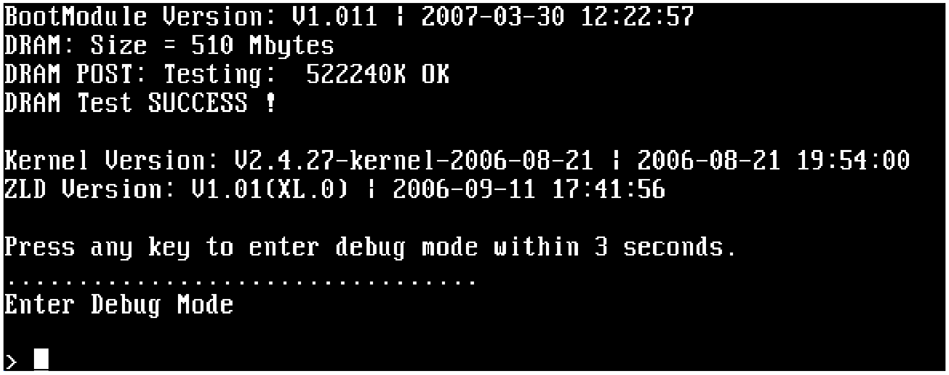
This procedure requires the Zyxel Device's recovery image. Download the firmware package from www.zyxel.com and unzip it. The recovery image uses a .ri extension, for example, "1.01(XL.0)C0.ri". Do the following after you have obtained the recovery image file.

Note: You only need to use this section if you need to restore the recovery image.

1 Restart the Zyxel Device.

2 When "Press any key to enter debug mode within 3 seconds." displays, press a key to enter debug mode.

Figure 35 Enter Debug Mode

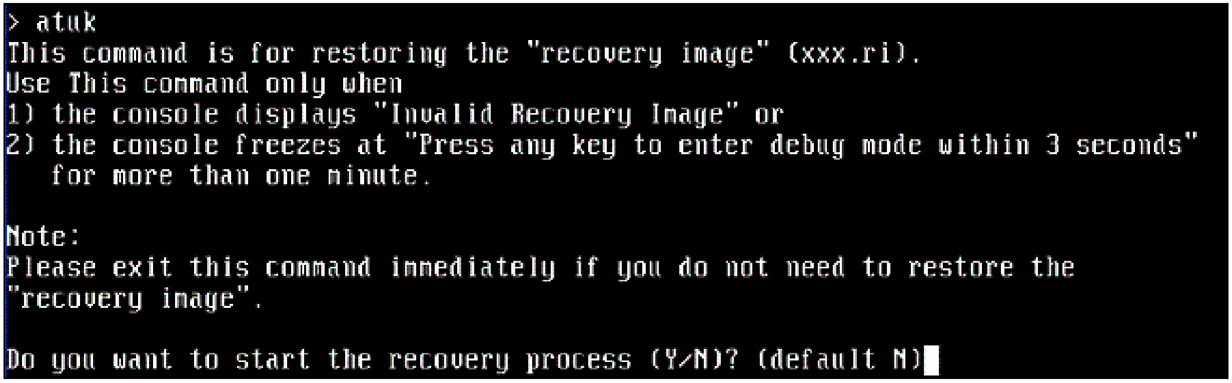


```
BootModule Version: V1.011 | 2007-03-30 12:22:57
DRAM: Size = 510 Mbytes
DRAM POST: Testing:  522240K OK
DRAM Test SUCCESS !

Kernel Version: V2.4.27-kernel-2006-08-21 | 2006-08-21 19:54:00
ZLD Version: V1.01(XL.0) | 2006-09-11 17:41:56

Press any key to enter debug mode within 3 seconds.
................................
Enter Debug Mode

>
```

3 Enter `atuk` to initialize the recovery process. If the screen displays "ERROR", enter `atur` to initialize the recovery process.

Note: You only need to use the `atuk` or `atur` command if the recovery image is damaged.

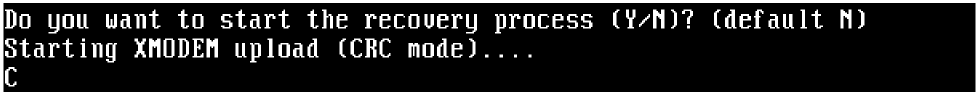
Figure 36 atuk Command for Restoring the Recovery Image



```
> atuk
This command is for restoring the "recovery image" (xxx.ri).
Use This command only when
1) the console displays "Invalid Recovery Image" or
2) the console freezes at "Press any key to enter debug mode within 3 seconds"
   for more than one minute.

Note:
Please exit this command immediately if you do not need to restore the
"recovery image".

Do you want to start the recovery process (Y/N)? (default N)
```

4 Enter `Y` and wait for the “Starting XMODEM upload” message before activating XMODEM upload on your terminal.

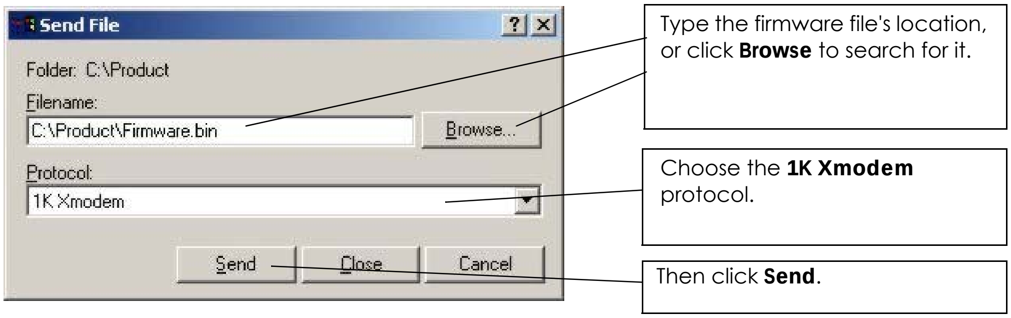
Figure 37 Starting Xmodem Upload



```
Do you want to start the recovery process (Y/N)? (default N)
Starting XMODEM upload (CRC mode)....
C
```

5 This is an example Xmodem configuration upload using HyperTerminal. Click **Transfer**, then **Send File** to display the following screen.

Figure 38 Example Xmodem Upload



Send File

Folder: C:\Product

Filename: C:\Product\Firmware.bin

Protocol: 1K Xmodem

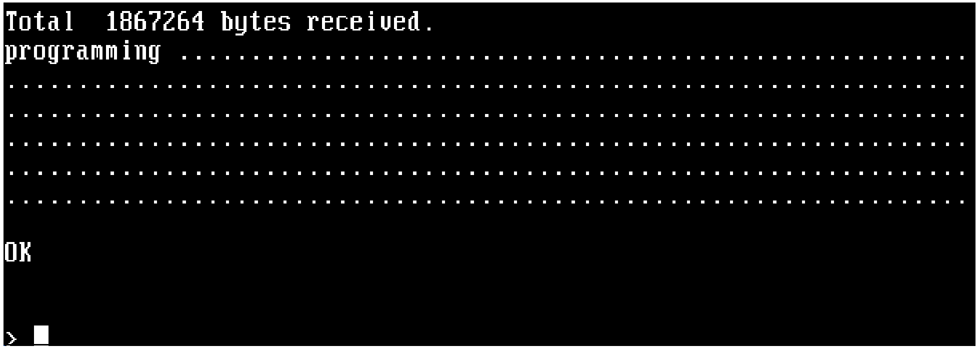
Type the firmware file's location, or click **Browse** to search for it.

Choose the **1K Xmodem** protocol.

Then click **Send**.

6 Wait for about three and a half minutes for the Xmodem upload to finish.

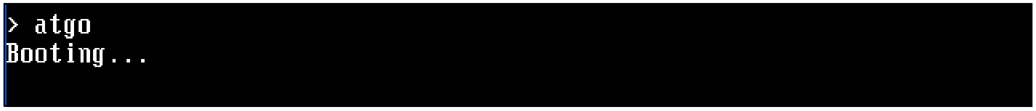
Figure 39 Recovery Image Upload Complete



```
Total  1867264 bytes received.
programming .......................................................
...................................................................
...................................................................
...................................................................
...................................................................
...................................................................

OK


>
```

7 Enter `atgo`. The Zyxel Device starts up. If “Connect a computer to port 1 and FTP to 192.168.1.1 to upload the new file” displays on the screen, the firmware file is damaged and you need to use the procedure in Section 60.12 on page 431 to recover the firmware.

Figure 40 atgo Debug Command



```
> atgo
Booting...
```

60.12 Restoring the Firmware

This procedure requires the Zyxel Device’s firmware. Download the firmware package from www.zyxel.com and unzip it. The firmware file uses a .bin extension, for example, "1.01(XL.0)C0.bin". Do the following after you have obtained the firmware file.

Note: This section is not for normal firmware uploads. You only need to use this section if you need to recover the firmware.

1 Connect your computer to the Zyxel Device’s port **1** (only port **1** can be used).

2 The Zyxel Device’s FTP server IP address for firmware recovery is 192.168.1.1, so set your computer to use a static IP address from 192.168.1.2 ~192.168.1.254.

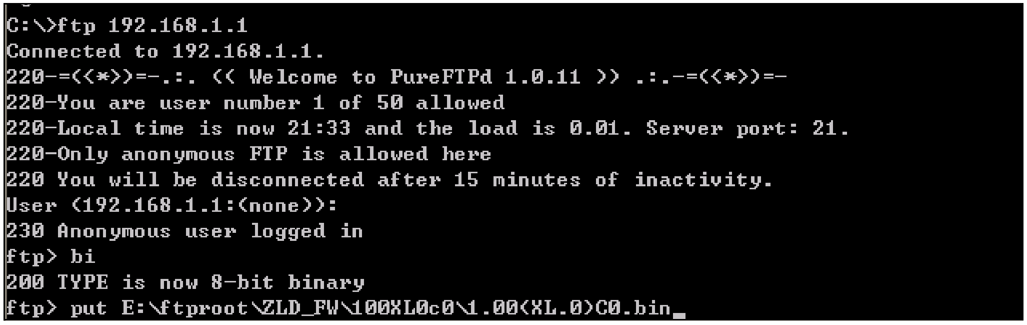
3 Use an FTP client on your computer to connect to the Zyxel Device. For example, in the Windows command prompt, type `ftp 192.168.1.1`. Keep the console session connected in order to see when the firmware recovery finishes.

4 Hit enter to log in anonymously.

5 Set the transfer mode to binary (type `bin)`.

6 Transfer the firmware file from your computer to the Zyxel Device. Type `put` followed by the path and name of the firmware file. This examples uses `put e:\ftproot\ZLD FW \1.01(XL.0)C0.bin`.

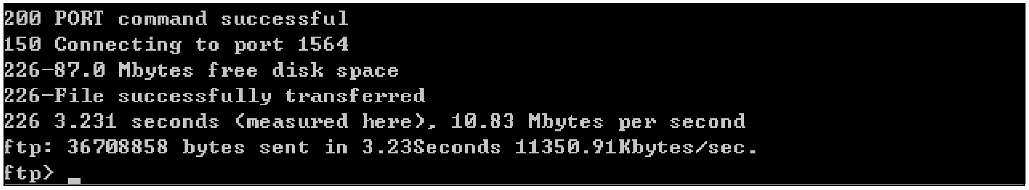
Figure 41 FTP Firmware Transfer Command



```
C:\>ftp 192.168.1.1
Connected to 192.168.1.1.
220-=(<*>)=-.:. (( Welcome to PureFTPd 1.0.11 )) .:.-=(<*>)=-
220-You are user number 1 of 50 allowed
220-Local time is now 21:33 and the load is 0.01. Server port: 21.
220-Only anonymous FTP is allowed here
220 You will be disconnected after 15 minutes of inactivity.
User (192.168.1.1:(none)):
230 Anonymous user logged in
ftp> bi
200 TYPE is now 8-bit binary
ftp> put E:\ftproot\ZLD_FW\100XL0c0\1.00(XL.0)C0.bin
```

7 Wait for the file transfer to complete.

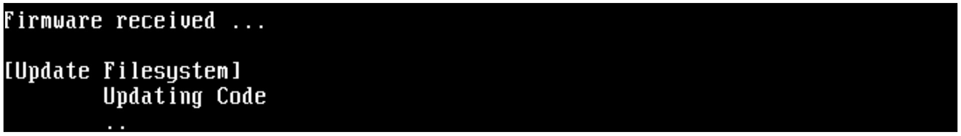
Figure 42 FTP Firmware Transfer Complete



```
200 PORT command successful
150 Connecting to port 1564
226-87.0 Mbytes free disk space
226-File successfully transferred
226 3.231 seconds (measured here), 10.83 Mbytes per second
ftp: 36708858 bytes sent in 3.23Seconds 11350.91Kbytes/sec.
ftp> _
```

8 After the transfer is complete, “Firmware received” or “ZLD-current received” displays. Wait (up to four minutes) while the Zyxel Device recovers the firmware.

