FortiADC CLI Reference

VERSION 5.0.0

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FortiADC CLI Reference

First Edition

TABLE OF CONTENTS

Change Log **10**
Introduction **11**
Using the CLI **14**
Connecting to the CLI 14
Command syntax 18
Subcommands 22
Permissions 26
Tips & tricks 26
config config **33**
config config sync-list 33
config firewall **35**
config firewall connlimit 35
config firewall connlimit6 37
config firewall nat-snat 38
config firewall policy 40
config firewall policy6 42
config firewall qos-filter 43
config firewall qos-filter6 45
config firewall qos-queue 45
config firewall vip 46
config global **49**
config global-dns-server **50**
config global-dns-server address-group 50
config global-dns-server dns64 52
config global-dns-server dsset-info-list 53
config global-dns-server general 54
config global-dns-server policy 55
config global-dns-server remote-dns-server 58
config global-dns-server response-rate-limit 59
config global-dns-server trust-anchor-key 60
config global-dns-server zone 61
config global-load-balance **67**
config global-load-balance data-center 67

config global-load-balance link ... 68
config global-load-balance servers ... 69
config global-load-balance setting ... 73
config global-load-balance topology ... 77
config global-load-balance virtual-server-pool ... 78
config global-load-balance host ... 80
config link-load-balance ... 83
config link-load-balance flow-policy ... 83
config link-load-balance gateway ... 86
config link-load-balance link-group ... 88
config link-load-balance persistence ... 90
config link-load-balance proximity-route ... 92
config link-load-balance virtual-tunnel ... 94
config load-balance ... 97
config load-balance auth-policy ... 97
config load-balance caching ... 99
config load-balance certificate-caching ... 101
config load-balance client-ssl-profile ... 102
config load-balance compression ... 106
config load-balance connection-pool ... 108
config load-balance content-rewriting ... 110
config load-balance content-routing ... 114
config load-balance decompression ... 118
config load-balance error-page ... 119
config load-balance geoip-list ... 119
config load-balance ippool ... 126
config load-balance l2-exception-list ... 128
config load-balance method ... 129
config load-balance persistence ... 131
config load-balance pool ... 134
config load-balance profile ... 140
config load-balance real-server-ssl-profile ... 169
config load-balance reputation ... 172
config load-balance reputation-exception ... 174
config load-balance virtual-server ... 175
config load-balance web-category ... 184
config load-balance web-filter-profile ... 184
config load-balance web-sub-category ... 185
config load-balance whitelist ... 187
config load-balance http2-profile ... 189
config load-balance pagespeed ... 190
config load-balance pagespeed-profile ... 192

config load-balance schedule-pool 193
config log 194
config log fast_report 194
config log report 196
config log report email 198
config log report_queryset 198
config log setting fast_stats 200
config log setting highspeed 201
config log setting local 202
config log setting remote 205
config router 209
config router isp 209
config router md5-ospf 210
config router ospf 211
config router policy 216
config router setting 217
config router static 219
config router bgp 220
config security 228
config security waf bot-detection 228
config security waf exception 230
config security waf heuristic-sql-xss-injection-detection 231
config security waf http-protocol-constraint 234
config security waf profile 241
config security waf url-protection 244
config security waf web-attack-signature 245
config security waf json-validation-detection 248
config security waf xml-schema file 251
config security waf_soap-wsdl-file 251
config security waf xml-validation-detection 251
config security antivirus profile 256
config security antivirus quarantine 257
config security antivirus settings 259
config system fortisandbox 259
config system 261
config system accprofile 263
config system address 266
config system address6 267
config system addrgrp 268
config system addrgrp6 269
config system admin 270
config system auto backup 273

config system certificate ca 275
config system certificate ca_group 276
config system certificate certificate_verify 277
config system certificate crl 279
config system certificate intermediate_ca 280
config system certificate intermediate_ca_group 281
config system certificate local 281
config system certificate local_cert_group 285
config system certificate remote 285
config system certificate ocsp 287
config system certificate ocsp_stapling 289
config system console 291
config system dns 292
config system dos-prevention 293
config system fortiguard 293
config system global 295
config system ha 297
config system health-check 304
config system interface 314
config system isp-addr 321
config system mailserver 326
config system overlay-tunnel 327
config system password-policy 329
config system schedule-group 330
config system scripting 331
config system service 331
config system servicegrp 333
config system setting 335
config system snmp community 336
config system snmp sysinfo 338
config system snmp user 339
config system tcpdump 341
config system time manual 342
config system time ntp 343
config system traffic-group 344
config system web-filter 345
config system tunneling 346
config system alert-syslog 347
config system alert-email 348
config system alert-snmp-trap 348
config system alert-action 349
config system alert 350

config system alert-policy 354
config user 356
config user ldap 356
config user local 357
config user radius 357
config user user-group 358
config user authentication-relay 360
diagnose 363
diagnose debug application 364
diagnose debug cli 366
diagnose debug config-error-log 367
diagnose debug crashlog 367
diagnose debug enable/disable 368
diagnose debug flow 369
diagnose debug info 371
diagnose debug kernel 372
diagnose debug report 373
diagnose debug timestamp 373
diagnose hardware deviceinfo 374
diagnose hardware ioport 375
diagnose hardware pciconfig 376
diagnose hardware sysinfo 379
diagnose llb policy list 380
diagnose netlink backlog 380
diagnose netlink device 381
diagnose netlink interface 382
diagnose netlink ip/ipv6 382
diagnose netlink neighbor/neighbor6 383
diagnose netlink route/route6 384
diagnose netlink tcp 385
diagnose netlink udp 386
diagnose server-load-balance persistence 387
diagnose server-load-balance session 388
diagnose sniffer packet 390
diagnose system top 392
diagnose system vm 394
diagnose debug application fnginx 394
diagnose debug application httproxy ssl 395
execute 397
execute backup 398
execute caching 400
execute certificate ca 400

execute certificate config 401
execute certificate crl 401
execute certificate local 401
execute certificate remote 402
execute checklogdisk 403
execute clean 403
execute config-sync 404
execute date 404
execute discovery-glb-virtual-server 405
execute dumpsystem 405
execute dumpsystem-file 406
execute factoryreset 407
execute fixlogdisk 407
execute formatlogdisk 408
execute geolookup 408
execute glb-dprox-lookup 408
execute glb-persistence-lookup 409
execute ha force sync-config 409
execute ha force standby traffic-group 410
execute ha manage 410
execute health-check-verify 410
execute isplookup 411
execute log delete-file 411
execute log delete-type 412
execute log list-type 412
execute log rebuild-db 413
execute nslookup 413
execute packet-capture/packet-capture6 413
execute packet-capture-file 414
execute ping-option/ping6-option 415
execute ping/ping6 417
execute reboot 419
execute reload 419
execute restore 419
execute shutdown 421
execute ssh 421
execute statistics-db 422
execute telnet 422
execute traceroute 423
execute vm license 423
execute web-category-test 424
execute SSL client-side session statistics 424

execute SSL handshake record statistics 424
get 425
get router info ospf 426
get router info routing-table 427
get security waf-signature-status 427
get system ha-status 428
get system performance 429
get system status 429
get system traffic-group 430
get system traffic-group status 430
get router info bgp all 431
get router info bgp ip 432
get router info bgp neighbors 432
get router info bgp regexp 433
get router info bgp summary 433
get router info6 bgp all 434
get router info6 bgp ip 434
get router info6 bgp neighbors 435
get router info6 bgp regexp 436
get router info6 bgp summary 436
show 437
Appendix A: Virtual domains 439
Overview 439
Enabling VDOMs 440
Creating VDOMs 440
Editing a VDOM 441
Assigning interfaces to a VDOM 443
Assigning administrators to a VDOM 443
Disabling VDOMs 443
Viewing VDOMs 444

Change Log

Date	Change Description
02-15-2018	FortiADC 5.0.0 CLI Reference initial release.

Introduction

Welcome, and thank you for selecting Fortinet products for your network protection.

Scope

This document describes how to use the command-line interface (CLI) of the FortiADC appliance. It assumes that you have already successfully installed the FortiADC appliance and completed basic setup.

At this stage:

- You have administrative access to the web UI and/or CLI.
- The FortiADC appliance is integrated into your network.

Once that basic installation is complete, you can use this document. This document is a reference for commands you can use to:

- Update the system.
- Configure features and advanced options.
- Diagnose problems.

This document does *not* cover the web UI or first-time setup. For that information, see the *FortiADC Handbook*.

Conventions

This document uses the conventions described in this section.

IP addresses

To avoid IP conflicts that would occur if you used examples in this document with public IP addresses that belong to a real organization, the IP addresses used in this document are fictional. They belong to the private IP address ranges defined by these RFCs.

- RFC 1918: Address Allocation for Private Internets
- RFC 5737: IPv4 Address Blocks Reserved for Documentation
- RFC 3849: IPv6 Address Prefix Reserved for Documentation

For example, even though a real network's Internet-facing IP address would be routable on the public Internet, in this document's examples, the IP address would be shown as a non-Internet-routable IP such as 10.0.0.1, 192.168.0.1, or 172.16.0.1.

Cautions, notes, & tips

This document uses the following guidance and styles for notes, tips and cautions.

Warns you about procedures or feature behaviors that could have unexpected or undesirable results including loss of data or damage to equipment.

Highlights important, possibly unexpected but non-destructive, details about a feature's behavior.

Presents best practices, troubleshooting, performance tips, or alternative methods.

Typographical conventions

Table 1 describes the typographical conventions used in this document.

Table 1: Typographical conventions

Convention	Example
A GUI element you are instructed to click or select	From Minimum log level, select **Notification**.

CLI input	`config system dns`
	`set primary <address_ipv4>`
	`end`

CLI output	`FortiADC-VM # execute certificate local regenerate self certificate regenerated!`
Emphasis	HTTP connections are *not* secure and can be intercepted by a third party.
File content	`<HTML><HEAD><TITLE>Authentication</TITLE></HEAD><BODY><H4>You must authenticate to use this service.</H4>`
Hyperlink	https://support.fortinet.com
Keyboard entry	Type a name for the configuration such as `virtual_server_1`.
Navigation	Go to System > Maintenance.
Publication	For details, see the *FortiADC Handbook*.

Command syntax

The CLI requires that you use valid syntax, and conform to expected input constraints. It rejects invalid commands.

For command syntax conventions such as braces, brackets, and command constraints such as `<address_ipv4>`, see Notation.

Using the CLI

The command-line interface (CLI) is an alternative to the web UI.

You can use either interface or both to configure the FortiADC appliance. In the web UI, you use buttons, icons, and forms, while, in the CLI, you either type text commands or upload batches of commands from a text file, like a configuration script.

If you are new to Fortinet products, or if you are new to the CLI, this section can help you to become familiar.

Connecting to the CLI

You can access the CLI in two ways:

- Locally — Connect your computer, terminal server, or console directly to the console port.
- Through the network — Connect your computer through any network attached to one of the network ports. To connect using an Secure Shell (SSH) or Telnet client, enable the network interface for Telnet or SSH administrative access. Enable HTTP/HTTPS administrative access to connect using the CLI Console widget in the web UI.

Local access is required in some cases:

- If you are installing your FortiADC appliance for the first time and it is not yet configured to connect to your network, unless you reconfigure your computer's network settings for a peer connection, you might only be able to connect to the CLI using a local console connection. See the *FortiADC Handbook*.
- Restoring the firmware utilizes a boot interrupt. Network access to the CLI is not available until *after* the boot process completes, and therefore local CLI access is the only viable option.

Before you can access the CLI through the network, you usually must enable SSH and/or HTTP/HTTPS and/or Telnet on the network interface through which you will access the CLI.

Connecting to the CLI using a local console

Local console connections to the CLI are formed by directly connecting your management computer or console to the FortiADC appliance, using its DB-9 console port.

Requirements

- A computer with an available serial communications (COM) port
- Console cable (RJ-45-to-DB-9 or null modem cable) included in your FortiADC package
- Terminal emulation software such as PuTTY

The following procedure describes connection using PuTTY software; steps may vary with other terminal emulators.

To connect to the CLI using a local console connection

1. Using the null modem or RJ-45-to-DB-9 cable, connect the FortiADC appliance's console port to the serial communications (COM) port on your management computer.
2. On your management computer, start PuTTY.
3. In the Category tree on the left, go to Connection > Serial and configure the following:

Serial port	COM1 (or, if your computer has multiple serial ports, the name of the connected serial port)
Speed (baud)	9600
Data bits	8
Stop bits	1
Parity	None
Flow control	None

4. In the Category tree on the left, go to Session (not the sub-node, Logging) and from Connection type, select **Serial**.
5. Click **Open**.
6. Press the Enter key to initiate a connection.
   The login prompt appears.
7. Type a valid administrator account name (such as `admin`) then press Enter.
8. Type the password for that administrator account and press Enter. (In its default state, there is no password for the `admin` account.)
   The CLI displays the following text, followed by a command line prompt:

```
Welcome!
```

You can now enter CLI commands, including configuring access to the CLI through SSH or Telnet.

Enabling access to the CLI through the network

SSH, Telnet, or CLI Console widget (via the web UI) access to the CLI requires connecting your computer to the FortiADC appliance using one of its RJ-45 network ports. You can either connect directly, using a peer connection between the two, or through any intermediary network.

If you do not want to use an SSH/Telnet client and you have access to the web UI, you can alternatively access the CLI through the network using the CLI Console widget in the web UI.

You must enable SSH and/or Telnet on the network interface associated with that physical network port. If your computer is not connected directly or through a switch, you must also configure the FortiADC appliance with a static route to a router that can forward packets from the FortiADC appliance to your computer.

You can do this using either:

- a local console connection (see the following procedure)
- the web UI

Requirements

- a computer with an available serial communications (COM) port and RJ-45 port
- terminal emulation software such as PuTTY
- the RJ-45-to-DB-9 or null modem cable included in your FortiADC package
- a crossover Ethernet cable (if connecting directly) or straight-through Ethernet cable (if connecting through a switch or router)

To enable SSH or Telnet access to the CLI using a local console connection

1. Using the network cable, connect the FortiADC appliance's network port either directly to your computer's network port, or to a network through which your computer can reach the FortiADC appliance.
2. Note the number of the physical network port.
3. Using a local console connection, connect and log into the CLI.
4. Enter the following commands:

```
config system interface
   edit <interface_name>
      set allowaccess {http https ping snmp ssh telnet}
end
```

where:

`<interface_name>` is the name of the network interface associated with the physical network port, such as `port1`

{http https ping snmp ssh telnet} is the complete, space-delimited list of permitted administrative access protocols, such as `https ssh telnet`; omit protocols that you do not want to permit

For example, to exclude HTTP, SNMP, and Telnet, and allow only HTTPS, ICMP ECHO (ping), and SSH administrative access on `port1`:

```
config system interface
   edit "port1"
      set allowaccess ping https ssh
   next
end
```

Telnet is not a secure access method. SSH should be used to access the CLI from the Internet or any other untrusted network.

5. To confirm the configuration, enter the command to view the access settings for the interface.

```
show system interface <interface_name>
```

The CLI displays the settings, including the management access settings, for the interface.

6. If you will be connecting indirectly, through one or more routers or firewalls, configure the appliance with at least one static route so that replies from the CLI can reach your client.

Connecting to the CLI using SSH

Once you configure the FortiADC appliance to accept SSH connections, you can use an SSH client on your management computer to connect to the CLI.

Secure Shell (SSH) provides both secure authentication and secure communications to the CLI. Supported SSH protocol versions, ciphers, and bit strengths vary by whether or not you have enabled FIPS-CC mode or are using a low encryption (LENC) version, but generally include SSH version 2 with AES-128, 3DES, Blowfish, and SHA-1.

Requirements

- a computer with an RJ-45 Ethernet port
- a crossover Ethernet cable
- an SSH client such as PuTTY

To connect to the CLI using SSH

1. On your management computer, start PuTTY.
   Initially, the Session category of settings is displayed.
2. In Host Name (or IP Address), type the IP address of a network interface on which you have enabled SSH administrative access.
3. In Port, type `22`.
4. From Connection type, select **SSH**.
5. Click **Open**.
   The SSH client connects to the FortiADC appliance.

   The SSH client may display a warning if this is the first time you are connecting to the FortiADC appliance and its SSH key is not yet recognized by your SSH client, or if you have previously connected to the FortiADC appliance but it used a different IP address or SSH key. If your management computer is directly connected to the FortiADC appliance with no network hosts between them, this is normal.
6. Click **Yes** to verify the fingerprint and accept the FortiADC appliance's SSH key. You will not be able to log in until you have accepted the key.
   The CLI displays a login prompt.
7. Type a valid administrator account name (such as `admin`) and press Enter.
8. Type the password for this administrator account and press Enter.

If three incorrect login or password attempts occur in a row, you will be disconnected. Wait one minute, then reconnect to attempt the login again.

The FortiADC appliance displays a command prompt (its hostname followed by a `#`). You can now enter CLI commands.

Connecting to the CLI using Telnet

Once the FortiADC appliance is configured to accept Telnet connections, you can use a Telnet client on your management computer to connect to the CLI.

Telnet is not a secure access method. SSH should be used to access the CLI from the Internet or any other untrusted network.

Requirements

- a computer with an RJ-45 Ethernet port
- a crossover Ethernet cable
- a FortiADC network interface configured to accept Telnet connections
- terminal emulation software such as PuTTY

To connect to the CLI using Telnet

1. On your management computer, start PuTTY.
2. In Host Name (or IP Address), type the IP address of a network interface on which you have enabled Telnet administrative access.
3. In Port, type `23`.
4. From Connection type, select **Telnet**.
5. Click **Open**.
6. Type a valid administrator account name (such as `admin`) and press Enter.
7. Type the password for this administrator account and press Enter.

If three incorrect login or password attempts occur in a row, you will be disconnected. Wait one minute, then reconnect to attempt the login again.

The CLI displays a command line prompt (by default, its host name followed by a `#`). You can now enter CLI commands.

Command syntax

When entering a command, the CLI requires that you use valid syntax and conform to expected input constraints. It will reject invalid commands.

For example, if you do not type the entire object that will receive the action of a command operator such as `config`, the CLI will return an error message such as:

```
Command fail. CLI parsing error
```

Fortinet documentation uses the following conventions to describe valid command syntax.

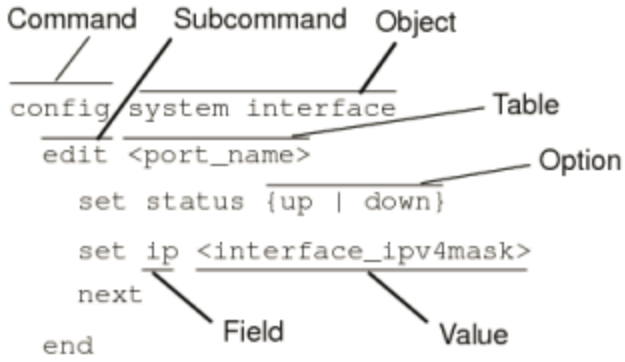
Terminology

Each command line consists of a command word followed by words for the configuration data or other specific item that the command uses or affects, for example:

```
get system admin
```

Fortinet documentation uses the terms in Figure 1 to describe the function of each word in the command line.

Figure 1: Command syntax terminology



The syntax uses the following terms:

- **command** — A word that begins the command line and indicates an action that the FortiADC appliance should perform on a part of the configuration or host on the network, such as `config` or `execute`. Together with other words, such as fields or values, that you terminate by pressing the Enter key, it forms a command line. Exceptions include multi-line command lines, which can be entered using an escape sequence.

  Valid command lines must be unambiguous if abbreviated. Optional words or other command line permutations are indicated by syntax notation.

  If you do not enter a known command, the CLI will return an error message such as:

  ```
  Unknown action 0
  ```

- **subcommand** — A kind of command that is available only when nested within the scope of another command. After entering a command, its applicable subcommands are available to you until you exit the scope of the command, or until you descend an additional level into another subcommand. Indentation is used to indicate levels of nested commands.

  Not all top-level commands have subcommands. Available subcommands vary by their containing scope.

- **object** — A part of the configuration that contains tables and/or fields. Valid command lines must be specific enough to indicate an individual object.
- **table** — A set of fields that is one of possibly multiple similar sets that each have a name or number, such as an administrator account, policy, or network interface. These named or numbered sets are sometimes referenced by other parts of the configuration that use them.
- **field** — The name of a setting, such as `ip` or `hostname`. Fields in some tables must be configured with values. Failure to configure a required field will result in an invalid object configuration error message, and the FortiADC appliance will discard the invalid table.
- **value** — A number, letter, IP address, or other type of input that is usually the configuration setting held by a field. Some commands, however, require multiple input values which may not be named but are simply entered in sequential order in the same command line. Valid input types are indicated by constraint notation.
- **option** — A kind of value that must be one or more words from a fixed set of options.

Indentation

Indentation indicates levels of nested commands, which indicate what other subcommands are available from within the scope.

For example, the `edit` subcommand is available only within a command that affects tables, and the `next` subcommand is available only from within the `edit` subcommand:

```
config system interface
   edit port1
      set status up
   next
end
```

For information about available subcommands, see Subcommands.

Notation

Brackets, braces, and pipes are used to denote valid permutations of the syntax. Constraint notations, such as `<address_ipv4>`, indicate which data types or string patterns are acceptable value input.

If you do not use the expected data type, the CLI returns an error message such as:

```
object set operator error, -4003 discard the setting
The request URL must start with "/" and without domain
    name.
```

or:

```
invalid unsigned integer value :-:

value parse error before '-'
Input value is invalid.
```

It might reject or discard your settings instead of saving them when you type `end`.

Table 2: Command syntax notation

Convention	Description

Square brackets `[ ]`	A non-required (optional) word or words. For example:
	`[verbose {1 | 2 | 3}]`
	indicates that you may either omit or type both the `verbose` word and its accompanying option, such as:
	`verbose 3`

Convention	Description
Curly braces `{ }`	A word or series of words that is constrained to a set of options delimited by either vertical bars or spaces. You must enter at least one of the options, unless the set of options is surrounded by square brackets [ ].
Options delimited by vertical bars `|`	Mutually exclusive options. For example: `{enable | disable}` indicates that you must enter either `enable` or `disable`, but must not enter both.

Options delimited by spaces	Non-mutually exclusive options. For example:
	`{http https ping snmp ssh telnet}`
	indicates that you may enter all or a subset of those options, in any order, in a space-delimited list, such as:
	`ping https ssh`
	Note: To change the options, you must re-type the entire list. For example, to add `snmp` to the previous example, you would type:
	`ping https snmp ssh`
	If the option adds to or subtracts from the existing list of options, instead of replacing it, or if the list is comma-delimited, the exception will be noted.

Convention	Description
Angle brackets < >	A word constrained by data type. To define acceptable input, the angled brackets contain a descriptive name followed by an underscore (_) and suffix that indicates the valid data type. For example: `<retries_int>` indicates that you should enter a number of retries, such as `5`. Data types include: • `<xxx_name>` — A name referring to another part of the configuration, such as `policy_A`. • `<xxx_index>` — An index number referring to another part of the configuration, such as `0` for the first static route. • `<xxx_pattern>` — A regular expression or word with wild cards that matches possible variations, such as `*@example.com` to match all e-mail addresses ending in `@example.com`. • `<xxx_fqdn>` — A fully qualified domain name (FQDN), such as `mail.example.com`. • `<xxx_email>` — An email address, such as `admin@mail.example.com`. • `<xxx_url>` — A uniform resource locator (URL) and its associated protocol and host name prefix, which together form a uniform resource identifier (URI), such as `http://www.fortinet.com/`. • `<xxx_ipv4>` — An IPv4 address, such as `192.168.1.99`. • `<xxx_v4mask>` — A dotted decimal IPv4 netmask, such as `255.255.255.0`. • `<xxx_ipv4mask>` — A dotted decimal IPv4 address and netmask separated by a space, such as `192.168.1.99 255.255.255.0`. • `<xxx_ipv4/mask>` — A dotted decimal IPv4 address and CIDR-notation netmask separated by a slash, such as such as `192.168.1.99/24`. • `<xxx_ipv6>` — A colon(`:`)-delimited hexadecimal IPv6 address, such as `3f2e:6a8b:78a3:0d82:1725:6a2f:0370:6234`. • `<xxx_v6mask>` — An IPv6 netmask, such as `/96`. • `<xxx_ipv6mask>` — An IPv6 address and netmask separated by a space. • `<xxx_str>` — A string of characters that is *not* another data type, such as `P@ssw0rd`. Strings containing spaces or special characters must be surrounded in quotes or use escape sequences. See Special characters. • `<xxx_int>` — An integer number that is *not* another data type, such as `15` for the number of minutes.