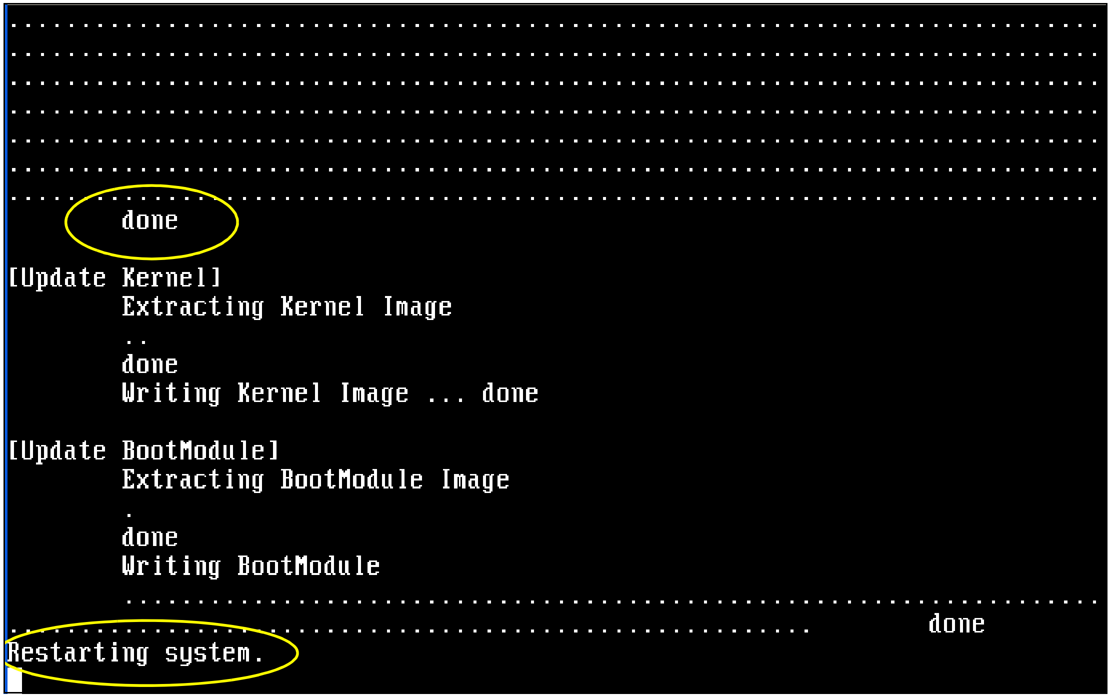
Figure 43 Firmware Received and Recovery Started



```
Firmware received ...

[Update Filesystem]
        Updating Code
        ..
```

9 The console session displays “done” when the firmware recovery is complete. Then the Zyxel Device automatically restarts.

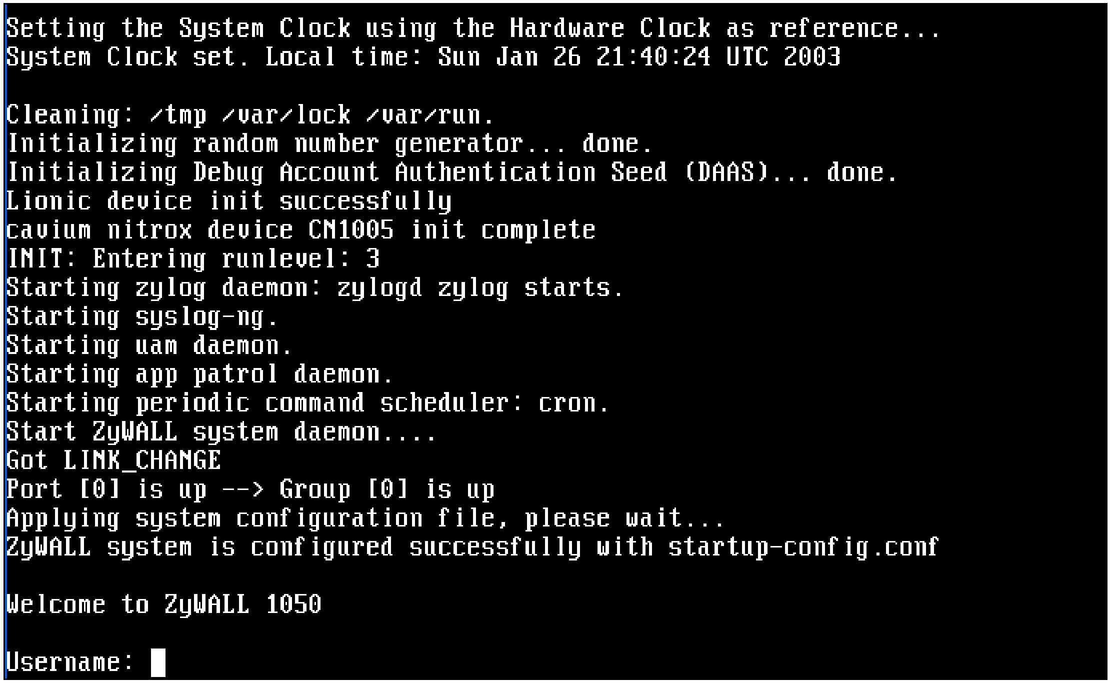
Figure 44 Firmware Recovery Complete and Restart



```
............................................................................
............................................................................
............................................................................
............................................................................
............................................................................
............................................................................
............................................................................
        done

[Update Kernel]
        Extracting Kernel Image
        ..
        done
        Writing Kernel Image ... done

[Update BootModule]
        Extracting BootModule Image
        .
        done
        Writing BootModule
        ....................................................................
........................................................        done
Restarting system.
```

10 The username prompt displays after the Zyxel Device starts up successfully. The firmware recovery process is now complete and the Zyxel Device is ready to use.

Figure 45 Restart Complete



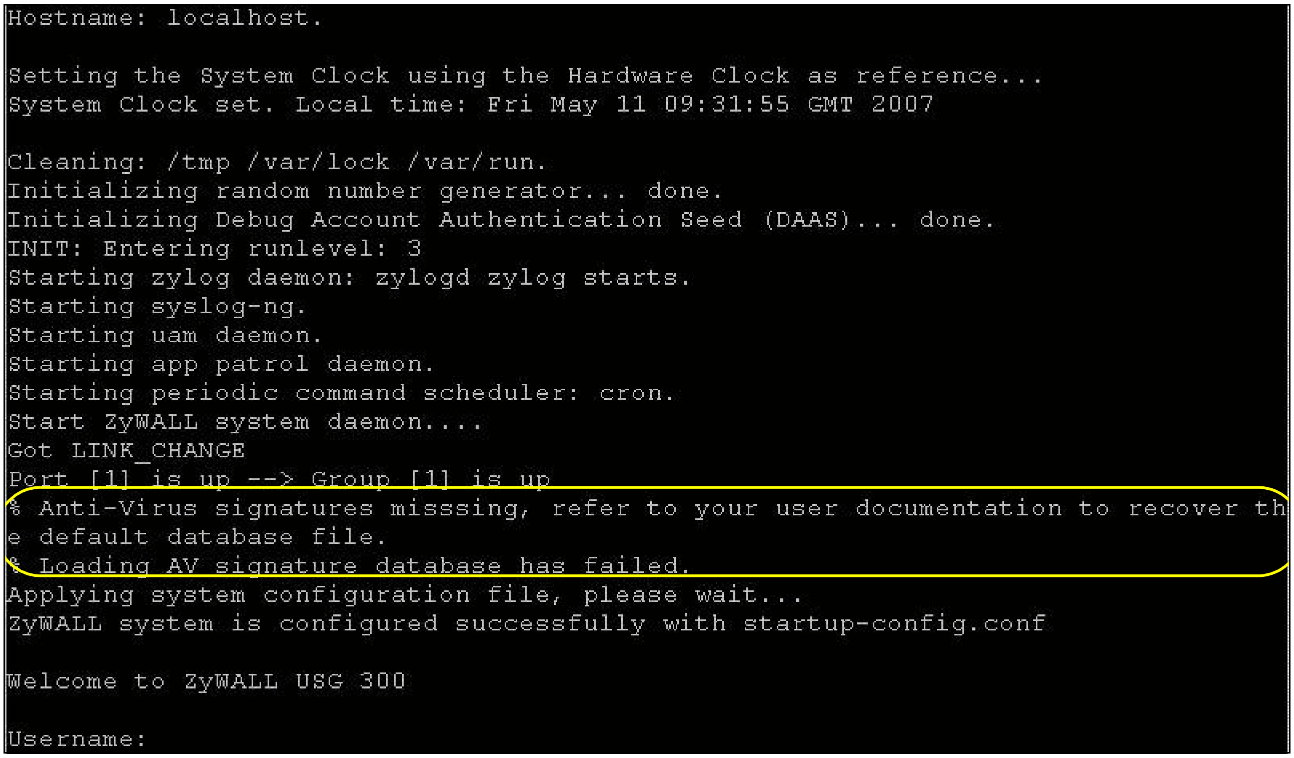
```
Setting the System Clock using the Hardware Clock as reference...
System Clock set. Local time: Sun Jan 26 21:40:24 UTC 2003

Cleaning: /tmp /var/lock /var/run.
Initializing random number generator... done.
Initializing Debug Account Authentication Seed (DAAS)... done.
Lionic device init successfully
cavium nitrox device CN1005 init complete
INIT: Entering runlevel: 3
Starting zylog daemon: zylogd zylog starts.
Starting syslog-ng.
Starting uam daemon.
Starting app patrol daemon.
Starting periodic command scheduler: cron.
Start ZyWALL system daemon....
Got LINK_CHANGE
Port [0] is up --> Group [0] is up
Applying system configuration file, please wait...
ZyWALL system is configured successfully with startup-config.conf

Welcome to ZyWALL 1050

Username:
```

60.13 Restoring the Default System Database

The default system database stores information such as the default anti-virus or IDP signatures. The Zyxel Device can still operate if the default system database is damaged or missing, but related features (like anti-virus or IDP) may not function properly.

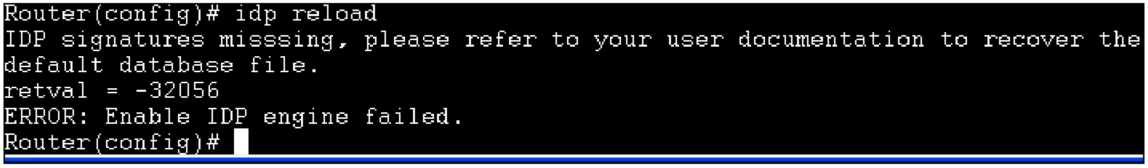
If the default system database file is not valid, the Zyxel Device displays a warning message in your console session at startup or when reloading the anti-virus or IDP signatures. It also generates a log. Here are some examples. Use this section to restore the Zyxel Device's default system database.