Subcommands

Once you connect to the CLI, you can enter commands.

Each command line consists of a command word that is usually followed by words for the configuration data or other specific item that the command uses or affects, for example:

```
get system admin
```

Subcommands are available from within the scope of some commands.When you enter a subcommand level, the command prompt changes to indicate the name of the current command scope. For example, after entering:

```
config system admin
```

the command prompt becomes:

```
(admin)#
```

Applicable subcommands are available to you until you exit the scope of the command, or until you descend an additional level into another subcommand.

For example, the `edit` subcommand is available only within a command that affects tables; the `next` subcommand is available only from within the `edit` subcommand:

```
config system interface
   edit port1
      set status up
   next
end
```

Available subcommands vary by command.From a command prompt within `config`, two types of subcommands might become available:

- commands that affect fields (see Field commands)
- commands that affect tables (see Table commands)

Subcommand scope is indicated in this CLI Reference by indentation. See Indentation.

Syntax examples for each top-level command in this CLI Reference do not show all available subcommands. However, when nested scope is demonstrated, you should assume that subcommands applicable for that level of scope are available.

Table commands

The following table describes commands used to manage configuration tables that contain sets of members or sets of rules, for example.

Table 3: Commands for tables

`delete <table_name>`	Remove a table from the current object. For example, in `config system admin`, you could delete an administrator account named `newadmin` by typing `delete newadmin` and pressing Enter. This deletes `newadmin` and all its fields, such as `newadmin`'s `first-name` and `email-address`. `delete` is only available within objects containing tables.

`edit <table_name>`	Create or edit a table in the current object. For example, in `config system admin`: • edit the settings for the default `admin` administrator account by typing `edit admin`. • add a new administrator account with the name `newadmin` and edit `newadmin`'s settings by typing `edit newadmin`. `edit` is an interactive subcommand: further subcommands are available from within `edit`. `edit` changes the prompt to reflect the table you are currently editing. `edit` is only available within objects containing tables.
`end`	Save the changes to the current object and exit the `config` command. This returns you to the top-level command prompt.
`get`	List the configuration of the current object or table. In objects, `get` lists the table names (if present), or fields and their values. In a table, `get` lists the fields and their values. For more information on `get` commands, see get.
`purge`	Remove all tables in the current object. For example, in `config user local-user`, you could type `get` to see the list of all local user names, then type `purge` and then `y` to confirm that you want to delete all users. `purge` is only available for objects containing tables. **Caution:** Back up the FortiADC appliance before performing a purge because it cannot be undone. To restore purged tables, the configuration must be restored from a backup. **Caution:** Do not purge `system interface` or `system admin` tables. This can result in being unable to connect or log in, requiring the FortiADC appliance to be formatted and restored.
`show`	Display changes to the default configuration. Changes are listed in the form of configuration commands. For more information on `show` commands, see show.

Example of table commands

From within the `system admin` object, you might enter:

```
edit admin_1
```

The CLI acknowledges the new table, and changes the command prompt to show that you are now within the `admin_1` table:

```
new entry 'admin_1' added
```

```
(admin_1)#
```

Field commands

The following table describes commands to manage field settings.

Table 4: Commands for fields

`abort`	Exit both the `edit` and/or `config` commands without saving the fields.
`end`	Save the changes made to the current table or object fields, and exit the `config` command. (To exit without saving, use `abort` instead.)
`get`	List the configuration of the current object or table. In objects, `get` lists the table names (if present), or fields and their values. In a table, `get` lists the fields and their values.
`next`	Save the changes you have made in the current table's fields, and exit the `edit` command to the object prompt. (To save and exit completely to the root prompt, use `end` instead.) `next` is useful when you want to create or edit several tables in the same object, without leaving and re-entering the `config` command each time. `next` is only available from a table prompt; it is not available from an object prompt.
`set <field_name> <value>`	Set a field's value. For example, in `config system admin`, after typing `edit admin`, you could type `set password newpass` to change the password of the `admin` administrator to `newpass`. **Note:** When using `set` to change a field containing a space-delimited list, type the whole new list. For example, `set <field> <new-value>` will replace the list with the <`new-value`> rather than appending <`new-value`> to the list.
`show`	Display changes to the default configuration. Changes are listed in the form of configuration commands.
`unset <field_name>`	Reset the table or object's fields to default values. For example, in `config system admin`, after typing `edit admin`, typing `unset password` resets the password of the `admin` administrator account to the default (in this case, no password).

Example of field commands

From within the `admin_1` table, you might enter the following command to assign the value `my1stExamplePassword` to the `password` field:

```
set password my1stExamplePassword
```

You might then enter the `next` command to save the changes and edit the next administrator's table.

Permissions

Depending on the account that you use to log in to the FortiADC appliance, you may not have complete access to all CLI commands or areas of the web UI.

Access profiles control which commands and areas an administrator account can access. Access profiles assign either:

- Read (view access)
- Write (change and execute access)
- Both read and write
- No access

Unlike other administrator accounts, the administrator account named `admin` exists by default and cannot be deleted. The `admin` administrator account is similar to a root administrator account. This administrator account always has full permission to view and change all FortiADC configuration options, including viewing and changing all other administrator accounts. Its name and permissions cannot be changed. It is the only administrator account that can reset another administrator's password without being required to enter that administrator's existing password.

For complete access to all commands, you must log in with the administrator account named `admin`.

Tips & tricks

Basic features and characteristics of the CLI environment provide support and ease of use for many CLI tasks.

This section includes:

- Help
- Shortcuts & key commands
- Command abbreviation
- Special characters
- Language support & regular expressions
- Screen paging
- Editing the configuration file in a text editor

Help

- To display brief help during command entry, press the question mark (?) key.
- Press the question mark (?) key at the command prompt to display a list of the commands available and a description of each.
- Press the question mark (?) key after a command keyword to display a list of the objects available with that command and a description of each.
- Type a word or part of a word, then press the question mark (?) key to display a list of valid word completions or subsequent words, and to display a description of each.

Shortcuts & key commands

Table 5: Shortcuts and key commands

Action	Keys
List valid word completions or subsequent words. If multiple words could complete your entry, display all possible completions with helpful descriptions of each.	?
Complete the word with the next available match. Press the key multiple times to cycle through available matches.	Tab
Recall the previous command. Command memory is limited to the current session.	Up arrow, or Ctrl + P
Recall the next command.	Down arrow, or Ctrl + N
Move the cursor left or right within the command line.	Left or Right arrow
Move the cursor to the beginning of the command line.	Ctrl + A
Move the cursor to the end of the command line.	Ctrl + E
Move the cursor backwards one word.	Ctrl + B
Move the cursor forwards one word.	Ctrl + F
Delete the current character.	Ctrl + D

Action	Keys
Abort current interactive commands, such as when entering multiple lines. If you are not currently within an interactive command such as `config` or `edit`, this closes the CLI connection.	Ctrl + C
Continue typing a command on the next line for a multi-line command. For each line that you want to continue, terminate it with a backslash (\ ). To complete the command line, terminate it by pressing the spacebar and then the Enter key, without an immediately preceding backslash.	\ then Enter

Command abbreviation

You can abbreviate words in the command line to their smallest number of non-ambiguous characters. For example, the command `get system status` could be abbreviated to:

```
g sy st
```

If you enter an ambiguous command, the CLI returns an error message such as:

```
ambiguous command before 's'
Value conflicts with system settings.
```

Special characters

Special characters <, >, (,), #, ', and " are usually not permitted in CLI. If you use them, the CLI will often return an error message such as:

```
The string contains XSS vulnerability characters

value parse error before '%^@'
Input not as expected.
```

Some may be enclosed in quotes or preceded with a backslash (\ ) character.

Table 6: Entering special characters

Character	Key
?	Ctrl + V then ?
Tab	Ctrl + V then Tab
Space (to be interpreted as part of a string value, not to end the string)	Enclose the string in quotation marks: “`Security Administrator`”. Enclose the string in single quotes: `'Security Administrator'`. Precede the space with a backslash: `Security\ Administrator`.

Character	Key
' (to be interpreted as part of a string value, not to end the string)	\'
" (to be interpreted as part of a string value, not to end the string)	\"
\	\\

Language support & regular expressions

Languages currently supported by the CLI interface include:

- English
- Japanese
- Simplified Chinese
- Traditional Chinese

In general, the names of configuration objects should be composed from common characters `A-Z, a-z, 0-9, _, -`.

Characters such as ñ, é, symbols, and ideographs are sometimes acceptable input. Support varies by the nature of the item being configured. CLI commands, objects, field names, and options must use their exact ASCII characters, but some items with arbitrary names or values may be input using your language of choice.

For example, the host name must not contain special characters, and so the web UI and CLI will not accept most symbols and other non-ASCII encoded characters as input when configuring the host name. This means that languages other than English often are not supported. However, some configuration items, such as names and comments, may be able to use the language of your choice.

To use other languages in those cases, you must use the correct encoding.

The system stores the input using Unicode UTF-8 encoding, but it is not normalized from other encodings into UTF-8 before stored. If your input method encodes some characters differently than in UTF-8, your configured items may not display or operate as expected.

Regular expressions are especially impacted. Matching uses the UTF-8 character values. If you enter a regular expression using another encoding, or if an HTTP client sends a request in an encoding other than UTF-8, matches may not be what you expect.

For example, with Shift-JIS, backslashes (\ ) could be inadvertently interpreted as yen symbols (¥) and vice versa. A regular expression intended to match HTTP requests containing money values with a yen symbol therefore may not work it if the symbol is entered using the wrong encoding.

For best results, follow these guidelines:

- Use UTF-8 encoding, or

- Use only the characters whose numerically encoded values are the same in UTF-8, such as the US-ASCII characters that are also encoded using the same values in ISO 8859-1, Windows code page 1252, Shift-JIS and other encodings, or
- For regular expressions that must match HTTP requests, use the same encoding as your HTTP clients

HTTP clients may send requests in encodings other than UTF-8. Encodings usually vary by the client's operating system or input language. If you cannot predict the client's encoding, you may only be able to match any parts of the request that are in English, because regardless of the encoding, the values for English characters tend to be encoded identically. For example, English words may be legible regardless of interpreting a web page as either ISO 8859-1 or as GB2312, whereas simplified Chinese characters might only be legible if the page is interpreted as GB2312.

To configure the system using other encodings, you might need to switch language settings on your management computer, including for your web browser or Telnet or SSH client. For instructions on how to configure your management computer's operating system language, locale, or input method, see its documentation.

If you choose to configure parts of the system using non-ASCII characters, verify that all systems interacting with the FortiADC appliance also support the same encodings. You should also use the same encoding throughout the configuration if possible in order to avoid needing to switch the language settings of your web browser or Telnet or SSH client while you work.

Similarly to input, your web browser or CLI client should usually interpret display output as encoded using UTF-8. If it does not, your configured items may not display correctly in the web UI or CLI. Exceptions include items such as regular expressions that you may have configured using other encodings in order to match the encoding of HTTP requests that the system receives.

To enter non-ASCII characters in a Telnet or SSH client

1. On your management computer, start your Telnet or SSH client.
2. Configure your Telnet or SSH client to send and receive characters using UTF-8 encoding the encoding.

   Support for sending and receiving international characters varies by each Telnet or SSH client. Consult the documentation for your Telnet or SSH client.
3. Log into the FortiADC system.
4. At the command prompt, type your command and press Enter.

   You might need to surround words that use encoded characters with single quotes (').

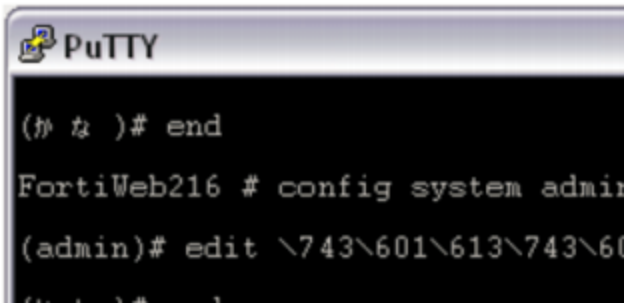
   Depending on your Telnet or SSH client's support for your language's input methods and for sending international characters, you may need to interpret them into character codes before pressing Enter.