Figure 46 Default System Database Console Session Warning at Startup: Anti-Virus



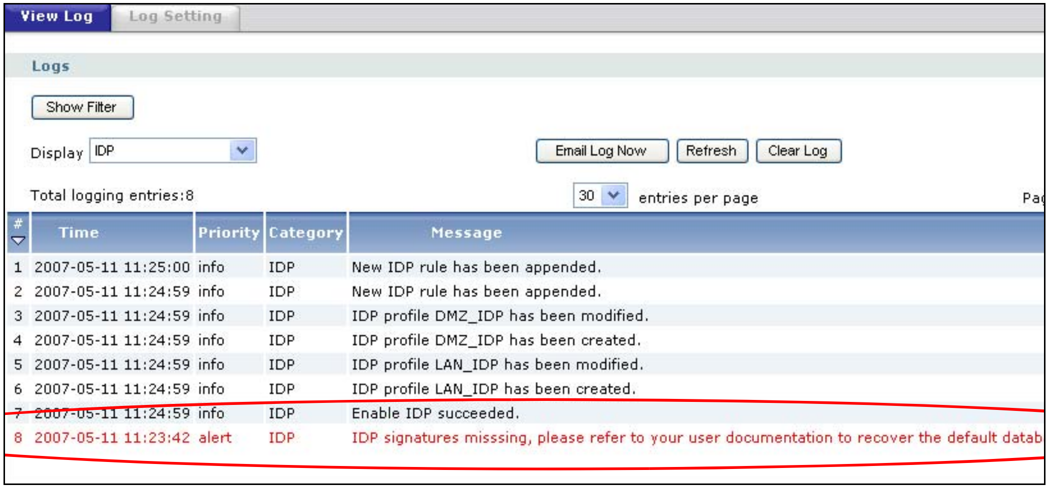
```
Hostname: localhost.

Setting the System Clock using the Hardware Clock as reference...
System Clock set. Local time: Fri May 11 09:31:55 GMT 2007

Cleaning: /tmp /var/lock /var/run.
Initializing random number generator... done.
Initializing Debug Account Authentication Seed (DAAS)... done.
INIT: Entering runlevel: 3
Starting zylog daemon: zylogd zylog starts.
Starting syslog-ng.
Starting uam daemon.
Starting app patrol daemon.
Starting periodic command scheduler: cron.
Start ZyWALL system daemon....
Got LINK_CHANGE
Port [1] is up --> Group [1] is up
% Anti-Virus signatures misssing, refer to your user documentation to recover th
e default database file.
% Loading AV signature database has failed.
Applying system configuration file, please wait...
ZyWALL system is configured successfully with startup-config.conf

Welcome to ZyWALL USG 300

Username:
```

Figure 47 Default System Database Console Session Warning When Reloading IDP



```
Router(config)# idp reload
IDP signatures misssing, please refer to your user documentation to recover the
default database file.
retval = -32056
ERROR: Enable IDP engine failed.
Router(config)#
```

Figure 48 Default System Database Missing Log: Anti-Virus



Display IDP

Total logging entries:8

30 entries per page

#	Time	Priority	Category	Message
1	2007-05-11 11:25:00	info	IDP	New IDP rule has been appended.
2	2007-05-11 11:24:59	info	IDP	New IDP rule has been appended.
3	2007-05-11 11:24:59	info	IDP	IDP profile DMZ_IDP has been modified.
4	2007-05-11 11:24:59	info	IDP	IDP profile DMZ_IDP has been created.
5	2007-05-11 11:24:59	info	IDP	IDP profile LAN_IDP has been modified.
6	2007-05-11 11:24:59	info	IDP	IDP profile LAN_IDP has been created.
7	2007-05-11 11:24:59	info	IDP	Enable IDP succeeded.
8	2007-05-11 11:23:42	alert	IDP	IDP signatures misssing, please refer to your user documentation to recover the default datab

This procedure requires the Zyxel Device's default system database file. Download the firmware package from www.zyxel.com and unzip it. The default system database file uses a .db extension, for example, "1.01(XL.0)C0.db". Do the following after you have obtained the default system database file.

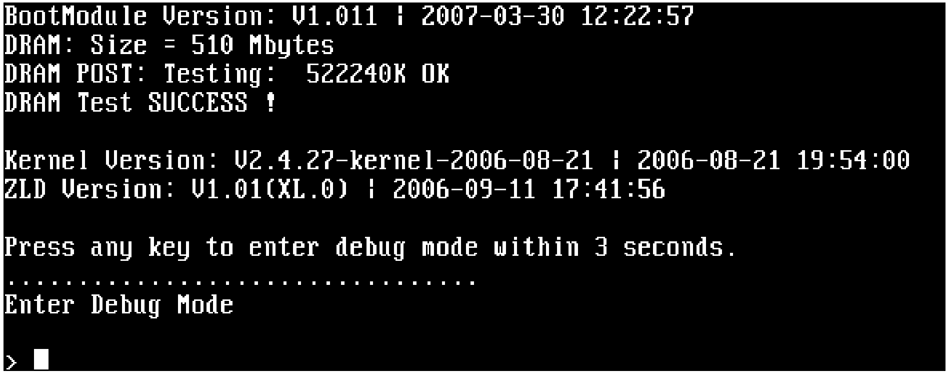
60.13.1 Using the atkz -u Debug Command

Note: You only need to use the `atkz -u` command if the default system database is damaged.

1 Restart the Zyxel Device.

2 When “Press any key to enter debug mode within 3 seconds.” displays, press a key to enter debug mode.

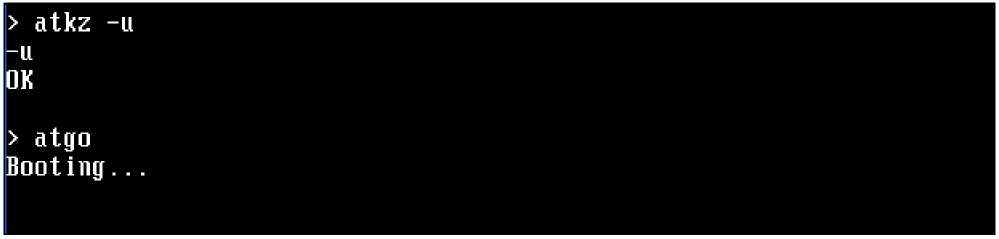
Figure 49 Enter Debug Mode



```
BootModule Version: V1.011 | 2007-03-30 12:22:57
DRAM: Size = 510 Mbytes
DRAM POST: Testing:  522240K OK
DRAM Test SUCCESS !

Kernel Version: V2.4.27-kernel-2006-08-21 | 2006-08-21 19:54:00
ZLD Version: V1.01(XL.0) | 2006-09-11 17:41:56

Press any key to enter debug mode within 3 seconds.
.................................
Enter Debug Mode

> 
```

3 Enter `atkz -u` to start the recovery process.

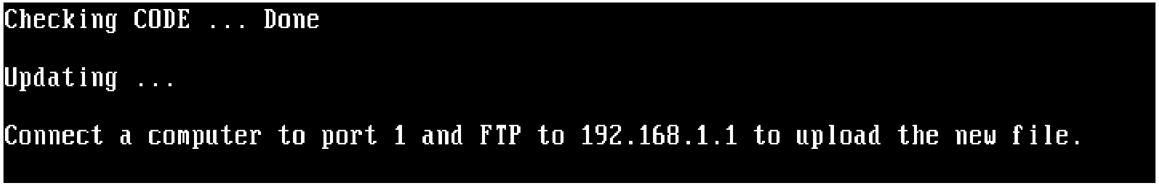
Figure 50 atkz -u Command for Restoring the Default System Database



```
> atkz -u
-u
OK

> atgo
Booting...
```

4 “Connect a computer to port 1 and FTP to 192.168.1.1 to upload the new file” displays on the screen. Connect your computer to the Zyxel Device’s port **1** (only port **1** can be used).

Figure 51 Use FTP with Port 1 and IP 192.168.1.1 to Upload File



```
Checking CODE ... Done

Updating ...

Connect a computer to port 1 and FTP to 192.168.1.1 to upload the new file.
```

5 The Zyxel Device’s FTP server IP address for firmware recovery is 192.168.1.1, so set your computer to use a static IP address from 192.168.1.2 ~192.168.1.254.

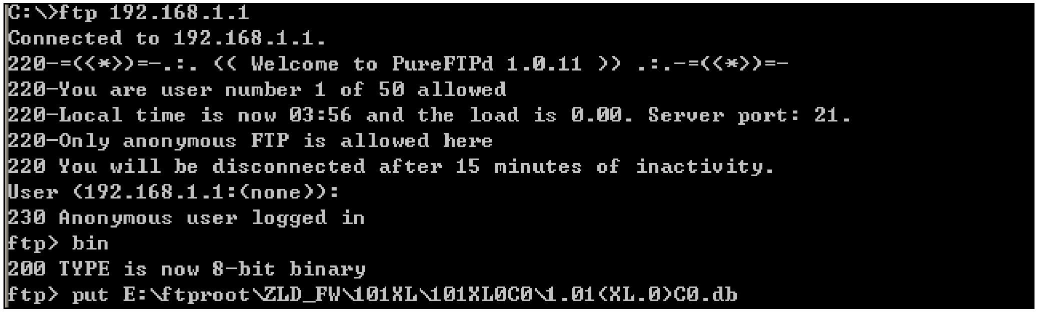
6 Use an FTP client on your computer to connect to the Zyxel Device. For example, in the Windows command prompt, type `ftp 192.168.1.1`. Keep the console session connected in order to see when the default system database recovery finishes.

7 Hit enter to log in anonymously.

8 Set the transfer mode to binary (type `bin`).

9 Transfer the firmware file from your computer to the Zyxel Device. Type `put` followed by the path and name of the firmware file. This examples uses `put e:\ftproot\ZLD FW \1.01(XL.0)C0.db`.

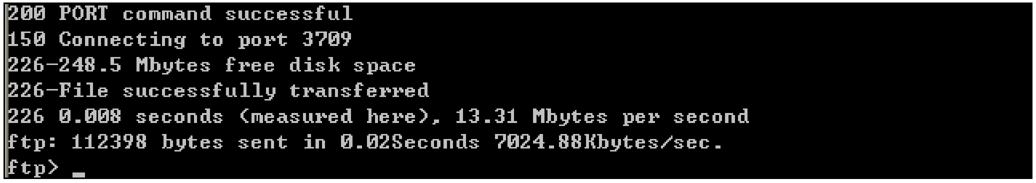
Figure 52 FTP Default System Database Transfer Command



```
C:\>ftp 192.168.1.1
Connected to 192.168.1.1.
220-=(<*>)=-.:. (( Welcome to PureFTPd 1.0.11 )) .:.-=(<*>)=-
220-You are user number 1 of 50 allowed
220-Local time is now 03:56 and the load is 0.00. Server port: 21.
220-Only anonymous FTP is allowed here
220 You will be disconnected after 15 minutes of inactivity.
User (192.168.1.1:(none)):
230 Anonymous user logged in
ftp> bin
200 TYPE is now 8-bit binary
ftp> put E:\ftproot\ZLD_FW\101XL\101XL0C0\1.01(XL.0)C0.db
```

10 Wait for the file transfer to complete.

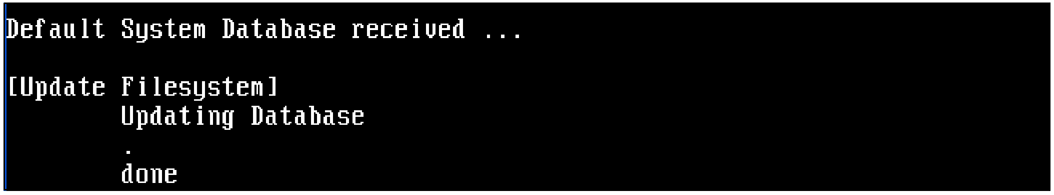
Figure 53 FTP Default System Database Transfer Complete



```
200 PORT command successful
150 Connecting to port 3709
226-248.5 Mbytes free disk space
226-File successfully transferred
226 0.008 seconds (measured here), 13.31 Mbytes per second
ftp: 112398 bytes sent in 0.02Seconds 7024.88Kbytes/sec.
ftp> _
```

11 The console session displays “done” after the default system database is recovered.

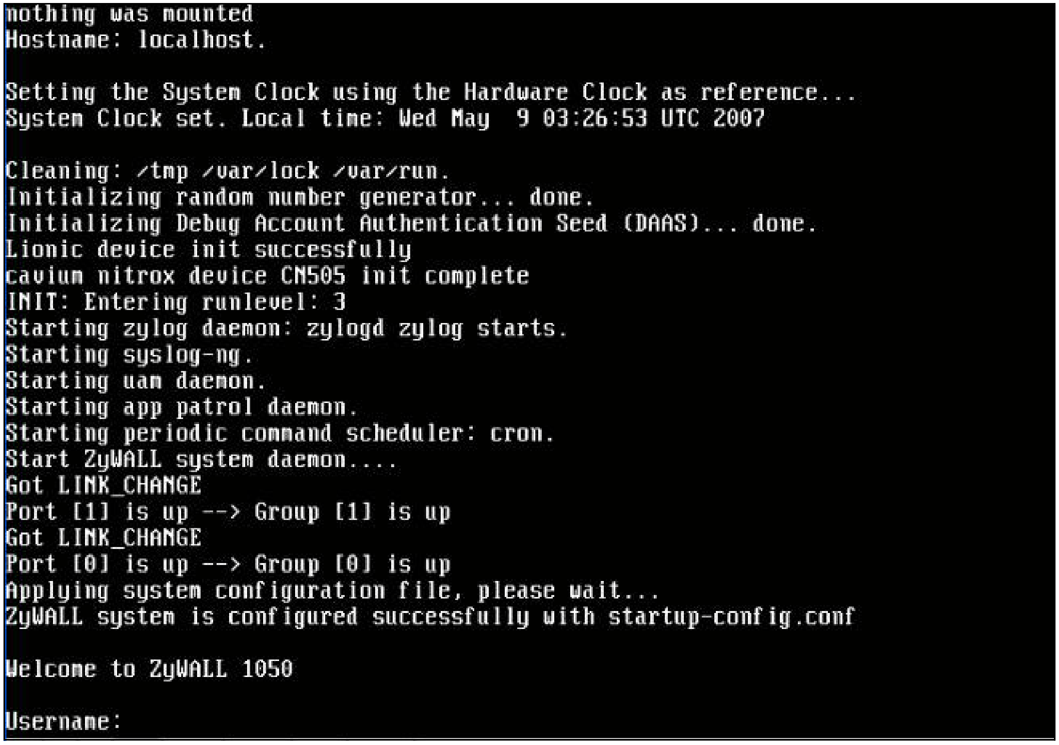
Figure 54 Default System Database Received and Recovery Complete



```
Default System Database received ...

[Update Filesystem]
        Updating Database
        .
        done
```

12 The username prompt displays after the Zyxel Device starts up successfully. The default system database recovery process is now complete and the Zyxel Device IDP and anti-virus features are ready to use again.