   For example, you might need to enter:

   ```
   edit '\743\601\613\743\601\652'
   ```

   The CLI displays your previous command and its output.

Figure 2: Entering encoded characters (PuTTY)



Screen paging

When output spans multiple pages, you can configure the CLI to pause after each page. When the display pauses, the last line displays `--More--`. You can then either:

- Press the spacebar to display the next page.
- Type `Q` to truncate the output and return to the command prompt.

This might be useful when displaying lengthy output, such as the list of possible matching commands for command completion, or a long list of settings. Rather than scrolling through or possibly exceeding the buffer of your terminal emulator, you can simply display one page at a time.

Editing the configuration file in a text editor

Editing the configuration file with a plain text editor can be time-saving if:

- you have many changes to make,
- are not sure where the setting is in the CLI, and/or
- own several FortiADC appliances

This is true especially if your plain text editor provides advanced features such as regular expressions for find-and-replace, or batch changes across multiple files.

Do *not* use a rich text editor such as Microsoft Word. Rich text editors insert special characters into the file in order to apply formatting, which may corrupt the configuration file.

To edit the configuration on your computer

1. Use execute backup to download the configuration file to a TFTP server, such as your management computer.
2. Edit the configuration file using a plain text editor that supports Unix-style line endings.

Do not edit the first line. The first lines of the configuration file (preceded by a `#` character) contains information about the firmware version and FortiADC model. If you change the model number, the FortiADC appliance will reject the configuration file when you attempt to restore it.

3. Use execute restore to upload the modified configuration file back to the FortiADC system.

The system downloads the configuration file and checks that the model information is correct. If it is, it loads the configuration file and checks each command for errors. If a command is invalid, the system ignores the command. If the configuration file is valid, it restarts and loads the new configuration.

config config

The `config config` commands are used to configure the configuration push/pull settings.

This chapter is a reference for the following commands:

- "config config sync-list" on page 33

config config sync-list

Use this command to push/pull a configuration to/from a target FortiADC system.

Before you begin:

- You must plan for the impact the configuration push/pull has on the target deployment.
- You must have read-write permission for system settings.

Syntax

```
config config sync-list
   edit <name>
      set server-ip <class_ip>
      set password <string>
      set type {fw gds lb llb log route security system}
      set comment <string>
   next
end
```

`server-ip`	IP address of the remote appliance.
`password`	Password of the remote appliance.
`type`	Space-separated list of configuration types to sync.
`comment`	A string to describe the purpose of the configuration, to help you and other administrators more easily identify its use. Put phrases in quotes. For example: “SLB and GLB settings to Data Center East”.

Example

```
docs-1 (sync-list) # edit example1
Add new entry 'example1' for node 4525

docs-1 (example1) # get
server-ip                      : 0.0.0.0
password                      : *
type                           :
comment                        :
```

```
docs-1 (example1) # set server-ip 172.30.144.101
docs-1 (example1) # set type
 fw           fw
 gds          gds
 lb           lb
 llb          llb
 log          log
 route        route
 security     security
 system       system

docs-1 (example1) # set type gds lb llb security
docs-1 (example1) # end
```

See Also

- execute config-sync

config firewall

The `config firewall` commands configure security feature settings.

This chapter is a reference for the following commands:

- "config firewall connlimit" on page 35
- "config firewall connlimit6" on page 37
- "config firewall nat-snat" on page 38
- "config firewall policy" on page 40
- "config firewall policy6" on page 42
- "config firewall qos-filter" on page 43
- "config firewall qos-filter6" on page 45
- "config firewall qos-queue" on page 45
- "config firewall vip" on page 46

config firewall connlimit

Use this command to create connection limit security rules for IPv4 addresses.

The firewall connection limit policy allows or denies traffic based on a matching tuple: source address, destination address, and service; and connection count. The purpose is to detect anomalous connection requests.

The limit you specify can be based on the following counts:

- Count of concurrent sessions that match the tuple.
- Count of concurrent sessions from a single host that match the tuple.

The FortiADC system evaluates firewall connection limit policy rules before other rules. It matches traffic against the connection limit table, beginning with the first rule. If no rule matches, the connection is forwarded for further processing. If a rule matches, and the limit has not been reached, the connection is forwarded for further processing. If a rule matches and the limit has been reached, the connection is dropped.

By default, if firewall connection limit rules are not configured, the system does not perform connection limit policy processing. The firewall connection limit can be configured for non-SLB traffic and for Layer 7 SLB traffic, but not Layer 4 SLB traffic.

Note: The purpose of the firewall connection limit is distinct from the virtual server connection limit. The firewall connection limit setting is a security setting; the virtual server connection limit is a capacity setting.

Before you begin:

- You must have a good understanding and knowledge of the capacity of your backend servers.
- You must have created the address configuration objects and service configuration objects that define the matching tuple in your connection limit rules.
- You must have read-write permission for firewall settings.

Syntax

```
config firewall connlimit
   config rule
      edit <name>
         set connection-limit <integer>
         set destination-address <datasource>
         set in-interface <datasource>
         set out-interface <datasource>
         set service <datasource>
         set source-address <datasource>
         set type {host | rule}
         set side {both | destination | source}
      next
   end
end
```

connection-limit	Maximum concurrent sessions. The default is 1,048,576.
destination-address	Destination address object to use to form the matching tuple.
in-interface	Interface that receives traffic.
out-interface	Interface that forwards traffic.
service	Service object to use to form the matching tuple.
source-address	Source address object to use to form the matching tuple.
type	Whether the limit is per rule or per host.
side	When the connection limit is per host, specify whether the connection counter gets incremented when the host IP address appears in: • source—Only increment the counter if the host is the source address. • destination—Only increment the counter if the host is the destination address. • both—Increment the counter if the host is the source or destination address.

Example

```
FortiADC-VM # config firewall connlimit
FortiADC-VM (connlimit) # config rule
FortiADC-VM (rule) # edit dest-rule
Add new entry 'dest-rule' for node 1890

FortiADC-VM (dest-rule) # get
in-interface :
out-interface :
source-address :
destination-address :
service :
type : host
side : both
```

```
connection-limit : 1048576

FortiADC-VM (dest-rule) # set in-interface port4
FortiADC-VM (dest-rule) # set out-interface port5
FortiADC-VM (dest-rule) # set destination-address fw-dest-addr1
FortiADC-VM (dest-rule) # set service fw-http
FortiADC-VM (dest-rule) # set type rule
FortiADC-VM (dest-rule) # end
```

config firewall connlimit6

Use this command to create connection limit security rules for IPv6 addresses.

The firewall connection limit policy allows or denies traffic based on a matching tuple: source address, destination address, and service; and connection count. The purpose is to detect anomalous connection requests.

The limit you specify can be based on the following counts:

- Count of concurrent sessions that match the tuple.
- Count of concurrent sessions from a single host that match the tuple.

The FortiADC system evaluates firewall connection limit policy rules before other rules. It matches traffic against the connection limit table, beginning with the first rule. If no rule matches, the connection is forwarded for further processing. If a rule matches, and the limit has not been reached, the connection is forwarded for further processing. If a rule matches and the limit has been reached, the connection is dropped.

By default, if firewall connection limit rules are not configured, the system does not perform connection limit policy processing. The firewall connection limit can be configured for non-SLB traffic and for Layer 7 SLB traffic, but not Layer 4 SLB traffic.

Note: The purpose of the firewall connection limit is distinct from the virtual server connection limit. The firewall connection limit setting is a security setting; the virtual server connection limit is a capacity setting.

Before you begin:

- You must have a good understanding and knowledge of the capacity of your backend servers.
- You must have created the address configuration objects and service configuration objects that define the matching tuple in your connection limit rules.
- You must have read-write permission for firewall settings.

Syntax

```
config firewall connlimit6
   config rule
      edit <name>
         set connection-limit <integer>
         set destination-address6 <datasource>
         set in-interface <datasource>
         set out-interface <datasource>
         set service <datasource>
         set source-address6 <datasource>
         set type {host | rule}
         set side {both | destination | source}
```

```
        next
    end
end
```

connection-limit	Maximum concurrent sessions. The default is 1,048,576.
destination-address6	Destination address object to use to form the matching tuple.
in-interface	Interface that receives traffic.
out-interface	Interface that forwards traffic.
service	Service object to use to form the matching tuple.
source-address6	Source address object to use to form the matching tuple.
type	Whether the limit is per rule or per host.
side	When the connection limit is per host, specify whether the connection counter gets incremented when the host IP address appears in: • source—Only increment the counter if the host is the source address. • destination—Only increment the counter if the host is the destination address. • both—Increment the counter if the host is the source or destination address.

config firewall nat-snat

Use this command to configure source NAT (SNAT) rules.

You use SNAT when clients have IP addresses from private networks. This ensures you do not have multiple sessions from different clients with source IP 192.168.1.1, for example. Or, you can map all client traffic to a single source IP address because a source address from a private network is not meaningful to the FortiADC system or backend servers.

The system maintains this NAT table and performs the inverse translation when it receives the server-to-client traffic. Be sure to configure the backend servers to use the FortiADC address as the default gateway so that server responses are also rewritten by the NAT module.

Note: This SNAT feature is not supported for traffic to virtual servers. Use the virtual server SNAT feature instead.

Before you begin:

- You must have read-write permission for firewall settings.

Syntax

```
config firewall nat-snat
   edit <name>
      set from <ip&netmask>
      set out-interface <datasource>
      set status {enable | disable}
```

```
        set to <ip&netmask>
        set traffic-group <datasource>
        set trans-to-type {ip | pool}
        set trans-to-ip <class_ip>
        set trans-to-ip-start <class_ip>
        set trans-to-ip-end <class_ip>
    next
end
```

from	Address/mask notation to match the source IP address in the packet header. 0.0.0.0/0 matches all IP addresses.
out-interface	Interface that forwards traffic.
status	Enable or disable SNAT status.
to	Address/mask notation to match the destination IP address in the packet header. For example, 192.0.2.0/24.
traffic-group	Specify a traffic group configuration object.
trans-to-type	• ip—Specify to translate the source IP to a single specified address. • pool—Specify to translate the source IP to the next address in a pool.
trans-to-ip	Specify an IPv4 address. The source IP address in the packet header will be translated to this address.
trans-to-ip-start	First IP address in the SNAT pool.
trans-to-ip-end	Last IP address in the SNAT pool.

Example

```
FortiADC-VM # config firewall nat-snat
FortiADC-VM (nat-snat) # edit fw-snat-example
Add new entry 'fw-snat-example' for node 1941

FortiADC-VM (fw-snat-example) # get
from : 0.0.0.0/0
to : 0.0.0.0/0
out-interface :
trans-to-type : ip
trans-to-ip : 0.0.0.0
traffic-group :
status : enable


FortiADC-VM (fw-snat-example) # set to 192.0.2.0/24
FortiADC-VM (fw-snat-example) # set out-interface port5
FortiADC-VM (fw-snat-example) # set trans-to-ip 192.0.2.10

FortiADC-VM (fw-snat-example) # get
from : 0.0.0.0/0
```

```
to : 192.0.2.0/24
out-interface : port5
trans-to-type : ip
trans-to-ip : 192.0.2.10
traffic-group :
status : enable

FortiADC-VM (fw-snat-example) # end
```

config firewall policy

Use this command to configure firewall policy rules for IPv4 addresses.

A firewall policy is a filter that allows or denies traffic to be forwarded to the system based on a matching tuple: source address, destination address, and service. By default, firewall policy rules are stateful: if client-to-server traffic is allowed, the session is maintained in a state table, and the response traffic is allowed.

The FortiADC system evaluates firewall policies before other rules. It matches traffic against the firewall policy table, beginning with the first rule. If a rule matches, the specified action is taken. If the session is denied by a firewall policy rule, it is dropped. If the session is accepted, system processing continues.

By default, if firewall rules are not configured, the system does not perform firewall processing; all traffic is processed as if the system were a router, and traffic is forwarded according to routing and other system rules.

Note: You do not need to create firewall rules for routine management traffic associated with the management port or HA ports. The interface “allow access” option enables permitted protocols. The system automatically permits from-self traffic, such as health check traffic, and expected responses.

Before you begin:

- You must have a good understanding and knowledge of firewalls.
- You must have created the address configuration objects and service configuration objects that define the matching tuple in your firewall policy rules.
- You must have read-write permission for firewall settings.

Syntax

```
config firewall policy
   set default-action {deny|accept}
   set stateful {enable|disable}
   config rule
      edit <name>
         set action {deny | accept}
         set destination-address <datasource>
         set in-interface <datasource>
         set out-interface <datasource>
         set service <datasource>
         set source-address <datasource>
         set status {enable | disable}
      next
   end
end
```

default-action	Action when no rule matches or no rules are configured: • deny—Drop the traffic. • accept—Allow the traffic to pass the firewall.
stateful	Enable/disable stateful firewall. When enabled, server response traffic is permitted automatically when the client-to-server rule allows the connection to be established. When disabled, you must create separate rules for client-to-server and server-to-client traffic. Enabled by default.
config rule	
action	• deny—Drop the traffic. • accept—Allow the traffic to pass the firewall.
destination-address	Destination address object to use to form the matching tuple.
in-interface	Interface that receives traffic.
out-interface	Interface that forwards traffic.
service	Service object to use to form the matching tuple.
source-address	Source address object to use to form the matching tuple.
status	Enable or disable firewall policy rule.

Example

```
FortiADC-VM # config firewall policy
FortiADC-VM (policy) # set default-action deny
FortiADC-VM (policy) # config rule
FortiADC-VM (rule) # edit fw-allow-http
Add new entry 'fw-allow-http' for node 1871

FortiADC-VM (fw-allow-http) # get
in-interface :
out-interface :
source-address :
destination-address :
service :
status : enable
action :

FortiADC-VM (fw-allow-http) # set action accept
FortiADC-VM (fw-allow-http) # set in-interface port4
FortiADC-VM (fw-allow-http) # set out-interface port5
FortiADC-VM (fw-allow-http) # set source-address fw-source-addr1
FortiADC-VM (fw-allow-http) # set destination-address fw-dest-addr1
FortiADC-VM (fw-allow-http) # set service fw-http

FortiADC-VM (fw-allow-http) # get
```

```
in-interface : port4
out-interface : port5
source-address : fw-source-addr1
destination-address : fw-dest-addr1
service : fw-http
status : enable
action : accept

FortiADC-VM (fw-allow-http) # end
```

config firewall policy6

Use this command to configure firewall policy rules for IPv6 addresses.

A firewall policy is a filter that allows or denies traffic to be forwarded to the system based on a matching tuple: source address, destination address, and service. By default, firewall policy rules are stateful: if client-to-server traffic is allowed, the session is maintained in a state table, and the response traffic is allowed.

The FortiADC system evaluates firewall policies before other rules. It matches traffic against the firewall policy table, beginning with the first rule. If a rule matches, the specified action is taken. If the session is denied by a firewall policy rule, it is dropped. If the session is accepted, system processing continues.

By default, if firewall rules are not configured, the system does not perform firewall processing; all traffic is processed as if the system were a router, and traffic is forwarded according to routing and other system rules.

Note: You do not need to create firewall rules for routine management traffic associated with the management port or HA ports. The interface “allow access” option enables permitted protocols. The system automatically permits from-self traffic, such as health check traffic, and expected responses.

Before you begin:

- You must have a good understanding and knowledge of firewalls.
- You must have created the address configuration objects and service configuration objects that define the matching tuple in your firewall policy rules.
- You must have read-write permission for firewall settings.

Syntax

```
config firewall policy6
   set default-action {deny|accept}
   set stateful {enable|disable}
   config rule
      edit <name>
         set action {deny | accept}
         set destination-address6 <datasource>
         set in-interface <datasource>
         set out-interface <datasource>
         set service <datasource>
         set source-address6 <datasource>
         set status {enable | disable}
      next
   end
end
```

default-action	Action when no rule matches or no rules are configured: • deny—Drop the traffic. • accept—Allow the traffic to pass the firewall.
stateful	Enable/disable stateful firewall. When enabled, server response traffic is permitted automatically when the client-to-server rule allows the connection to be established. When disabled, you must create separate rules for client-to-server and server-to-client traffic. Enabled by default.
config rule	
action	• deny—Drop the traffic. • accept—Allow the traffic to pass the firewall.
destination-address6	Destination address object to use to form the matching tuple.
in-interface	Interface that receives traffic.
out-interface	Interface that forwards traffic.
service	Service object to use to form the matching tuple.
source-address6	Source address object to use to form the matching tuple.
status	Enable or disable firewall policy6 rule.

config firewall qos-filter

Use this command to configure QoS rules for IPv4 addresses.

A QoS filter is the policy that assigns traffic to the QoS queue.

Note: The QoS policy feature is not supported for traffic to virtual servers.

Before you begin:

- You must have a good understanding and knowledge of traffic in your network that requires QoS provisioning.
- You must have created the address configuration objects and service configuration objects that define the matching tuple for QoS rules.
- You must have created a QoS queue configuration object.
- You must have read-write permission for firewall settings.

Syntax

```
config firewall qos-filter
   edit <name>
      set destination-address <datasource>
      set in-interface <datasource>
      set out-interface <datasource>
```

```
        set queue <datasource>
        set service <datasource>
        set source-address <datasource>
        set status {enable|disable}
    next
end
```

destination-address	Destination address object to use to form the matching tuple.
in-interface	Interface that receives traffic.
out-interface	Interface that forwards traffic.
queue	QoS queue that will be used for packets that match the filter criteria.
service	Service object to use to form the matching tuple.
source-address	Source address object to use to form the matching tuple.
status	Enable/disable the filter.

Example

```
FortiADC-VM # config firewall qos-filter

FortiADC-VM (qos-filter) # edit qos-premium
Add new entry 'qos-premium' for node 1922

FortiADC-VM (qos-premium) # get
status : enable
in-interface :
out-interface :
source-address :
destination-address :
service :
queue :

FortiADC-VM (qos-premium) # set in-interface port4
FortiADC-VM (qos-premium) # set out-interface port5
FortiADC-VM (qos-premium) # set source-address fw-source-addr1
FortiADC-VM (qos-premium) # set destination-address fw-dest-addr1
FortiADC-VM (qos-premium) # set service fw-http
FortiADC-VM (qos-premium) # set queue lane-1

FortiADC-VM (qos-premium) # get
status : enable
in-interface : port4
out-interface : port5
source-address : fw-source-addr1
destination-address : fw-dest-addr1
service : fw-http
queue : lane-1

FortiADC-VM (qos-premium) # end
```

config firewall qos-filter6

Use this command to configure QoS rules for IPv6 addresses.

A QoS filter is the policy that assigns traffic to the QoS queue.

Note: The QoS policy feature is not supported for traffic to virtual servers.

Before you begin:

- You must have a good understanding and knowledge of traffic in your network that requires QoS provisioning.
- You must have created the address configuration objects and service configuration objects that define the matching tuple for QoS rules.
- You must have created a QoS queue configuration object.
- You must have read-write permission for firewall settings.

Syntax

```
config firewall qos-filter6
   edit <name>
      set destination-address6 <datasource>
      set in-interface <datasource>
      set out-interface <datasource>
      set queue <datasource>
      set service <datasource>
      set source-address6 <datasource>
      set status {enable|disable}
   next
end
```

destination-address6	Destination address object to use to form the matching tuple.
in-interface	Interface that receives traffic.
out-interface	Interface that forwards traffic.
queue	QoS queue that will be used for packets that match the filter criteria.
service	Service object to use to form the matching tuple.
source-address6	Source address object to use to form the matching tuple.
status	Enable/disable the filter.

config firewall qos-queue

Use this command to configure QoS queues.

You can use QoS policies to provision bandwidth for any traffic that matches the rule. You might consider QoS policies for latency- or bandwidth-sensitive services, such as VoIP and ICMP.

The FortiADC system does not provision bandwidth based on the TOS bits (also called differentiated services) in the IP header to control packet queueing. Instead, the system provisions bandwidth based on a source/destination/service matching tuple that you specify.

Note: The QoS policy feature is not supported for traffic to virtual servers.

Basic steps

1. Configure a queue.
2. Configure a QoS filter.

Before you begin:

- You must have read-write permission for firewall settings.

Syntax

```
config firewall qos-queue
   edit <name>
      set bandwidth <digit>[G|M|K]
   next
end
```

`bandwidth`	Maximum bandwidth rate. Specify a number and a unit abbreviation. For example, specify `100K` for 100 Kbps, `10M` for 10 Mbps, and `1G` for 1Gbps. If you do not specify a bandwidth, the default qos-queue is 1G.

Example

The following commands configure a firewall policy rule:

```
FortiADC-VM # config firewall qos-queue

FortiADC-VM (qos-queue) # edit lane-1
Add new entry 'lane-1' for node 1909
FortiADC-VM (lane-1) # end

FortiADC-VM # get firewall qos-queue lane-1
bandwidth : 1G
bandwidth-int : 1073741824
```

config firewall vip

Use this command to configure 1-to-1 NAT rules.

You can use 1-to-1 NAT when you want to publish public or “external” IP addresses for FortiADC resources but want the communication among servers on the internal network to be on a private or “internal” IP address range.

1-to-1 NAT is supported for traffic to virtual servers. The address translation occurs before the ADC has processed its rules, so FortiADC server load balancing policies that match source address (such as content routing and content rewriting rules) should be based on the mapped address space.

The system maintains this NAT table and performs the inverse mapping when it sends traffic from the internal side to the external side.

Before you begin:

- You must have read-write permission for firewall settings.

Syntax

```
config firewall vip
   edit <name>
      set extif <datasource>
      set extip <class_ip>
      set extport <integer>
      set mappedip-min <class_ip>
      set mappedip-max <class_ip>
      set mappedport-min <integer>
      set mappedport-max <integer>
      set portforward {enable | disable}
      set protocol {tcp | udp}
      set status {enable | disable}
      set traffic-group <datasource>
   next
end
```

`extif`	Interface that receives traffic.
`extip`	Specify the first address in the range. The last address is calculated after you enter the mapped IP range.
`extport`	Specify the first port number in the range. The last port number is calculated after you enter the mapped port range.
`mappedip-min`	First address in the range.
`mappedip-max`	Last address in the range.
`mappedport-min`	First port in the range.
`mappedport-max`	Last port in the range.
`portforward`	Enable/disable port forwarding.
`protocol`	TCP or UDP
`status`	Enable or disable static nat status
`traffic-group`	Specify the traffic group name.

Example

```
FortiADC-VM # config firewall vip
FortiADC-VM (vip) # edit 1-to-1-NAT
Add new entry '1-to-1-NAT' for node 661

FortiADC-VM (1-to-1-NAT) # get
extif :
extip : 0.0.0.0
mappedip-min : 0.0.0.0
mappedip-max : 0.0.0.0
portforward : disable
traffic-group:
status: enable

FortiADC-VM (1-to-1-NAT) # set extif port4
FortiADC-VM (1-to-1-NAT) # set extip 198.51.100.10
FortiADC-VM (1-to-1-NAT) # set mappedip-min 192.0.2.10
FortiADC-VM (1-to-1-NAT) # set mappedip-max 192.0.2.19

FortiADC-VM (1-to-1-NAT) # get
extif : port4
extip : 198.51.100.10
mappedip-min : 192.0.2.10
mappedip-max : 192.0.2.19
traffic-group :
status : enable
portforward : disable
status: enable

FortiADC-VM (1-to-1-NAT) # end
```

config global

The `config global` command is applicable to VDOMs and visible only to super admin users. See Appendix A: Virtual domains for information about special VDOM commands.

config global-dns-server

The `config global-dns-server` commands configure the DNS server used in global load balancing.

This chapter is a reference for the following commands:

- "config global-dns-server address-group" on page 50
- "config global-dns-server dns64" on page 52
- "config global-dns-server dsset-info-list" on page 53
- "config global-dns-server general" on page 54
- "config global-dns-server policy" on page 55
- "config global-dns-server remote-dns-server" on page 58
- "config global-dns-server response-rate-limit" on page 59
- "config global-dns-server trust-anchor-key" on page 60
- "config global-dns-server zone" on page 61

config global-dns-server address-group

Use this command to configure the source and destination IP addresses that are the matching criteria for DNS policies. The system includes the predefined address groups `any` and `none`.

Before you begin:

- You must have read-write permission for global load balancing settings.

After you have configured an address group, you can specify it in the DNS64 and DNS policy configurations.