Figure 55 Startup Complete



```
nothing was mounted
Hostname: localhost.

Setting the System Clock using the Hardware Clock as reference...
System Clock set. Local time: Wed May  9 03:26:53 UTC 2007

Cleaning: /tmp /var/lock /var/run.
Initializing random number generator... done.
Initializing Debug Account Authentication Seed (DAAS)... done.
Lionic device init successfully
cavium nitrox device CN505 init complete
INIT: Entering runlevel: 3
Starting zylog daemon: zylogd zylog starts.
Starting syslog-ng.
Starting uam daemon.
Starting app patrol daemon.
Starting periodic command scheduler: cron.
Start ZyWALL system daemon....
Got LINK_CHANGE
Port [1] is up --> Group [1] is up
Got LINK_CHANGE
Port [0] is up --> Group [0] is up
Applying system configuration file, please wait...
ZyWALL system is configured successfully with startup-config.conf

Welcome to ZyWALL 1050

Username:
```

CHAPTER 61
Logs

This chapter provides information about the Zyxel Device's logs.

Note: When the system log reaches the maximum number of log messages, new log messages automatically overwrite existing log messages, starting with the oldest existing log message first.

See the User's Guide for the maximum number of system log messages in the Zyxel Device.

61.1 Log Commands Summary

The following table describes the values required for many log commands. Other values are discussed with the corresponding commands.

Table 256 Input Values for Log Commands

LABEL	DESCRIPTION
interface_name	The name of the interface. Ethernet interface: For some Zyxel Device models, use ge*x*, *x* = 1 - N, where N equals the highest numbered Ethernet interface for your Zyxel Device model. For othere Zyxel Device models, use a name such as wan1, wan2, opt, lan1, or dmz. Virtual interface on top of Ethernet interface: add a colon (:) and the number of the virtual interface. For example: ge*x*:*y*, *x* = 1 - N, *y* = 1 - 4 VLAN interface: vlan*x*, *x* = 0 - 4094 Virtual interface on top of VLAN interface: vlan*x*:*y*, *x* = 0 - 4094, *y* = 1 - 12 Bridge interface: br*x*, *x* = 0 - N, where N depends on the number of bridge interfaces your Zyxel Device model supports. Virtual interface on top of bridge interface: br*x*:*y*, *x* = the number of the bridge interface, *y* = 1 - 4 PPPoE/PPTP interface: ppp*x*, *x* = 0 - N, where N depends on the number of PPPoE/PPTP interfaces your Zyxel Device model supports.
module_name	The name of the category; `kernel`, `syslog`, ... The `default` category includes debugging messages generated by open source software. The `all` category includes all messages in all categories.
protocol	The name of a protocol such as TCP, UDP, ICMP.

The following sections list the logging commands.

61.1.1 Log Entries Commands

This table lists the commands to look at log entries.

Table 257 logging Commands: Log Entries

COMMAND	DESCRIPTION
show logging entries [priority *pri*] [category *module_name*] [srcip *ip*] [srcip6 *ipv6_addr*] [dstip *ip*] [dstip6 *ipv6_addr*] [service *service_name]* [begin <1..512> end <1..512>] [keyword *keyword*] [srciface *interface_name*] [dstiface *interface_name*] [protocol *protocol*]	Displays the specified entries in the system log. *pri*: alert | crit | debug | emerg | error | info | notice | warn *keyword*: You can use alphanumeric and ()+/:=?!*#@$_%- characters, and it can be up to 63 characters long. This searches the message, source, destination, and notes fields.
show logging entries field *field* [begin <1..512> end <1..512>]	Displays the specified fields in the system log. *field*: time | msg | src | dst | note | pri | cat | all

61.1.2 System Log Commands

This table lists the commands for the system log settings.

Table 258 logging Commands: System Log Settings

COMMAND	DESCRIPTION
show logging status system-log	Displays the current settings for the system log.
logging system-log category *module_name* {disable | level normal | level all}	Specifies what kind of information, if any, is logged in the system log and debugging log for the specified category.
[no] logging system-log suppression interval <10..600>	Sets the log consolidation interval for the system log. The no command sets the interval to ten.
[no] logging system-log suppression	Enables log consolidation in the system log. The no command disables log consolidation in the system log.
[no] logging cef-format include year	Includes the year in the cef (Common Event Format) syslog-compatible format.
[no] connectivity-check continuous-log activate	Has the Zyxel Device generate a log for each connectivity check. The no command has the Zyxel Device only log the first connectivity check.
show connectivity-check continuous-log status	Displays whether or not the Zyxel Device generates a log for each connectivity check.
clear logging system-log buffer	Clears the system log.

61.1.2.1 System Log Command Examples

The following command displays the current status of the system log.

```
Router# configure terminal
Router(config)# show logging status system-log
512 events logged
suppression active  : yes
suppression interval: 10
category settings   :
    content-filter     : normal , forward-web-sites : no     ,
    blocked-web-sites  : normal , user              : normal ,
    myZyxel.com        : normal , zysh              : normal ,
    idp                : normal , app-patrol        : normal ,
    ike                : normal , ipsec             : normal ,
    firewall           : normal , sessions-limit    : normal ,
    policy-route       : normal , built-in-service  : normal ,
    system             : normal , connectivity-check: normal ,
    device-ha          : normal , routing-protocol  : normal ,
    nat                : normal , pki               : normal ,
    interface          : normal , interface-statistics: no     ,
    account            : normal , port-grouping     : normal ,
    force-auth         : normal , l2tp-over-ipsec   : normal ,
    anti-virus         : normal , white-list        : normal ,
    black-list         : normal , ssl-vpn           : normal ,
    cnm                : normal , traffic-log       : no     ,
    file-manage        : normal , dial-in           : normal ,
    adp                : normal , default           : all    ,
```

61.1.3 Debug Log Commands

This table lists the commands for the debug log settings.

Table 259 logging Commands: Debug Log Settings

COMMAND	DESCRIPTION
show logging debug status	Displays the current settings for the debug log.
show logging debug entries [priority *pri*] [category *module_name*] [srcip *ip*] [srcip6 *ipv6_addr*] [dstip *ip*] [dstip6 *ipv6_addr*] [service *service_name]* [srciface *interface_name*] [dstiface *interface_name*] [protocol *protocol*] [begin <1..512> end <1..512>] [keyword *keyword*]	Displays the specified entries in the system log. *pri*: alert | crit | debug | emerg | error | info | notice | warn *keyword*: You can use alphanumeric and ()+/:=?!*#@$_%- characters, and it can be up to 63 characters long. This searches the message, source, destination, and notes fields.
show logging debug entries field *field* [begin <1..1024> end <1..1024>]	Displays the specified field in the debug log. *field*: time | msg | src | dst | note | pri | cat | all
[no] logging debug suppression	Enables log consolidation in the debug log. The no command disables log consolidation in the debug log.
[no] logging debug suppression interval <10..600>	Sets the log consolidation interval for the debug log. The no command sets the interval to ten.
clear logging debug buffer	Clears the debug log.

This table lists the commands for the remote syslog server settings. For the purposes of this device's CLI, Access Points are referred to as WTPs.

Table 260 logging Commands: Remote Syslog Server Settings

COMMAND	DESCRIPTION
`show logging status syslog`	Displays the current settings for the remote servers.
`[no] logging syslog <1..4>`	Enables the specified remote server. The `no` command disables the specified remote server.
`[no] logging syslog <1..4> address {`*`ip`*` | `*`hostname`*`}`	Sets the URL or IP address of the specified remote server. The `no` command clears this field. *`hostname`*: You may up to 63 alphanumeric characters, dashes (-), or periods (.), but the first character cannot be a period.
`[no] logging syslog <1..4> {disable | level normal | level all}`	Specifies what kind of information, if any, is logged for the specified category.
`[no] logging syslog <1..4> facility {local_1 | local_2 | local_3 | local_4 | local_5 | local_6 | local_7}`	Sets the log facility for the specified remote server. The `no` command sets the facility to local_1.
`[no] logging syslog <1..4> format {cef | vrpt}`	Sets the format of the log information. `cef`: Common Event Format, syslog-compatible format. `vrpt`: Zyxel's Vantage Report, syslog-compatible format.

This table lists the commands for setting how often to send information to the VRPT (Zyxel's Vantage Report) server.

Table 261 logging Commands: VRPT Settings

COMMAND	DESCRIPTION
`vrpt send device information interval <15..3600>`	Sets the interval (in seconds) for how often the Zyxel Device sends a device information log to the VRPT server.
`vrpt send interface statistics interval <15..3600>`	Sets the interval (in seconds) for how often the Zyxel Device sends an interface statistics log to the VRPT server.
`vrpt send system status interval <15..3600>`	Sets the interval (in seconds) for how often the Zyxel Device sends a system status log to the VRPT server.
`show vrpt send device information interval`	Displays the interval (in seconds) for how often the Zyxel Device sends a device information log to the VRPT server.
`show vrpt send interface statistics interval`	Displays the interval (in seconds) for how often the Zyxel Device sends an interface statistics log to the VRPT server.
`show vrpt send system status interval`	Displays the interval (in seconds) for how often the Zyxel Device sends a system status log to the VRPT server.
`MODULE_NAME_WTP`	{user| zysh| built-in-service| system| system-monitoring| routing-protocol| pki| interface| interface-statistics| account| force-auth| traffic-log| file-manage| wlan| daily-report| dhcp| default| capwap| wlan-station-info| all}
`FACILITY`	{local_1|local_2|local_3|local_4|local_5|local_6|local_7}
`HOSTNAME`	"(([a-z0-9\-])+\.)+([a-z]{2}\.[a-z]{2}|[a-z]{2,4})"
`USER_NAME_`	"([0-9]|[a-z]|[A-Z]|[-_]|\.|\@|[0-9]|[a-z]|[A-Z]|[-_])+"
`ZYLOG_SUBJECT`	"[a-zA-Z0-9 '()+,./:=?;!*#@$_%-]{1,61}""<subject>";

Table 261 logging Commands: VRPT Settings (continued)

COMMAND	DESCRIPTION
MODULE_NAME_WTP_	{user | zysh | built-in-service | system | routing-protocol | pki | interface | account | force-auth | file-manage | wlan | daily-report | dhcp | default | capwap | wlan-station-info | all}
WEEKDAYS	{sun | mon | tue | wed | thu | fri | sat}

61.1.4 E-mail Profile Commands

This table lists the commands for the e-mail profile settings.

Table 262 logging Commands: E-mail Profile Settings

COMMAND	DESCRIPTION
show logging status mail	Displays the current settings for the e-mail profiles.
[no] logging mail <1..2>	Enables the specified e-mail profile. The no command disables the specified e-mail profile.
[no] logging mail <1..2> address {*ip* | *hostname*}	Sets the URL or IP address of the mail server for the specified e-mail profile. The no command clears the mail server field. *hostname*: You may up to 63 alphanumeric characters, dashes (-), or periods (.), but the first character cannot be a period.
logging mail <1..2> sending_now	Sends mail for the specified e-mail profile immediately, according to the current settings.
[no] logging mail <1..2> tls activate	Select Transport Layer Security (TLS) if you want encrypted communications between the mail server and the Zyxel Device.
[no]logging mail <1..2> tls authenticate-server	If you choose TLS Security, you may also select this to have the Zyxel Device authenticate the mail server in the TLS handshake.
[no] logging mail <1..2> authentication	Enables SMTP authentication. The no command disables SMTP authentication.
[no] logging mail <1..2> authentication username *username* password *password*	Sets the username and password required by the SMTP mail server. The no command clears the username and password fields. *username*: You can use alphanumeric characters, underscores (_), and dashes (-), and it can be up to 31 characters long. *password*: You can use most printable ASCII characters. You cannot use square brackets [ ], double quotation marks (“), question marks (?), tabs or spaces. It can be up to 31 characters long.
[no] logging mail <1..2> port <1..65535>	Sets the port number of the mail server for the specified e-mail profile.
[no] logging mail <1..2> {send-log-to | send-alerts-to} *e_mail*	Sets the e-mail address for logs or alerts. The no command clears the specified field. *e_mail*: You can use up to 63 alphanumeric characters, underscores (_), or dashes (-), and you must use the @ character.
[no] logging mail <1..2> subject *subject*	Sets the subject line when the Zyxel Device mails to the specified e-mail profile. The no command clears this field. *subject*: You can use up to 60 alphanumeric characters, underscores (_), dashes (-), or !@#$%*()+=;:',./ characters.
[no] logging mail <1..2> category *module_name* level {alert | all}	Specifies what kind of information is logged for the specified category. The no command disables logging for the specified category.
[no] logging mail <1..2> schedule {full | hourly}	Sets the e-mail schedule for the specified e-mail profile. The no command clears the schedule field.