Syntax

```
config global-dns-server address-group
   edit <name>
      config member
         edit <No.>
            set action {include|exclude}
            set addr-type {ipv4|ipv6}
            set ip-network <ip&netmask>
            set ip6-network <ip&netmask>
         next
      end
   next
end
```

`action`	• include—The rule logic creates an address object that includes addresses matching the specified address block. • exclude—The rule logic creates an address object that excludes addresses matching the specified address block.

addr-type	IPv4 or IPv6
ip-network	Address/mask notation to match the IP address in the packet header. Create objects to match source IPv4 address and different objects to match destination IPv4 address.
ip6-network	Address/mask notation to match the IPv6 address in the packet header. Create objects to match source IPv6 address and different objects to match destination IPv6 address.

Example

```
FortiADC-VM # config global-dns-server address-group
FortiADC-VM (address-group) # edit campus
Add new entry 'campus' for node 2206

FortiADC-VM (campus) # config member
FortiADC-VM (member) # edit 1
Add new entry '1' for node 2209

FortiADC-VM (1) # get
action : include
addr-type : ipv4
ip-network : 0.0.0.0/0

FortiADC-VM (1) # set ip-network 192.0.2.0/24
FortiADC-VM (1) # end
FortiADC-VM (campus) # end

FortiADC-VM # config global-dns-server address-group
FortiADC-VM (address-group) # edit branch
Add new entry 'branch' for node 2206

FortiADC-VM (branch) # config member
FortiADC-VM (member) # edit 1
Add new entry '1' for node 2209
FortiADC-VM (1) # set ip-network 198.51.100.0/24
FortiADC-VM (1) # end
FortiADC-VM (branch) # end

FortiADC-VM # show global-dns-server address-group
config global-dns-server address-group
edit "campus"
config member
edit 1
set ip-network 192.0.2.0/24
next
end
next
edit "branch"
config member
edit 1
set ip-network 198.51.100.0/24
```

```
next
end
next
end
```

config global-dns-server dns64

Use this command to map IPv4 addresses to AAAA queries when there are no AAAA records. This feature is optional. It can be used in network segments that use NAT64 to support IPv6 client communication with IPv4 backend servers.

Before you begin:

- You must have a good understanding of DNS and knowledge of the DNS deployment in your network.
- You must have configured address objects that specify the network segments for which the DNS64 map applies.
- You must have read-write permission for global load balancing settings.

After you have created a DNS64 configuration, you can specify it in a DNS policy configuration.

Syntax

```
config global-dns-server dns64
   edit <name>
      set exclude {any | none | <datasource>}
      set mapped-address {any | none | <datasource>}
      prefix6 <ip&netmask>
      source-address {any | none | <datasource>}
   next
end
```

exclude	Specify a wildcard (any or none) or an address object. Allows specification of a list of IPv6 addresses that can be ignored. Typically, you exclude addresses that do have AAAA records.
mapped-address	Address object that specifies the IPv4 addresses that are to be mapped in the corresponding A RR set.
prefix6	IP address and netmask that specify the DNS64 prefix. Compatible IPv6 prefixes have lengths of 32, 40, 48, 56, 64 and 96 as per RFC 6052. Each DNS64 configuration has one prefix. Multiple configurations can be defined.
source-address	Specify an address object. Only clients that match the source IP use the DNS64 lookup table.

Example

```
FortiADC-VM # config global-dns-server dns64
FortiADC-VM (dns64) # edit 1
Add new entry '1' for node 2289
```

```
FortiADC-VM (1) # get
prefix6 : ::/0
source-address :
mapped-address :
exclude :

FortiADC-VM (1) # set prefix6 64:ff::/96
FortiADC-VM (1) # set source-address any
FortiADC-VM (1) # set mapped-address dns64_mapped_pool
FortiADC-VM (1) # set exclude none

FortiADC-VM (1) # get
prefix6 : 64:ff::/96
source-address : any
mapped-address : dns64_mapped_pool
exclude : none

FortiADC-VM (1) # end
```

config global-dns-server dsset-info-list

Use this command to paste in the content of the DSSET files provided by child domain servers or stub domains.

If you enable DNSSEC, secure communication between the FortiADC DNS server and any child DNS servers is based on keys contained in delegation signer files (DSSET files). In DNSSEC deployments, DSSET files are generated automatically when the zone is signed by DNSSEC.

Note: You use the Global DNS zone configuration to generate the DSSET file for this server. The file generated by the zone configuration editor is the one you give to any parent zone or the registrar of your domain.

Before you begin:

- You must have a good understanding of DNSSEC and knowledge of the DNS deployment in your network.
- You must have used DNSSEC to sign the child domain servers and have downloaded the DSset files to a location you can reach from your management computer.
- You must have read-write permission for global load balancing settings.

Syntax

```
config global-dns-server dsset-info-list
   edit <name>
      set filename <string>
      set content <string>
   next
end
```

`filename`	Specify the filename. The convention is dsset-<domain>, for example, `dsset-example.com`.

content	Specify (paste) the DSset file content. The content of DSset files is similar to the following: `dns.example.com. IN DS 13447 5 1 A5AD9EFB6840F58CF817F3CC7C24A7ED2DD5559C`

config global-dns-server general

Use this command to configure basic behavior for the DNS server.

The general settings configuration specifies the interfaces that listen for DNS requests. By default, the system listens on the IPv4 and IPv6 addresses of all configured interfaces for DNS requests.

The other settings in the general settings configuration are applied when traffic does not match a Global DNS policy.

Before you begin:

- You must have a good understanding of DNS and knowledge of the DNS deployment in your network.
- You must have read-write permission for global load balancing settings.

Syntax

```
config global-dns-server general
   set dnssec-status {enable|disable}
   set dnssec-validate-status {enable|disable}
   set forward {first | only}
   set forwarders <datasource>
   set gds-status {enable|disable}
   set ipv4-accessed-status {enable|disable}
   set ipv6-accessed-status {enable|disable}
   set listen-on-all-interface {enable|disable}
   set listen-on-interface <datasource>
   set recursion-status {enable|disable}
   set response-rate-limit <datasource>
   set traffic-log {enable|disable}
   set use-system-dns-server {enable|disable}
end
```

dnssec-status	Enable/disable DNSSEC.
dnssec-validate-status	Enable/disable DNSSEC validation.
forward	• first—The DNS server queries the forwarder before doing its own DNS lookup. • only—Only queries the forwarder. Does not perform its own DNS lookups.
forwarders	If the DNS server zone has been configured as a forwarder, specify the remote DNS server to which it forwards requests.

gds-status	Enable/disable the DNS server configuration.
ipv4-accessed-status	Enable/disable listening for DNS requests on the interface IPv4 address.
ipv6-accessed-status	Enable/disable listening for DNS requests on the interface IPv6 address.
listen-on-all-interface	Enable listening on all interfaces.
listen-on-interface	If you do not listen on all interfaces, select one or more ports to listen on.
recursion-status	Enable/disable recursion. If enabled, the DNS server attempts to do all the work required to answer the query. If not enabled, the server returns a referral response when it does not already know the answer.
response-rate-limit	Specify a rate limit configuration object.
traffic-log	Enable/disable logging.
use-system-dns-server	Forward DNS requests to the system DNS server instead of the forwarder.

Example

```
FortiADC-VM # config global-dns-server general

FortiADC-VM (general) # get
gds-status : disable
recursion-status : enable
dnssec-status : disable
dnssec-validate-status : disable
ipv6-accessed-status : enable
ipv4-accessed-status : enable
traffic-log : disable
listen-on-all-interface : enable
forward : first
use-system-dns-server : enable
response-rate-limit :

FortiADC-VM (general) # set gds-status enable
FortiADC-VM (general) # end
```

config global-dns-server policy

Use this command to configure a rulebase that matches traffic to DNS zones.

Traffic that matches both source and destination criteria is served by the policy. Traffic that does not match any policy is served by the DNS “general settings” configuration.

Before you begin:

- You must have a good understanding of DNS and knowledge of the DNS deployment in your network.
- You must have configured address objects, remote servers, DNS zones, and optional configuration objects you want to specify in your policy.
- You must have read-write permission for global load balancing settings.

Syntax

```
config global-dns-server policy
   edit <name>
      set destination-address <datasource>
      set dns64-list {<datasource> ...}
      set dnssec-status {enable|disable}
      set dnssec-validate-status {enable|disable}
      set forward {first | only}
      set forwarders <datasource>
      set recursion-status {enable|disable}
      set response-rate-limit <datasource>
      set source-address <datasource>
      set zone-list {<datasource> ...}
   next
end
```

`destination-address`	Address object to specify the destination match criteria.
`dns64-list`	Specify one or more DNS64 configurations to use when resolving IPv6 requests.
`dnssec-status`	Enable/disable DNSSEC.
`dnssec-validate-status`	Enable/disable DNSSEC validation.
`forward`	• first—The DNS server queries the forwarder before doing its own DNS lookup. • only—Only queries the forwarder. Does not perform its own DNS lookups.
`forwarders`	If the DNS server zone has been configured as a forwarder, specify the remote DNS servers to which it forwards requests.
`recursion-status`	Enable/disable recursion. If enabled, the DNS server attempts to do all the work required to answer the query. If not enabled, the server returns a referral response when it does not already know the answer.
`response-rate-limit`	Specify a rate limit configuration object.
`source-address`	Address object to specify the source match criteria.

zone-list	Specify one or more zone configurations to serve DNS requests from matching traffic.

Example

```
FortiADC-VM (policy) # edit lan_policy
Add new entry 'lan_policy' for node 2236

FortiADC-VM (lan_policy) # get
source-address :
destination-address :
zone-list :
dns64-list :
recursion-status : enable
dnssec-status : disable
dnssec-validate-status: disable
forward : first
forwarders :
response-rate-limit :

FortiADC-VM (lan_policy) # set source-address campus
FortiADC-VM (lan_policy) # set destination-address any
FortiADC-VM (lan_policy) # set zone-list lan-zone
FortiADC-VM (lan_policy) # next

FortiADC-VM (policy) # edit wan_policy
Add new entry 'wan_policy' for node 2236

FortiADC-VM (wan_policy) # set source-address branch
FortiADC-VM (wan_policy) # set destination-address any
FortiADC-VM (wan_policy) # set zone-list wan-zone
FortiADC-VM (wan_policy) # end

FortiADC-VM # get global-dns-server policy lan_policy
source-address : campus
destination-address : any
zone-list : lan-zone
dns64-list :
recursion-status : enable
dnssec-status : disable
dnssec-validate-status: disable
forward : first
forwarders :
response-rate-limit :

FortiADC-VM # get global-dns-server policy wan_policy
source-address : branch
destination-address : any
zone-list : wan-zone
dns64-list :
recursion-status : enable
dnssec-status : disable
dnssec-validate-status: disable
forward : first
forwarders :
```

```
response-rate-limit :
```

config global-dns-server remote-dns-server

Use this command to create a list of DNS forwarders.

DNS forwarders are commonly used when you do not want the local DNS server to connect to Internet DNS servers. For example, if the local DNS server is behind a firewall and you do not want to allow DNS through that firewall, you implement DNS forwarding to a remote server that is deployed in a DMZ or similar network region that can contact Internet DNS servers.

Before you begin:

- You must have a good understanding of DNS and knowledge of the remote DNS servers that can be used to communicate with Internet domain servers.
- You must have read-write permission for global load balancing settings.

After you have configured a remote DNS server, you can select it in the DNS zone and DNS policy configurations.

Syntax

```
config global-dns-server remote-dns-server
   edit <name>
      config member
         edit <No.>
            set addr-type {ipv4|ipv6}
            set ip <class_ip>
            set ip6 <class_ip>
            set port <integer>
         next
      end
   next
end
```

addr-type	IPv4 or IPv6
ip	IP address of the remote DNS server.
ip6	IP address of the remote DNS server.
port	Port number the remote server uses for DNS. The default is 53.

Example

```
FortiADC-VM # config global-dns-server remote-dns-server
FortiADC-VM (remote-dns-ser~e) # edit google.com
Add new entry 'google.com' for node 2329

FortiADC-VM (google.com) # config member
FortiADC-VM (member) # edit 1
Add new entry '1' for node 2331
```

```
FortiADC-VM (1) # get
addr-type : ipv4
ip : 0.0.0.0
port : 53

FortiADC-VM (1) # set ip 8.8.8.8

FortiADC-VM (1) # get
addr-type : ipv4
ip : 8.8.8.8
port : 53
FortiADC-VM (1) # end
FortiADC-VM (google.com) # end
```

config global-dns-server response-rate-limit

Use this command to configure response rate limit objects that you specify in the DNS policy and DNS general configurations.