Table 262 logging Commands: E-mail Profile Settings (continued)

COMMAND	DESCRIPTION
`logging mail <1..2> schedule daily hour <0..23> minute <0..59>`	Sets a daily e-mail schedule for the specified e-mail profile.
`logging mail <1..2> schedule weekly day` *`day`* `hour <0..23> minute <0..59>`	Sets a weekly e-mail schedule for the specified e-mail profile. *day*: sun | mon | tue | wed | thu | fri | sat
`[no] logging mail <1..2> tls starttls-off`	Turns off STARTTLS and uses the TLS protocol for SMTP mail encryption over TLS logging. The `no` command enables the default STARTTLS protocol.

61.1.4.1 E-mail Profile Command Examples

The following commands set up e-mail log 1.

```
Router# configure terminal
Router(config)# logging mail 1 address mail.zyxel.com.tw
Router(config)# logging mail 1 subject AAA
Router(config)# logging mail 1 authentication username lachang.li password
XXXXXX
Router(config)# logging mail 1 send-log-to lachang.li@zyxel.com.tw
Router(config)# logging mail 1 send-alerts-to lachang.li@zyxel.com.tw
Router(config)# logging mail 1 from lachang.li@zyxel.com.tw
Router(config)# logging mail 1 schedule weekly day mon hour 3 minute 3
Router(config)# logging mail 1
```

61.1.5 Console Port Logging Commands

This table lists the commands for the console port settings.

Table 263 logging Commands: Console Port Settings

COMMAND	DESCRIPTION
`show logging status console`	Displays the current settings for the console log. (This log is not discussed above.)
`[no] logging console`	Enables the console log. The `no` command disables the console log.
`logging console category` *`module_name`* `level {alert | crit | debug | emerg | error | info | notice | warn}`	Controls whether or not debugging information for the specified priority is displayed in the console log, if logging for this category is enabled.
`[no] logging console category` *`module_name`*	Enables logging for the specified category in the console log. The `no` command disables logging.

CHAPTER 62
Reports and Reboot

This chapter provides information about the report associated commands and how to restart the Zyxel Device using commands. It also covers the daily report e-mail feature.

62.1 Report Commands Summary

The following sections list the report, session, and packet size statistics commands.

62.1.1 Report Commands

This table lists the commands for reports.

Table 264 report Commands

COMMAND	DESCRIPTION
`[no] report`	Begins data collection. The `no` command stops data collection.
`show report status`	Displays whether or not the Zyxel Device is collecting data and how long it has collected data.
`clear report [`*`interface_name`*`]`	Clears the report for the specified interface or for all interfaces.
`show report [`*`interface_name`*` {ip	service	url}]`	Displays the traffic report for the specified interface and controls the format of the report. Formats are: `ip` - traffic by IP address and direction `service` - traffic by service and direction `url` - hits by URL

62.1.2 Report Command Examples

The following commands start collecting data, display the traffic reports, and stop collecting data.

```
Router# configure terminal
Router(config)# show report ge1 ip
No. IP Address      User                 Amount          Direction
===================================================================
1   192.168.1.4     admin                1273(bytes)     Outgoing
2   192.168.1.4     admin                711(bytes)      Incoming
Router(config)# show report ge1 service
No. Port  Service          Amount          Direction
====================================================================
1   21    ftp              1273(bytes)     Outgoing
2   21    ftp              711(bytes)      Incoming
Router(config)# show report ge1 url
No. Hit        URL
=====================================================================
1   1          140.114.79.60
Router(config)# show report status
Report status: on
Collection period: 0 days 0 hours 0 minutes 18 seconds
```

62.1.3 Session Commands

This table lists the commands to display the current sessions for debugging or statistical analysis.

Table 265 Session Commands

COMMAND	DESCRIPTION
show conn [user {*username*|any|unknown}] [service {*service-name*|any|unknown}] [source {*ip*|any}] [destination {*ip*|any}] [begin <1..128000>] [end <1..128000>] [dstcc {*country-code*|any}] [srtcc {*country-code*|any}] fastpath	Displays information about the selected sessions, a number of sessions (begin, end) or about all sessions. You can look at all the active sessions or filter the information by user name, service object, source IP, destination IP, country or session number(s). any means all users, services, countries and IP addresses respectively. unknown means unknown users and services respectively. dstcc and srtcc mean source and destination country code. *country_code*: 2-letter country-codes, such as TW, DE, or FR. Use show country-code list to see the codes that represent countries. fastpath Packets that pass through the Zyxel Device are inspected and either allowed through or dropped based on the security policy. IPv4 Packets that match the current connections in the fast path can pass through the Zyxel Device without unnecessary security policy checks. This feature maximizes performance.
show report [*interface_name*] https-url	Displays the most-visited Web sites accessed via SSL through the specified interface and how many times each site has been visited.
show conn ip-traffic destination	Displays information about traffic session sorted by the destination.
show conn ip-traffic source	Displays information about traffic session sorted by the source.
show conn status	Displays the number of active sessions.

62.1.4 Packet Size Statistics Commands

Using the packet size statistics to view packet size distribution may aid you in troubleshooting network performance. In particular, a large number of small packets can drastically reduce throughput. This table lists the commands to enable and disable packet size statistics data collection and display the setting status and statistics.

Table 266 Packet Size Statistics Commands

COMMAND	DESCRIPTION
`[no] report packet size statistics`	Enables or disables packet size statistics data collection.
`show report packet size statistics status`	Shows whether packet size statistics data collection is enabled or disabled.
`show report packet size statistics {interface_name} [interval interval]`	Displays the specified interface's packet size distribution statistics. You can also specify the packet size interval into which to group the statistics. *interval*: 128, 256, or 512 (bytes)
`report packet size statistics clear`	Clears the packet size statistics data for all interface.

62.2 Email Daily Report Commands

The following table identifies the values used in some of these commands. Other input values are discussed with the corresponding commands.

Table 267 Input Values for Email Daily Report Commands

LABEL	DESCRIPTION
e_mail	An e-mail address. You can use up to 80 alphanumeric characters, underscores (_), periods (.), or dashes (-), and you must use the @ character.

Use these commands to have the Zyxel Device e-mail you system statistics every day. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 268 Email Daily Report Commands

COMMAND	DESCRIPTION
`show daily-report status`	Displays the e-mail daily report settings.
`daily-report`	Enters the sub-command mode for configuring daily e-mail reports settings.
`[no] activate`	Turns daily e-mail reports on or off.
`draw-usage-graphics`	Has the report e-mail include usage graphs.
`smtp-address {ip	hostname}`	Sets the SMTP mail server IP address or domain name.
`[no] smtp-auth activate`	Enables or disables SMTP authentication.
`smtp-auth username username password password`	Sets the username and password for SMTP authentication.
`no smtp-address`	Resets the SMTP mail server configuration.
`no smtp-auth username`	Resets the authentication configuration.
`[no] smtp-port <1..65535>`	Sets the SMTP port. The `no` command deletes the setting.

Table 268   Email Daily Report Commands (continued)

COMMAND	DESCRIPTION
`mail-subject set` *`subject`*	Configures the subject of the report e-mails. Spaces are allowed.
`no mail-subject set`	Clears the configured subject for the report e-mails.
`[no] mail-subject append system-name`	Determines whether the system name will be appended to the subject of the report e-mails.
`[no] mail-subject append date-time`	Determines whether the sending date-time will be appended at subject of the report e-mails.
`[no] mail-from` *`e_mail`*	Sets the sender e-mail address of the report e-mails.
`[no] mail-to-1` *`e_mail`*	Sets to whom the Zyxel Device sends the report e-mails (up to five recipients).
`[no] mail-to-2` *`e_mail`*	See above.
`[no] mail-to-3` *`e_mail`*	See above.
`[no] mail-to-4` *`e_mail`*	See above.
`[no] mail-to-5` *`e_mail`*	See above.
`[no] item as-report`	Determines whether or not anti-spam statistics are included in the report e-mails.
`[no] item av-report`	Determines whether or not anti-virus statistics are included in the report e-mails.
`[no] item cf-report`	Determines whether or not content filtering statistics are included in the report e-mails.
`[no] item cpu-usage`	Determines whether or not CPU usage statistics are included in the report e-mails.
`[no] item idp-report`	Determines whether or not IDP statistics are included in the report e-mails.
`[no] item mem-usage`	Determines whether or not memory usage statistics are included in the report e-mails.
`[no] item port-usage`	Determines whether or not port usage statistics are included in the report e-mails.
`[no] item session-usage`	Determines whether or not session usage statistics are included in the report e-mails.
`[no] item traffic-report`	Determines whether or not network traffic statistics are included in the report e-mails.
`schedule hour <0..23> minute <00..59>`	Sets the time for sending out the report e-mails.
`[no] reset-counter`	Determines whether or not to discard all report data and starts all of the report statistics data counters over at zero after successfully sending out a report e-mail.
`send-now`	Sends the daily e-mail report immediately.
`reset-counter-now`	Discards all report data and starts all of the report statistics data counters over at zero.
`[no] smtp-tls starttls-off`	Turns off STARTTLS and uses the TLS protocol for SMTP mail encryption over TLS for the daily report. The no command enables the default STARTTLS protocol.
`exit`	Leaves the sub-command mode.

62.2.1 Email Daily Report Example

This example sets the following about sending a daily report e-mail:

- Disables the reporting.
- Specifies example-SMTP-mail-server.com as the address of the SMTP mail server.
- Sets the subject of the report e-mails to test.
- Stops the system name from being appended to the mail subject.
- Appends the date and time to the mail subject.
- Sets the sender as my-email@example.com.
- Sets example-administrator@example.com as the first account to which to send the mail.
- Has the Zyxel Device not use the second and third mail-to options.
- Sets my-email@example.com as the fourth mail-to option.
- Has the Zyxel Device not use the fifth mail-to option.
- Has the Zyxel Device provide username 12345 and password 12345 to the SMTP server for authentication.
- Sets the Zyxel Device to send the report at 1:57 PM.
- Has the Zyxel Device not reset the counters after sending the report.
- Has the report include CPU, memory, port, and session usage along with traffic statistics.
- Turns on the daily e-mail reporting.

```
Router(config)# daily-report
Router(config-daily-report)# no activate
Router(config-daily-report)# smtp-address example-SMTP-mail-server.com
Router(config-daily-report)# mail-subject set test
Router(config-daily-report)# no mail-subject append system-name
Router(config-daily-report)# mail-subject append date-time
Router(config-daily-report)# mail-from my-email@example.com
Router(config-daily-report)# mail-to-1 example-administrator@example.com
Router(config-daily-report)# no mail-to-2
Router(config-daily-report)# no mail-to-3
Router(config-daily-report)# mail-to-4 my-email@example.com
Router(config-daily-report)# no mail-to-5
Router(config-daily-report)# smtp-auth activate
Router(config-daily-report)# smtp-auth username 12345 password pass12345
Router(config-daily-report)# schedule hour 13 minutes 57
Router(config-daily-report)# no reset-counter
Router(config-daily-report)# item cpu-usage
Router(config-daily-report)# item mem-usage
Router(config-daily-report)# item port-usage
Router(config-daily-report)# item session-usage
Router(config-daily-report)# item traffic-report
Router(config-daily-report)# activate
Router(config-daily-report)# exit
Router(config)#
```

This displays the email daily report settings and has the Zyxel Device send the report.

```
Router(config)# show daily-report status
email daily report status
=========================
activate: yes
scheduled time: 13:57
reset counter: no
smtp address: example-SMTP-mail-server.com
smtp port: 25
smtp auth: yes
smtp username: 12345
smtp password: pass12345
mail subject:  test subject
append system name: no
append date time: yes
mail from: my-email@example.com
mail-to-1: example-administrator@example.com
mail-to-2:
mail-to-3:
mail-to-4: my-email@example.com
mail-to-5:
cpu-usage: yes
mem-usage: yes
session-usage: yes
port-usage: yes
traffic-report: yes

Router(config)# daily-report send-now
```

62.3 Reboot

Use this to restart the device (for example, if the device begins behaving erratically).

If you made changes in the CLI, you have to use the `write` command to save the configuration before you reboot. Otherwise, the changes are lost when you reboot.

Use the `reboot` command to restart the device.

CHAPTER 63
Session Timeout

Use these commands to modify and display the session timeout values. You must use the `configure terminal` command before you can use these commands.

Table 269 Session Timeout Commands

COMMAND	DESCRIPTION
`session timeout {udp-connect <1..300> | udp-deliver <1..300> | icmp <1..300>}`	Sets the timeout for UDP sessions to connect or deliver and for ICMP sessions.
`session timeout session {tcp-established | tcp-synrecv | tcp-close | tcp-finwait | tcp-synsent | tcp-closewait  | tcp-lastack | tcp-timewait} <1..300>`	Sets the timeout for TCP sessions in the ESTABLISHED, SYN_RECV, FIN_WAIT, SYN_SENT, CLOSE_WAIT, LAST_ACK, or TIME_WAIT state.
`show session timeout {icmp | tcp-timewait | udp}`	Displays ICMP, TCP, and UDP session timeouts.

The following example sets the UDP session connect timeout to 10 seconds, the UDP deliver session timeout to 15 seconds, and the ICMP timeout to 15 seconds.

```
Router(config)# session timeout udp-connect 10
Router(config)# session timeout udp-deliver 15
Router(config)# session timeout icmp 15
Router(config)# show session timeout udp
UDP session connect timeout: 10 seconds
UDP session deliver timeout: 15 seconds
Router(config)# show session timeout icmp
ICMP session timeout: 15 seconds
```

CHAPTER 64 Diagnostics and Remote Assistance

This chapter covers how to use the diagnostics feature. See also Chapter 66 on page 458 for information on other maintenance tools.

64.1 Diagnostics

The diagnostics feature provides an easy way for you to generate a file containing the Zyxel Device's configuration and diagnostic information. You may need to generate this file and send it to customer support during troubleshooting.

64.2 Diagnosis Commands

The following table lists the commands that you can use to have the Zyxel Device collect diagnostics information. Use the `configure terminal` command to enter the configuration mode to be able to use these commands.

Table 270 diagnosis Commands

COMMAND	DESCRIPTION
`diag-info collect`	Has the Zyxel Device create a new diagnostic file.
`show diag-info`	Displays the name, size, and creation date (in yyyy-mm-dd hh:mm:ss format) of the diagnostic file.
`show cpu average`	Displays the current percentage usage of each CPU in the Zyxel Device as a percentage of total processing power and the current CPU utilization percentage for each application used on the Zyxel Device.
`show mem status all`	Displays the current DRAM memory utilization percentage for each application used on the Zyxel Device and each application's running time in hours - minutes - seconds.
`diaginfo collect ac`	Collects information on the AP controller (the Zyxel Device).
`diaginfo collect wtp`	Collects information on Access Points managed by the AP controller (the Zyxel Device).
`diaginfo delete / ac`	Deletes information collected on the AP controller (the Zyxel Device).
`diaginfo delete / wtp`	Deletes information collected on Access Points managed by the AP controller (the Zyxel Device).

Table 270 diagnosis Commands (continued)

COMMAND	DESCRIPTION
nslookup {*ipv4* | *hostname*} [server *ipv4*] [extension *filter-extension*]	Performs name server lookup for querying a Domain Name System (DNS) server to get the domain name or IPv4 address mapping. The server and extension fields are optional. *filter_extension*: You can use 1-256 alphanumeric characters, spaces, or '()+,/ :=?;!*#@$_%.- characters.
nslookup6 {*ipv6* | *hostname*} [server *ipv6*] [extension *filter-extension*]	Performs name server lookup for querying a Domain Name System (DNS) server to get the domain name or IPv6 address mapping. The server and extension fields are optional. *filter_extension*: You can use 1-256 alphanumeric characters, spaces, or '()+,/ :=?;!*#@$_%.- characters.

64.3 Diagnosis Commands Example

The following example creates a diagnostic file and displays its name, size, and creation date.

```
Router# configure terminal
Router(config)# diag-info collect
Please wait, collecting information
Router(config)# show diag-info
Filename  : diaginfo-20070423.tar.bz2
File size : 1259 KB
Date      : 2014-04-23 09:55:09
```

The following is an example of the nslookup command.

```
Router# nslookup www.zyxel.com.tw
Trying "www.zyxel.com.tw"
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 42419
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 0

;; QUESTION SECTION:
;www.zyxel.com.tw.              IN      ANY

;; ANSWER SECTION:
www.zyxel.com.tw.       38400   IN      CNAME   origin-tw.zyxel.com.

Received 67 bytes from 127.0.0.1#53 in 1 ms
Router#
```

64.4 Remote Assistance

Use Remote Assistance commands to configure and schedule external access to the Zyxel Device for troubleshooting. You can also specify the port numbers the services must use to connect to the Zyxel Device.

64.5 Remote Assistance Commands

The following table lists the commands that you can use to configure Remote Assistance on the Zyxel Device. Use the `configure terminal` command to enter the configuration mode to be able to use these commands.

Table 271 remote-assistance Commands

COMMAND	DESCRIPTION
`(no) remote-assistance activate`	Enables an external person, such as customer support to access the Zyxel Device from a network outside the Zyxel Device local network for troubleshooting. The `no` command disables remote assistance.
`remote-assistance [https|ssh] port` *`port`*	Sets the service port number for external access. It should be the same port number as the one configured on the Zyxel Device.
remote-assistance [address1|address2] *`ipv4`*	Sets the public IPv4 addresses of external users that are allowed to access the Zyxel Device remotely.
`remote-assistance remove {address1|address2}`	Removes the public IPv4 addresses of external users that are allowed to access the Zyxel Device remotely.
`remote-assistance settings [random|manual]`	`random` allows access to the Zyxel Device remotely by using a randomly generated user name and password pair. `manual` allows access to the Zyxel Device remotely by using a previously configured specific user account.
`remote-assistance user-object` *`user`*	Specifies a previously created user/group object that can have external access to the Zyxel Device for troubleshooting.
`remote-assistance generate user-password`	Randomly generates a user name and password pair for remote access to the Zyxel Device.
`remote-assistance schedule DATE TIME` *`date time`*	Specifies a date (yyyy-mm-dd) and time (hh-mm) that external access is allowed.
`show remote-assistance`	Displays configured remote assistance settings including randomly generated user name / password, addresses, access ports and schedule.
`show remote-assistance generate`	Displays randomly generated user name / password for remote assistance.

CHAPTER 65
Packet Flow Explore

This chapter covers how to use the packet flow explore feature.

65.1 Packet Flow Explore

Use this to get a clear picture on how the Zyxel Device determines where to forward a packet and how to change the source IP address of the packet according to your current settings. This function provides you a summary of all your routing and SNAT settings and helps troubleshoot the related problems.

65.2 Packet Flow Explore Commands

The following table lists the commands that you can use to have the Zyxel Device display routing and SNAT related settings.

Table 272 Packet Flow Explore Commands

COMMAND	DESCRIPTION
`show route order`	Displays the order of routing related functions the Zyxel Device checks for packets. Once a packet matches the criteria of a routing rule, the Zyxel Device takes the corresponding action and does not perform any further flow checking.
`show system snat order`	Displays the order of SNAT related functions the Zyxel Device checks for packets. Once a packet matches the criteria of an SNAT rule, the Zyxel Device uses the corresponding source IP address and does not perform any further flow checking.
`show system route policy-route`	Displays activated policy routes.
`show system route nat-1-1`	Displays activated 1-to-1 NAT rules.
`show system route site-to-site-vpn`	Displays activated site-to-site VPN rules.
`show system route dynamic-vpn`	Displays activated dynamic VPN rules.
`show system route default-wan-trunk`	Displays the default WAN trunk settings.
`show ip route static-dynamic`	Displays activated static-dynamic routes.
`show system snat policy-route`	Displays activated policy routes which use SNAT.
`show system snat nat-1-1`	Displays activated NAT rules which use SNAT.
`show system snat nat-loopback`	Displays activated activated NAT rules which use SNAT with NAT loopback enabled.
`show system snat default-snat`	Displays the default WAN trunk settings.

65.3 Packet Flow Explore Commands Example

The following example shows all routing related functions and their order.

```
Router> show route order
route order: Policy Route, Direct Route, 1-1 SNAT, SiteToSite VPN, Dynamic
VPN, Static-Dynamic Route, Default WAN Trunk, Main Route
```

The following example shows all SNAT related functions and their order.

```
Router> show system snat order
snat order: Policy Route SNAT, 1-1 SNAT, Loopback SNAT, Default SNAT
```

The following example shows all SNAT related functions and their order.

```
Router> show system route policy-route
No.  PR NO. Source  Destination       Incoming     DSCP   Service   Nexthop
Type        Nexthop Info
============================================================================

```

The following example shows all activated 1-to-1 SNAT rules.

```
Router> show system route nat-1-1
No.  VS Name         Source     Destination   Outgoing        Gateway
============================================================================
```

The following example shows all activated site-to-site VPN rules.

```
Router> show system route site-to-site-vpn
No.  Source         Destination          VPN Tunnel
============================================================================

```

The following example shows all activated dynamic VPN rules.

```
Router> show system route dynamic-vpn
No.  Source         Destination             VPN Tunnel
============================================================================

```

The following example shows the default WAN trunk's settings.

```
Router> show system route default-wan-trunk
No.  Source          Destination     Trunk
============================================================================
1    any             any             trunk_ex
```

The following example shows all activated dynamic VPN rules.

```
Router> show system route dynamic-vpn
No.  Source         Destination             VPN Tunnel
===========================================================================
```

The following example shows all activated static-dynamic VPN rules.

```
Router> show ip route static-dynamic
Flags: A - Activated route, S - Static route, C - directly Connected
       O - OSPF derived, R - RIP derived, G - selected Gateway
       ! - reject, B - Black hole, L - Loop

IP Address/Netmask    Gateway          IFace           Metric    Flags
Persis
t
===========================================================================
0.0.0.0/0             10.1.1.254       wan1            0         ASG      -
```

The following example shows all activated policy routes which use SNAT.

```
Router> show system snat policy-route
No.  PR NO. Outgoing        SNAT
===========================================================================
```

The following example shows all activated 1-to-1 NAT rules.

```
Router> show system snat nat-1-1
No.  VS Name     Source        Destination   Outgoing        SNAT
===========================================================================
```

The following example shows all activated policy routes which use SNAT and enable NAT loopback..

```
Router> show system snat nat-loopback
Note: Loopback SNAT will be only applied only when the initiator is located
at the network which the server locates at

No.  VS Name         Source        Destination     SNAT
===========================================================================
```

The following example shows all activated 1-to-1 NAT rules.

```
Router> show system snat nat-1-1
No.  VS Name     Source        Destination   Outgoing        SNAT
===========================================================================
```

The following example shows the default WAN trunk settings.

```
Router> show system snat default-snat
Incoming                 Outgoing                 SNAT
===========================================================================
Internal Interface       External Interface       Outgoing Interface IP


Internal Interfaces: lan1, hidden, lan2, dmz
External Interfaces: wan1, wan2, wan1_ppp, wan2_ppp
Router>
```

CHAPTER 66
Maintenance Tools

Use the maintenance tool commands to check the conditions of other devices through the Zyxel Device. The maintenance tools can help you to troubleshoot network problems.

Here are maintenance tool commands that you can use in privilege mode.

Table 273 Maintenance Tools Commands in Privilege Mode

COMMAND	DESCRIPTION
`packet-trace [interface interface_name] [[ip-proto|ipv6-proto] | protocol_name | any}] [src-host {ip | hostname | any}] [dst-host {ip | hostname | any}] [port {<1..65535> | any}] [file] [duration <1..3600>] [extension-filter filter_extension]`	Sniffs traffic going through the specified interface with the specified protocol, source address, destination address, and/or port number. If you specify `file`, the Zyxel Device dumps the traffic to `/packet_trace/packet_trace_interface`. Use FTP to retrieve the files (see Section 60.7 on page 422). If you do not assign the duration, the Zyxel Device keeps dumping traffic until you use Ctrl-C. Use the extension filter to extend the use of this command. *protocol_name*: You can use the name, instead of the number, for some IP protocols, such as `tcp`, `udp`, `icmp`, and so on. The names consist of 1-16 alphanumeric characters or dashes (-). The first character cannot be a number. *hostname*: You can use up to 252 alphanumeric characters, dashes (-), or periods (.). The first character cannot be a period. *filter_extension*: You can use 1-256 alphanumeric characters, spaces, or '()+,/:=?;!*#@$_%.- characters.
`traceroute {ip | hostname}`	Displays the route taken by packets to the specified destination. Use `Ctrl+c` to return to the prompt.
`traceroute6 {ipv6 | hostname}`	Displays the route taken by packets to the specified destination. Use `Ctrl+c` to return to the prompt.
`[no] packet-capture activate`	Performs a packet capture that captures network traffic going through the set interface(s). Studying these packet captures may help you identify network problems. The `no` command stops the running packet capture on the Zyxel Device. Note: Use the `packet-capture configure` command to configure the packet-capture settings before using this command.
`packet-capture configure`	Enters the sub-command mode.
`    duration <0..300>`	Sets a time limit in seconds for the capture. The Zyxel Device stops the capture and generates the capture file when either this period of time has passed or the file reaches the size specified using the `files-size` command below. 0 means there is no time limit.