The response rate limit keeps the FortiADC authoritative DNS server from being used in amplifying reflection denial of service (DoS) attacks.

Before you begin:

- You must have a good understanding of DNS.
- You must have read-write permission for global load balancing settings.

After you have created a response rate limit configuration, you can select it in the DNS policy and DNS general settings configurations.

Syntax

```
config global-dns-server response-rate-limit
   edit <name>
      set per-second <integer>
   next
end
```

`per-second`	Maximum number of responses per second. The valid range is 1-2040. The default is 1000.

Example

```
FortiADC-VM # config global-dns-server response-rate-limit
FortiADC-VM (response-rate-~i) # edit gdns-rl-1
Add new entry 'gdns-rl-1' for node 2313
FortiADC-VM (gdns-rl-1) # end

FortiADC-VM # get global-dns-server response-rate-limit gdns-rl-1
per-second : 1000
```

config global-dns-server trust-anchor-key

Use this command to change the trust anchor key (if necessary).

DNSSEC validation requires that a DNS name server know the trust anchor key for the root DNS domain in order to validate already signed responses. In general, trust anchor keys do not change often, but they do change occasionally, and might change unexpectedly in the event the keys are compromised.

The FortiADC DNS server is preconfigured with a trust anchor key for the root DNS domain. If you are informed that you must update this key, you can use the configuration editor to paste the new content into the DNS server configuration.

Further reading:

http://data.iana.org/root-anchors/draft-icann-dnssec-trust-anchor.html

Before you begin:

- You must have a good understanding of DNSSEC and knowledge of the DNS deployment in your network.
- You must have already obtained the key so that you can copy and paste it into the DNS server configuration.
- You must have read-write permission for global load balancing settings.

Syntax

```
config global-dns-server trust-anchor-key
   edit <name>
      set value <string>
      set description <string>
   next
end
```

value	The key value. The key format is a string with the following format:
	`\"<domainname>\" <num1> <num2> <num3> \"<content>\"`
	The following is an example:
	`\".\" 256 3 5 \"AwEAAbDrWmiIReotvZ6FObgKygZwUxSUJW9z5pjiQMLH0JBGXooHrR16 pdKhI9mNkM8bLUMtwYfgeUOYXIvfagee8rk=\"`

description	A description of this configuration.

Example

```
FortiADC-VM # config global-dns-server trust-anchor-key
FortiADC-VM (trust-anchor-key) # edit sss
Add new entry 'sss' for node 2240

FortiADC-VM (sss) # get
value :
description :

FortiADC-VM (sss) # set
*value key value
```

```
description key description

FortiADC-VM (sss) # set value "\".\" 256 3 5
    \"AwEAAbDrWmiIReotvZ6FObgKygZwUxSUJW9z5pjiQMLH0JBGXooHrR16
    pdKhI9mNkM8bLUMtwYfgeUOYXIvfagee8rk=\""
FortiADC-VM (sss) # end
```

config global-dns-server zone

Use this command to configure DNS zone and resource records.

The DNS zone configuration is the key to the global load balancing solution. This configuration contains the key DNS server settings, including:

- Domain name and name server details.
- Type—Whether the server is the master or a forwarder.
- DNSSEC—Whether to use DNSSEC.
- DNS RR records—The zone configuration contains resource records (RR) used to resolve DNS queries delegated to the domain by the parent zone.

You can specify different DNS server settings for each zone you create. For example, the DNS server can be a master for one zone and a forwarder for another zone.

Before you begin:

- You must have a good understanding of DNS and knowledge of the DNS deployment in your network.
- You must have authority to create authoritative DNS zone records for your network.
- You must have read-write permission for global load balancing settings.

After you have configured a DNS zone, you can select it in the DNS policy configuration.

Syntax

```
config global-dns-server zone
   edit <name>
      set type {forward|fqdn-generate|master}
      set domain-name <string>
      set negative-ttl <integer>
      set primary-server-ip <class_ip>
      set primary-server-ip6 <class_ip>
      set primary-server-name <string>
      set responsible-mail <string>
      set ttl <integer>
      set forward {first | only}
      set forwarders <datasource>
      set dnssec-status {enable|disable}
      set dnssec-algorithm RSASHA1
      set dsset-info <string>
      set dssetinfo-filename <string>
      set dsset-info-list <datasource>
      set KSK <string>
      set KSK-Filename <string>
      set ZSK <string>
      set ZSK-Filename <string>
```

```
        config a-aaaa-record
           edit <No.>
              set hostname <string>
              set source-type {ipv4 | ipv6}
              set ip <class_ip>
              set ip6 <class_ip>
              set method wrr
              set weight <integer>
           next
        end
        config cname-record
           edit <No.>
              set alias <string>
              set target <string>
           next
        end
        config mx-record
           edit <No.>
              set domain-name <string>
              set hostname <string>
              set type {ipv4|ipv6}
              set ip <class_ip>
              set ip6 <class_ip>
              set priority <integer>
           next
        end
        config ns-record
           edit <No.>
              set domain-name <string>
              set host-name <string>
              set type {ipv4|ipv6}
              set ip <class_ip>
              set ip6 <class_ip>
           next
        end
        config txt-record
           edit <No.>
              set name <string>
              set text <name>=<value>,<name>=<value>
           next
        end
        config srv-record
           edit 1
              set hostname 222
              set target-server 222
           next
        end
        config ptr-record
           edit <No.>
              set ptr-address <string>
              set fqdn <string>
           next
        end
     next
  end
```

config global-dns-server zone	
type	• forward—The configuration allows you to apply DNS forwarding on a per-domain basis, overriding the forwarding settings in the “general” configuration. • fqdn-generate—The configuration has been generated by the global load balancing feature set. You cannot configure this type manually. • master—The configuration contains the “master” copy of data for the zone and is the authoritative server for it.
domain-name	The domain name must end with a period. For example: `example.com`.
negative-ttl	The last field in the SOA—the negative caching TTL. This informs other servers how long to cache no-such-domain (NXDOMAIN) responses from you. The default is 3600 seconds. The valid range is 0 to 2,147,483,647.
primary-server-ip	IP address of the primary server.
primary-server-ip6	IP address of the primary server.
primary-server-name	Sets the server name in the SOA record.
responsible-mail	Username of the person responsible for this zone, such as `root`.
ttl	The $TTL directive at the top of the zone file (before the SOA) gives a default TTL for every RR without a specific TTL set. The default is 86,400. The valid range is 1 to 2,147,483,647.
forward	• first—The DNS server queries the forwarder before doing its own DNS lookup. • only—Only query the forwarder. Do not perform a DNS lookup.
forwarders	Specify a remote server configuration object.
dnssec-status	Enable/disable DNSSEC.
dnssec-algorithm	RSHSHA1 is the only supported algorithm.
dsset-info	It is generated by the system if DNSSEC is enabled for the zone.
dssetinfo-filename	The file is generated by the system if DNSSEC is enabled for the zone. The file generated by the zone configuration editor is the one you give to any parent zone or the registrar of your domain. The convention is dsset-<domain>, for example `dsset-example.com`.
dsset-info-list	Specify a DSset info list configuration object.

KSK	Type characters for a string key. The file is generated by the system if DNSSEC is enabled for the zone.
KSK-Filename	The file is generated by the system if DNSSEC is enabled for the zone. To regenerate the KSK, disable DNSSEC and then re-enable DNSSEC.
ZSK	Type characters for a string key. The file is generated by the system if DNSSEC is enabled for the zone.
ZSK-Filename	The file is generated by the system if DNSSEC is enabled for the zone. To regenerate the ZSK, disable DNSSEC and then re-enable DNSSEC.
config a-aaaa-record	
hostname	The hostname part of the FQDN, such as www. **Note**: • You can specify the @ symbol to denote the zone root. The value substituted for @ is the preceding $ORIGIN directive. • A hostname can contain alphanumeric characters such as a–z, A–Z, and 0–9, but must NOT end with - (hyphen) or . (period). • You can also use * (wild card) in a domain name.
source-type	IPv4 or IPv6
ip	IP address of the virtual server.
ip6	IP address of the virtual server.
method	Weighted Round Robin is the only method supported.
weight	Assigns relative preference among members—higher values are more preferred and are assigned connections more frequently. The default is 1. The valid range is 1-255.
config cname-record	
alias	An alias name to another true or canonical domain name (the target). For instance, www.example.com is an alias for example.com.
target	The true or canonical domain name. For instance, example.com.
config mx-record	
hostname	The hostname part of the FQDN for a mail exchange server, such as mail.

type	IPv4 or IPv6
ip	IP address of the mail server.
ip6	IP address of the mail server.
priority	Preference given to this RR among others at the same owner. Lower values have greater priority.
config ns-record	
domain-name	The domain for which the name server has authoritative answers, such as example.com.
host-name	The hostname part of the FQDN, such as ns.
type	IPv4 or IPv6
ip	IP address of the name server.
ip6	IP address of the name server.
config txt-record	
name	Hostname. TXT records are name-value pairs that contain human readable information about a host. The most common use for TXT records is to store SPF records.
text	Comma-separated list of name=value pairs. An example SPF record has the following form: "v=spf1 +mx a:colo.example.com/28 -all" If you complete the entry from the CLI, put the string in quotes. (If you complete the entry from the the Web UI, you do not put the string in quotes.)
config srv-record	
hostname	The SRV Hostname.
target-server	The target server name (record).
config ptr-record	

PTR Address	A PTR address, such as 10.168.192.in-addr.arpa. or 1. If you use the number, the domain name is in the format "x.x.x.in-addr.arpa.".
FQDN	A fully qualified domain name, such as "www.example.com".

Example

```
FortiADC-VM # config global-dns-server zone
FortiADC-VM (zone) # edit wan-zone
Add new entry 'wan-zone' for node 2248

FortiADC-VM (wan-zone) # get
type : master
domain-name :
dnssec-status : disable
ttl : 86400
responsible-mail :
negative-ttl : 3600
primary-server-name :
primary-server-ip : 0.0.0.0
primary-server-ip6 : ::

FortiADC-VM (wan-zone) # set domain-name www.fortiadc.com.
FortiADC-VM (wan-zone) # set responsible-mail root
FortiADC-VM (wan-zone) # set primary-server-name ns
FortiADC-VM (wan-zone) # set primary-server-ip 202.33.11.107

FortiADC-VM (wan-zone) # config a-aaaa-record
FortiADC-VM (a-aaaa-record) # edit 1
Add new entry '1' for node 2257
FortiADC-VM (1) # set hostname www
FortiADC-VM (1) # get
hostname : www
source-type : ipv4
weight : 1
ip : 0.0.0.0
method : wrr
FortiADC-VM (1) # set hostname www
FortiADC-VM (1) # set ip 202.33.11.1
FortiADC-VM (1) # end
FortiADC-VM (wan-zone) # end
```

config global-load-balance

The `config global-load-balance` commands configure the global load balancing feature settings. You configure global load balancing settings on the FortiADC instance that hosts the DNS server that is used for global load balancing. You do not configure these settings on the local FortiADC instances that are load balanced.

This chapter is a reference for the following commands:

- "config global-load-balance data-center" on page 67
- "config global-load-balance link" on page 68
- "config global-load-balance servers" on page 69
- "config global-load-balance setting" on page 73
- "config global-load-balance topology" on page 77
- "config global-load-balance virtual-server-pool" on page 78
- "config global-load-balance host" on page 80

config global-load-balance data-center

Use this command to create data center configurations that you associate with the server configurations for local FortiADCs. The data center configuration sets key properties: Location and/or ISP and ISP province. These properties are keys in the global load balancing algorithm that selects the FortiADC in closest proximity to the client.

The system includes the FortiGuard geolocation database and predefined ISP address books that you use in the configuration.

Before you begin:

- If you want to specify a user-defined ISP address book, you must create it before using this command.
- You must have read-write permission for global load balancing settings.

After you have created a data center configuration object, you can specify it in the global load balance servers configuration.

Syntax

```
config global-load-balance data-center
   edit <name>
      set location <datasource>
      set description <string>
   next
end
```

`<name>`	Configuration name. No spaces or special characters. You reference this name in the global load balance servers configuration.

description	Optional description to help administrators know the purpose or usage of the configuration.
location	Specify a location from the geolocation list. **Note:** Starting from FortiADC 5.0.0, you are required to the country or city code instead of the full name of the country or city.