Table 273 Maintenance Tools Commands in Privilege Mode (continued)

COMMAND	DESCRIPTION
`file-suffix <profile_name>`	Specifies text to add to the end of the file name (before the dot and filename extension) to help you identify the packet capture files. Modifying the file suffix also avoids making new capture files that overwrite existing files of the same name. The file name format is "interface name-file suffix.cap", for example "vlan2-packet-capture.cap".
`files-size <1..10000>`	Specify a maximum size limit in megabytes for the total combined size of all the capture files on the ZyWALL, including any existing capture files and any new capture files you generate. The Zyxel Device stops the capture and generates the capture file when either the file reaches this size or the time period specified (using the `duration` command above) expires.
`host-ip {ip-address | profile_name | any>`	Sets a host IP address or a host IP address object for which to capture packets. `any` means to capture packets for all hosts.
`host-port <0..65535>`	If you set the IP Type to `any`, `tcp`, or `udp` using the `proto-type` command below, you can specify the port number of traffic to capture.
`iface {add | del} {interface_name | virtual_interface_name}`	Adds or deletes an interface or a virtual interface for which to capture packets to the capture interfaces list.
`ip-version {ip|ip6|any}`	Sets wether to capture IPv4 or IPv6 traffic. Any means to capture packets for all types of traffic.
`proto-type {icmp | icmp6 | igmp | igrp | pim | ah | esp | vrrp | udp | tcp | any}`	Sets the protocol of traffic for which to capture packets. `any` means to capture packets for all types of traffic.
`snaplen <68..1512>`	Specifies the maximum number of bytes to capture per packet. The Zyxel Device automatically truncates packets that exceed this size. As a result, when you view the packet capture files in a packet analyzer, the actual size of the packets may be larger than the size of captured packets.
`storage <internal|usbstorage>`	Sets to have the Zyxel Device only store packet capture entries on the Zyxel Device (internal) or on a USB storage connected to the Zyxel Device.
`ring-buffer <enable|disable>`	Enables or disables the ring buffer used as a temporary storage.
`split-size <1..2048>`	Specify a maximum size limit in megabytes for individual packet capture files. After a packet capture file reaches this size, the Zyxel Device starts another packet capture file.
`Ping {ipv4 | hostname} [source ipv4] [size <0..65507>] [forever| count <1..4096>]`	Sends an ICMP ECHO_REQUEST to test the reachability of a host on an IPv4 network and to measure the round-trip time for a message sent from the originating host to the destination computer. `size`: specifies the number of data bytes to be sent `count`: Stop after sending this number of ECHO_REQUEST packets. `forever`: keep sending ECHO_REQUEST packets until you use Ctrl+c to stop.

Table 273 Maintenance Tools Commands in Privilege Mode (continued)

COMMAND	DESCRIPTION
`ping {ipv4_addr	hostname} [source ipv4] [size <0..65507>] [forever	count <1..4096>] [interface interface_name] [extension filter-extension]`	Sends an ICMP ECHO_REQUEST to test the reachability of a host on an IPv4 network and to measure the round-trip time for a message sent from the originating host to the destination computer. Use the extension filter to extend the use of this command. `source`: Set source address to specified interface IPv4 address. `size`: specifies the number of data bytes to be sent. `count`: Stop after sending this number of ECHO_REQUEST packets. `forever`: keep sending ECHO_REQUEST packets until you use Ctrl+c to stop. *interface_name*: specifies interface through which to send the ECHO_REQUEST packets. *filter_extension*: You can use 1-256 alphanumeric characters, spaces, or '()+,/:=?;!*#@$_%.- characters.
`ping6{ipv6	hostname} [source ipv6] [size <0..65527>] [forever| count <1..4096>] [interface {interface_name	virtual_interface_name}][extension filter_extension]`	Sends an ICMP ECHO_REQUEST to test the reachability of a host on an IPv6 network and to measure the round-trip time for a message sent from the originating host to the destination computer. Use the extension filter to extend the use of this command. `source`: Set source address to specified interface IPv6 address. When pinging IPv6 link-local address this option is required. `size`: specifies the number of data bytes to be sent `count`: Stop after sending this number of ECHO_REQUEST packets. `forever`: keep sending ECHO_REQUEST packets until you use Ctrl+c to stop. *interface_name*: specifies interface through which to send the ECHO_REQUEST packets. *filter_extension*: You can use 1-256 alphanumeric characters, spaces, or '()+,/:=?;!*#@$_%.- characters.
`traceroute {ipv4	hostname} [source ipv4] [interface interface_name] [extension filter-extension]`	Displays the route packets take to an IPv4 network host. Use the extension filter to extend the use of this command. `source`: Set source address to specified interface IPv4 address. *interface_name*: specifies a network interface to obtain the source IP address for outgoing probe packets. *filter_extension*: You can use 1-256 alphanumeric characters, spaces, or '()+,/:=?;!*#@$_%.- characters.
`traceroute6 {ipv6	hostname} [source ipv6] [interface interface_name] [extension filter-extension]`	Displays the route packets take to an IPv6 network host. Use the extension filter to extend the use of this command. `source`: Set source address to specified interface IPv6 address. *interface_name*: specifies a network interface to obtain the source IP address for outgoing probe packets. *filter_extension*: You can use 1-256 alphanumeric characters, spaces, or '()+,/:=?;!*#@$_%.- characters.
`tracepath6 {ipv6	hostname}`	Displays the path MTU for the target address.
`show packet-capture status`	Displays whether a packet capture is ongoing.

Table 273 Maintenance Tools Commands in Privilege Mode (continued)

COMMAND	DESCRIPTION
`show ipv6 neighbor-list`	Displays the Zyxel Device's IPv6 neighbors.
`show packet-capture config`	Displays current packet capture settings.

Here are maintenance tool commands that you can use in configuration mode.

Table 274 Maintenance Tools Commands in Configuration Mode

COMMAND	DESCRIPTION
`ipv6 neighbor flush {`*`ipv6`*` | all}`	Clears the specified IPv6 address or all IPv6 addresses from the IPv6 neighbor cache.

66.1 Maintenance Command Examples

Some packet-trace command examples are shown below.

```
Router# packet-trace duration 3
tcpdump: listening on eth0
19:24:43.239798 192.168.1.10 > 192.168.1.1: icmp: echo request
19:24:43.240199 192.168.1.1 > 192.168.1.10: icmp: echo reply
19:24:44.258823 192.168.1.10 > 192.168.1.1: icmp: echo request
19:24:44.259219 192.168.1.1 > 192.168.1.10: icmp: echo reply
19:24:45.268839 192.168.1.10 > 192.168.1.1: icmp: echo request
19:24:45.269238 192.168.1.1 > 192.168.1.10: icmp: echo reply

6 packets received by filter
0 packets dropped by kernel
```

```
Router# packet-trace interface ge2 ip-proto icmp file extension-filter -s
-> 500 -n
tcpdump: listening on eth1
07:24:07.898639 192.168.105.133 > 192.168.105.40: icmp: echo request (DF)
07:24:07.900450 192.168.105.40 > 192.168.105.133: icmp: echo reply
07:24:08.908749 192.168.105.133 > 192.168.105.40: icmp: echo request (DF)
07:24:08.910606 192.168.105.40 > 192.168.105.133: icmp: echo reply

8 packets received by filter
0 packets dropped by kernel
```

```
Router# packet-trace interface ge2 ip-proto icmp file extension-filter
-> and src host 192.168.105.133 and dst host 192.168.105.40 -s 500 -n
tcpdump: listening on eth1
07:26:51.731558 192.168.105.133 > 192.168.105.40: icmp: echo request (DF)
07:26:52.742666 192.168.105.133 > 192.168.105.40: icmp: echo request (DF)
07:26:53.752774 192.168.105.133 > 192.168.105.40: icmp: echo request (DF)
07:26:54.762887 192.168.105.133 > 192.168.105.40: icmp: echo request (DF)

8 packets received by filter
0 packets dropped by kernel
```

```
Router# traceroute www.zyxel.com
traceroute to www.zyxel.com (203.160.232.7), 30 hops max, 38 byte packets
 1  172.23.37.254  3.049 ms  1.947 ms  1.979 ms
 2  172.23.6.253  2.983 ms  2.961 ms  2.980 ms
 3  172.23.6.1  5.991 ms  5.968 ms  6.984 ms
 4  * * *
```

Here are maintenance tool commands that you can use in configure mode.

Table 275   Maintenance Tools Commands in Configuration Mode

COMMAND	DESCRIPTION
`show arp-table`	Displays the current Address Resolution Protocol table.
`arp IP` *`mac_address`*	Edits or creates an ARP table entry.
`no arp` *`ip`*	Removes an ARP table entry.

The following example creates an ARP table entry for IP address 192.168.1.10 and MAC address 01:02:03:04:05:06. Then it shows the ARP table and finally removes the new entry.

```
Router# arp 192.168.1.10 01:02:03:04:05:06
Router# show arp-table
Address                 HWtype  HWaddress           Flags Mask           Iface
192.168.1.10             ether   01:02:03:04:05:06   CM                    ge1
172.23.19.254            ether   00:04:80:9B:78:00   C                     ge2
Router# no arp 192.168.1.10
Router# show arp-table
Address                 HWtype  HWaddress           Flags Mask           Iface
192.168.1.10                     (incomplete)                              ge1
172.23.19.254            ether   00:04:80:9B:78:00   C                     ge2
```

66.1.1 Packet Capture Command Example

The following examples show how to configure packet capture settings and perform a packet capture. First you have to check whether a packet capture is running. This example shows no other packet capture is running. Then you can also check the current packet capture settings.

```
Router(config)# show packet-capture status
capture status: off
Router(config)#
Router(config)# show packet-capture config
iface: None
ip-version: any
proto-type: any
host-port: 0
host-ip: any
file-suffix: -packet-capture
snaplen: 1500
duration: 0
file-size: 10
split-size: 2
ring-buffer: 0
storage: 0
```

Then configure the following settings to capture packets going through the Zyxel Device's WAN1 interface only.

- IP address: any
- Host IP: any
- Host port: any (then you do not need to configure this setting)
- File suffix: Example
- File size: 10 megabytes
- Duration: 150 seconds
- Save the captured packets to: USB storage device
- Use the ring buffer: no
- The maximum size of a packet capture file: 100 megabytes

```
Router(config)# packet-capture configure
Router(packet-capture)# iface add wan1
Router(packet-capture)# ip-type any
Router(packet-capture)# host-ip any
Router(packet-capture)# file-suffix Example
Router(packet-capture)# files-size 10
Router(packet-capture)# duration 150
Router(packet-capture)# storage usbstorage
Router(packet-capture)# ring-buffer disable
Router(packet-capture)# split-size 100
Router(packet-capture)#
```

Exit the sub-command mode and have the Zyxel Device capture packets according to the settings you just configured.

```
Router(packet-capture)# exit
Router(config)# packet-capture activate
Router(config)#
```

Manually stop the running packet capturing.

```
Router(config)# no packet-capture activate
Router(config)#
```

Check current packet capture status and list all stored packet captures.

```
Router(config)# show packet-capture status
capture status: off
Router(config)# dir /packet_trace
File Name                                          Size     Modified Time
===========================================================================
wan1-Example.cap                                575160   2009-11-24 09:06:59
Router(config)#
```

You can use FTP to download a capture file. Open and study it using a packet analyzer tool (for example, Ethereal or Wireshark).

CHAPTER 67
Watchdog Timer

This chapter provides information about the Zyxel Device's watchdog timers.

67.1 Hardware Watchdog Timer

The hardware watchdog has the system restart if the hardware fails.

The `hardware-watchdog-timer` commands are for support engineers. It is recommended that you not modify the hardware watchdog timer settings.

Table 276 hardware-watchdog-timer Commands

COMMAND	DESCRIPTION
`[no] hardware-watchdog-timer <4..37>`	Sets how long the system's hardware can be unresponsive before resetting. The `no` command turns the timer off.
`show hardware-watchdog-timer status`	Displays the settings of the hardware watchdog timer.

67.2 Software Watchdog Timer

The software watchdog has the system restart if the core firmware fails.

The `software-watchdog-timer` commands are for support engineers. It is recommended that you not modify the software watchdog timer settings.

Table 277 software-watchdog-timer Commands

COMMAND	DESCRIPTION
`[no] software-watchdog-timer <10..600>`	Sets how long the system's core firmware can be unresponsive before resetting. The `no` command turns the timer off.
`show software-watchdog-timer status`	Displays the settings of the software watchdog timer.
`show software-watchdog-timer log`	Displays a log of when the software watchdog timer took effect.

67.3 Application Watchdog

The application watchdog has the system restart a process that fails. These are the `app-watchdog` commands. Use the `configure terminal` command to enter the configuration mode to be able to use these commands.

Table 278 app-watchdog Commands

COMMAND	DESCRIPTION
`[no] app-watch-dog activate`	Turns the application watchdog timer on or off.
`[no] app-watch-dog auto-recover`	If app-watch-dog detects a dead process, app-watch-dog will try to auto recover. The `no` command turns off auto-recover
`[no] app-watch-dog console-print {always|once}`	Display debug messages on the console (every time they occur or once). The `no` command changes the setting back to the default.
`[no] app-watch-dog cpu-threshold min <1..100> max <1..100>`	Sets the percentage thresholds for sending a CPU usage alert. The Zyxel Device starts sending alerts when CPU usage exceeds the maximum (the second threshold you enter). The Zyxel Device stops sending alerts when the CPU usage drops back below the minimum threshold (the first threshold you enter). The `no` command changes the setting back to the default.
`[no] app-watch-dog interval <6..300>`	Sets how frequently (in seconds) the Zyxel Device checks the system processes. The `no` command changes the setting back to the default.
`[no] app-watch-dog retry-count <1..5>`	Set how many times the Zyxel Device is to re-check a process before considering it failed. The `no` command changes the setting back to the default.
`[no] app-watch-dog alert`	Has the Zyxel Device send an alert the user when the system is out of memory or disk space.
`[no] app-watch-dog disk-threshold min <1..100> max <1..100>`	Sets the percentage thresholds for sending a disk usage alert. The Zyxel Device starts sending alerts when disk usage exceeds the maximum (the second threshold you enter). The Zyxel Device stops sending alerts when the disk usage drops back below the minimum threshold (the first threshold you enter). The `no` command changes the setting back to the default.
`[no] app-watch-dog mem-threshold min <1..100> max <1..100>`	Sets the percentage thresholds for sending a memory usage alert. The Zyxel Device starts sending alerts when memory usage exceeds the maximum (the second threshold you enter). The Zyxel Device stops sending alerts when the memory usage drops back below the minimum threshold (the first threshold you enter). The `no` command changes the setting back to the default.
`app-watch-dog reboot-log flush`	Flushes the reboot log record.
`[no] app-watch-dog sys-reboot`	If auto recover fail reaches the maximum retry count, app-watch-dog reboots the device. The `no` command turns off system auto reboot.
`show app-watch-dog config`	Displays the application watchdog timer settings.
`show app-watch-dog monitor-list`	Display the list of applications that the application watchdog is monitoring.
`show app-watch-dog reboot-log`	Displays the application watchdog reboot log.

67.3.1 Application Watchdog Commands Example

The following example displays the application watchdog configuration and lists the processes that the application watchdog is monitoring.

```
Application Watch Dog Setting:
  activate: yes
  alert: yes
  console print: always
  retry count: 3
  auto recover: yes
  system reboot: yes
  interval: 60 seconds
  mem threshold: 80% ~ 90%
  cpu threshold: 80% ~ 90%
  disk threshold: 80% ~ 90%
Router(config)# show app-watch-dog monitor-list
#app_name       min_process_count       max_process_count(-1 unlimited) recover_enable  recover_reboot  recover_always  recover_max_try_count   recover_max_fail_count
uamd                    1                               -1                      1               2               1               1                       3
firewalld               1                               -1                      0               1               1               1                       3
policyd                 1                               -1                      1               1               1               1                       3
contfltd                1                               -1                      1               1               1               1                       3
classify                1                               -1                      0               1               1               1                       3
ospfd                   1                               -1                      0               1               1               1                       3
ripd                    1                               -1                      0               1               1               1                       3
resd                    1                               -1                      0               1               1               1                       3
zyshd_wd                1                               -1                      0               1               1               1                       3
zyshd                   1                               -1                      0               0               1               1                       3
httpd                   1                               -1                      1               1               1               1                       3
dhcpd                   1                               -1                      1               1               1               1                       3
sshipsecpm              1                               -1                      1               1               1               1                       3
zylogd                  1                               -1                      0               1               1               1                       3
syslog-ng               1                               -1                      0               1               1               1                       3
zylogger                1                               -1                      0               1               1               1                       3
ddns_had                1                               -1                      0               1               1               1                       3
tpd                     1                               -1                      0               1               1               1                       3
wdtd                    1                               -1                      0               1               1               1                       3
zebra                   1                               -1                      0               1               1               1                       3
link_updown             1                               -1                      0               1               1               1                       3
fauthd                  1                               -1                      0               1               1               1                       3
pro                     1                               -1                      0               1               1               1                       3
signal_wrapper          1                               -1                      0               1               1               1                       3
asd                     1                               -1                      0               1               1               1                       3
ctipd.bin               1                               -1                      1               1               1               1                       3
ipmonitord              1                               -1                      0               1               1               1                       3
```

CHAPTER 68
Managed AP Commands

Connect directly to a managed AP's CLI (Command Line Interface) to configure the managed AP's CAPWAP (Control And Provisioning of Wireless Access Points) client and DNS server settings.

68.1 Managed Series AP Commands Overview

Log into an AP's CLI and use the commands in this chapter if the AP does not automatically connect to the Zyxel Device or you need to configure the AP's DNS server. Use the CAPWAP client commands to configure settings to let the AP connect to the Zyxel Device. Use the DNS server commands to configure the DNS server address to which the AP connects. When the AP reboots, it only keeps the configuration from commands covered in this chapter.

68.2 Accessing the AP CLI

Connect to the AP's console port and use a terminal emulation program or connect through the network using Telnet or SSH. The settings and steps for logging in are similar to connecting to the Zyxel Device. See Section 1.2 on page 24 for details.

Note: The AP's default login username is **admin** and password is **1234**. The username and password are case-sensitive. If the AP has connected to the Zyxel Device, the AP uses the same admin password as the Zyxel Device.

Use the `write` command to save the current configuration to the Zyxel Device.

Note: Always save the changes before you log out after each management session. All unsaved changes will be lost after the system restarts.

68.3 CAPWAP Client Commands

Use the CAPWAP client commands to configure the AP's IP address and other related management interface settings. Do not use the original interface commands to configure the IP address and related settings on the AP, because the AP does not save interface command settings after rebooting.

The following table identifies the values required for many of these commands. Other input values are discussed with the corresponding commands.

Table 279 Input Values for CAPWAP Client Commands

LABEL	DESCRIPTION
ip	IPv4 address.
netmask	The network subnet mask. For example, 255.255.255.0.
gateway	The default gateway IP address of the interface. Enter a standard IPv4 IP address (for example, 127.0.0.1).
primary_ac_ap	The primary IPv4 address of the Zyxel Device.
secondary_ac_ap	Optional IPv4 address of the Zyxel Device.
vid	The VLAN ID (1~4094) of the managed AP.
primary_ac_dns	The primary fully qualified domain name (FQDN) of the Zyxel Device.
secondary_ac_dns	The secondary fully qualified domain name (FQDN) of the Zyxel Device.

The following table describes commands for configuring the AP's CAPWAP client parameters, which include the management interface. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 280 Command Summary: CAPWAP Client

COMMAND	DESCRIPTION
`capwap ap vlan ip address` *ip netmask*	Sets the IP address and network mask of the AP's management interface.
`capwap ap vlan ip gateway` *gateway*	Sets the default gateway IP address for the AP's management interface.
`capwap ap vlan no ip gateway`	Clears the default gateway IP address setting for the AP's management interface.
`capwap ap vlan vlan-id` *vid* `{ tag	untag }`	Sets the AP's management VLAN ID as well as whether the AP sends tagged or untagged packets. The management VLAN on the Zyxel Device and AP must match for the Zyxel Device to manage the AP. The Zyxel Device's force vlan command (see Table 12 on page 54) takes priority over this command.
`capwap ap ac-ip` *{primary_ac_ip|primary_ac_dns} {secondary_ac_ip|secondary_ac_dns}*	Specifies the primary and secondary IP address or domain name of the AP controller (the Zyxel Device) to which the AP connects.
`capwap ap ac-ip auto`	Sets the AP to use DHCP to get the address of the AP controller (the Zyxel Device).
`show capwap ap info`	Displays the IP address of the Zyxel Device managing the AP and CAPWAP settings and status.
`show capwap ap discovery-type`	Displays how the AP finds the Zyxel Device.
`show capwap ap ac-ip`	Displays the address of the Zyxel Device or `auto` if the AP finds the Zyxel Device through broadcast packets.

68.3.1 CAPWAP Client Commands Example

This example shows how to configure the AP's management interface and how it connects to the AP controller (the Zyxel Device), and check the connecting status. The following commands:

- Display how the AP finds the Zyxel Device

- Set the AP’s management IP address to 192.168.1.37 and netmask 255.255.255.0
- Set the AP’s default gateway IP address to 192.168.1.32
- Sets the AP’s management interface to use VLAN ID 2 and send tagged packets
- Specifies the primary and secondary IP addresses of the Zyxel Device (192.168.1.1 and 192.168.1.2) to which the AP connects.
- Displays the settings it configured

```
Router# configure terminal
Router(config)# show capwap ap discovery-type
Discovery type : Broadcast
Router(config)# capwap ap vlan ip address 192.168.1.37 255.255.255.0
Router(config)# capwap ap vlan ip gateway 192.168.1.32
Router(config)# capwap ap vlan vlan-id 2 tag
Router(config)# capwap ap ac-ip 192.168.1.1 192.168.1.2
Router(config)# show capwap ap discovery-type
Discovery type : Static AC IP
Router(config)# show capwap ap ac-ip
AC IP: 192.168.1.1 192.168.1.2
Router(config)# exit
Router# show capwap ap info
                AC-IP                   192.168.1.1
       Discovery type                   Static AC IP
             SM-State                   RUN(8)
        msg-buf-usage                   0/10 (Usage/Max)
       capwap-version                   10118
         Radio Number                   1/4 (Usage/Max)
           BSS Number                   8/8 (Usage/Max)
              IANA ID                   037a
          Description                   AP-0013499999FF
```

68.4 DNS Server Commands

The following table describes commands for configuring the AP's DNS server. You must use the `configure terminal` command to enter the configuration mode before you can use these commands.

Table 281 Command Summary: DNS Server

COMMAND	DESCRIPTION
ip dns server zone-forwarder {<1..32>|append|insert <1..32>} {*domain_zone_name*|*} {interface *interface_name* | user-defined *ipv4_address* [interface {*interface_name* | auto}]}	Sets a domain zone forwarder record that specifies a fully qualified domain name. You can also use a asterisk (*) if all domain zones are served by the specified DNS server(s). *domain_zone_name*: This is a domain zone, not a host. For example, zyxel.com.tw is the domain zone for the www.zyxel.com.tw fully qualified domain name. So whenever the Zyxel Device receives needs to resolve a zyxel.com.tw domain name, it can send a query to the recorded name server IP address. *interface_name*: This is the interface through which the ISP provides a DNS server. The interface should be activated and set to be a DHCP client. auto: any interface that the Zyxel Device uses to send DNS queries to a DNS server according to the routing rule.
ip dns server zone-forwarder move <1..32> to <1..32>	Changes the index number of a zone forwarder record.
no ip dns server zone-forwarder <1..4>	Removes the specified zone forwarder record.

68.4.1 DNS Server Commands Example

This example configures the AP to connect to the AP controller (the Zyxel Device) by DNS. The following commands:

- Set the AP's management IP address to 192.168.1.100 and netmask 255.255.255.0
- Sets the AP's management interface to use VLAN ID 3
- Set the AP's default gateway IP address to 192.168.1.1
- Add a domain zone forwarder record that specifies a DNS server's IP address of 10.1.1.1 and uses the bridge 0 interface to send queries to that DNS server
- Set the AP controller's primary domain name as capwap-server.zyxel.com and secondary domain name as capwap.test.com

```
Router(config)# capwap ap vlan ip address 192.168.1.100 255.255.255.0
Router(config)# capwap ap vlan vlan-id 3
Router(config)# capwap ap vlan ip gateway 192.168.1.1
Router(config)# ip dns server zone-forwarder append * user-defined 10.1.1.1
interface br0
Router(config)# capwap ap ac-ip capwap-server.zyxel.com capwap.test.com
```

68.4.2 DNS Server Commands and DHCP

The AP in the example in Section 68.4.1 on page 471 uses a static IP address. If the AP uses DHCP instead, you do not need to configure the DNS server's IP address on the AP when you configure DHCP option 6 on the DHCP server. For the example in Section 68.4.1 on page 471, you would just need to configure the management interface’s VLAN ID (`capwap ap vlan vlan-id 3`).

List of Commands (Alphabetical)

This section lists the commands and sub-commands in alphabetical order. Commands and subcommands appear at the same level.