Example

```
FortiADC-VM # config global-load-balance data-center
FortiADC-VM (data-center) # edit dc-china
Add new entry 'dc1' for node 2836
FortiADC-VM (dc1) # get
location :
description :
FortiADC-VM (dc1) # set location CN
FortiADC-VM (dc1) # end
```

config global-load-balance link

A link can be an access point of an ISP, and you can specify the data-center and the ISP in the link configuration. For the gateway in `config gateway`, you can specify the LLB gateway of each o f the SLB devices which are related to this link. A global load-balancing device can find out the status of the LLB link to this link according to the gateway configuration. At the same time, the RTT detection result of the same link could be shared.

Syntax

```
config global-load-balance link
   edit "link"
      set data-center <data-center name>
      set isp <isp name>
      set isp-province <isp province name>
      config gateway
         edit 1
            set server <server name>
            set gateway-name <gateway>
         next
         edit 2
            set server <server>
            set gateway-name <gateway name>
         next
      end
   next
end
```

data-center	Specify a data center for the link.
isp	Specify an ISP for the link.

isp-province	Specify a province in the selected ISP for the link.
server	Specify a global load-balancing server for the link.
gateway-name	Specify a gateway for the link.

Example

```
config global-load-balance link
   edit "link1"
      set data-center dc1
      set isp china-mobile
      set isp-province Henan
      config gateway
         edit 1
            set server slb48
            set gateway-name gw_81
         next
         edit 2
            set server slb48_dris
            set gateway-name gw81_dris
         next
      end
   next
end
```

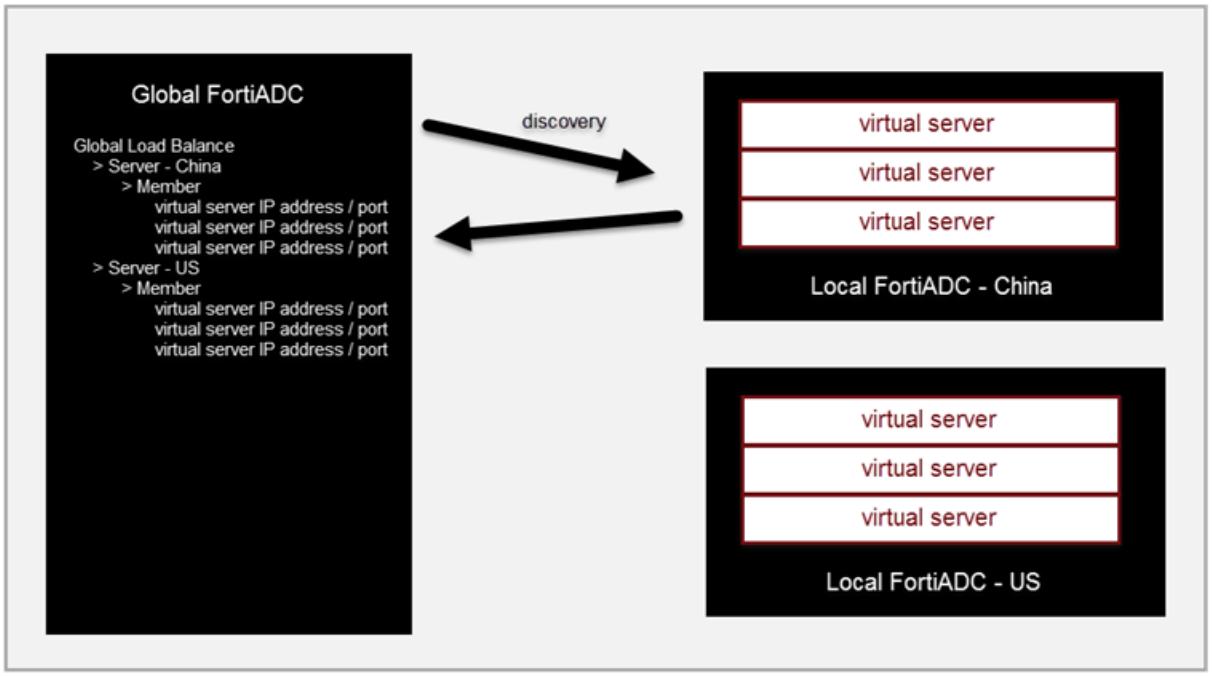
config global-load-balance servers

Use this command to configure global load balance servers.

In the context of the global server load balance configuration, servers are the local SLB (FortiADC instances or third-party servers) that are to be load balanced. For FortiADC instances, the GLB checks status and synchronizes configuration from the local SLB so that it can learn the set of virtual servers that are possible to include in the GLB virtual server pool.

Figure 1 illustrates configuration discovery. You use the execute discovery-glb-virtual-server command to populate the virtual-server-list configuration. Placement in this list does not include them in the pool. You also must name them explicitly in the virtual server pool configuration.

Figure 1: Virtual server discovery



Before you begin:

- You must have created the data center configuration objects that are associated with the local SLB.
- You must have created virtual server configurations on the local FortiADC SLB so that you can use execute discovery-glb-virtual-server command to discover them.
- You must have read-write permission for global load balancing settings.

After you have created a server configuration object, you can specify it the global load balancing virtual server pool configuration.

Syntax

```
config global-load-balance servers
   edit <name>
      set address-type {ipv4|ipv6}
      set data-center <datasource>
      set ip <class_ip>
      set server-type {FortiADC-SLB|Generic-Host}
      set sync-status {enable|disable}
      set health-check-ctrl {enable|disable}
      set health-check-list <datasource> <datasource> ...
      set health-check-relation {AND|OR}
      config virtual-server-list
         edit <name>
            set address-type {ipv4|ipv6}
            set ip <class-ip>
            set port <integer>
            set protocol {TCP|UDP}
            set gateway <string>
            set health-check-inherit {enable|disable}
```

```
            set health-check-ctrl {enable|disable}
            set health-check-list <datasource> <datasource> ...
            set health-check-relation {AND|OR}
        next
    end
  next
end
```

address-type	IPv4 or IPv6.
data-center	Specify a data center configuration object. The data center configuration object properties are used to establish the proximity of the servers and the client requests.
ip	Specify the IP address for the FortiADC management interface.
server-type	FortiADC-SLB: A FortiADC instance. Generic-Host: A third party ADC or server.
sync-status	Enable/disable synchronization of the virtual server status from the local FortiADC SLB. Disabled by default. If enabled, synchronization occurs whenever there is a change in virtual server status.
health-check-ctrl	If type is Generic Host, enable/disable health checks for the virtual server list. The health check settings at this configuration level are the parent configuration. When you configure the list, you can specify whether to inherit or override the parent configuration. If type is FortiADC-SLB, this option is not available. Health checking is built-in, and you can optionally configure a gateway health check.
health-check-list	Specify one or more health check configuration objects.
health-check-relation	• AND—All of the specified health checks must pass for the server to be considered available. • OR—One of the specified health checks must pass for the server to be considered available.

config virtual-server-list

When servers are FortiADC servers, use execute discovery-glb-virtual-server to populate the basic virtual-server-list configuration. After it has been populated, you can add a gateway health check. (optional).

<name>	Must match the virtual server configuration name on the local FortiADC.
address-type	IPv4 or IPv6.
ip	Virtual server IP address.

port	Virtual server port.
protocol	TCP or UDP. The default is TCP.
gateway	Used when server type is FortiADC. Specify a gateway to enable an additional health check: is the gateway beyond the FortiADC reachable? Specify a string that matches the configuration name of a link load balancing gateway.
health-check-inherit	If type is Generic Host, enable to inherit the health check settings from the parent configuration. Disable to specify health check settings in this member configuration.
health-check-ctrl	Enable health checking for the virtual server.
health-check-list	Specify one or more health check configuration objects.
health-check-relation	• AND—All of the selected health checks must pass for the server to the considered available. • OR—One of the selected health checks must pass for the server to be considered available.

Example

```
FortiADC-VM # config global-load-balance servers

FortiADC-VM (servers) # edit FortiADC-2

FortiADC-VM (FortiADC-2) # set data-center United_States
FortiADC-VM (FortiADC-2) # set ip 172.30.144.100
FortiADC-VM (FortiADC-2) # set server-type FortiADC-SLB
FortiADC-VM (FortiADC-2) # set sync-status enable

FortiADC-VM (FortiADC-2) # show
config global-load-balance servers
edit "FortiADC-2"
set sync-status enable
set ip 172.30.144.100
set data-center United_States
config virtual-server-list
end
next
end

FortiADC-VM (FortiADC-2) # end

FortiADC-VM # execute discovery-glb-virtual-server server FortiADC-2

FortiADC-VM # show global-load-balance servers FortiADC-2
```

```
config global-load-balance servers
edit "FortiADC-2"
set sync-status enable
set ip 172.30.144.100
set data-center United_States
config virtual-server-list
edit "mail_example_com"
set ip 192.0.2.2
set port 80
next
edit "www_example_com"
set ip 192.0.2.1
set port 811
next
end
next
end

FortiADC-VM # config global-load-balance servers

FortiADC-VM (servers) # edit FortiADC-2

FortiADC-VM (FortiADC-2) # config virtual-server-list

FortiADC-VM (virtual-server~l) # show
config virtual-server-list
edit "mail_example_com"
set ip 192.0.2.2
set port 80
next
edit "www_example_com"
set ip 192.0.2.1
set port 811
next
end

FortiADC-VM (virtual-server~l) # edit www_example_com
FortiADC-VM (www_example_com) # set gateway US-ISP1
FortiADC-VM (www_example_com) # end

FortiADC-VM (FortiADC-2) # end
```

config global-load-balance setting

Use this command to configure persistence, proximity, and password settings.

- Persistence
- Proximity
- Password

Persistence

Use this command to configure source address affinity and a timeout for GSLB persistence. You enable persistence per host in the GSLB host configuration.

If the DNS query is for a host that has persistence enabled, the DNS server replies with an answer that has the virtual server IP addresses listed in the order determined by the GSLB proximity algorithms, and the client source IP address (for example 192.168.1.100) is recorded in the persistence table. If source address affinity is set to 24 bits, subsequent queries for the host from the 192.168.1.0/24 network are sent an answer with the virtual servers listed in the same order (unless a server becomes unavailable and is therefore omitted from the answer).

Persistence is required for applications that include transactions across multiple hosts, so the persistence table is also used for queries for other hosts with the same domain. For example, a transaction on a banking application might include connections to login.bank.com and transfer.bank.com. To support persistence in these cases, the GSLB persistence lookup accounts for domain as well. The first query for login.bank.com creates a mapping for the source address network 192.168.1.0/24 and the domain bank.com. When the DNS server receives subsequent requests, it consults the persistence table for a source network match, then a domain match and a hostname match. In this example, as long as you have created host configurations for both login.bank.com and transfer.bank.com, and persistence is enabled for each, the persistence table can be used to ensure the DNS answers to queries from the same network list the resource records in the same order.

Before you begin:

- You must have read-write permission for global load balancing settings.

Syntax

```
config global-load-balance setting
   set persistence-mask-length <integer>
   set persistence-mask-length6 <integer>
   set persistence-timeout <integer>
end
```

persistence-mask-length	Number of IPv4 netmask bits that define network affinity for the persistence table. The default is 24.
persistence-mask-length6	Number of IPv6 netmask bits that define network affinity for the persistence table. The default is 64.
persistence-timeout	This setting specifies the length of time in seconds for which the entry is maintained in the persistence table. The default is 86400. The valid range is 60-2,592,000 seconds.

Example

```
FortiADC-docs # config global-load-balance setting
FortiADC-docs (setting) # get
password : *
proximity-detect-protocol : icmp
proximity-detect-retry-count : 3
proximity-cache-mask-length : 24
proximity-cache-mask-length6 : 64
proximity-detect-interval : 3
```

```
proximity-cache-aging-period : 86400
persistence-mask-length : 24
persistence-mask-length6 : 64
persistence-timeout : 60
FortiADC-docs (setting) # set persistence-mask-length 24
FortiADC-docs (setting) # set persistence-mask-length6 64
FortiADC-docs (setting) # set persistence-timeout 60
FortiADC-docs (setting) # end
```

Proximity

Use this command to configure dynamic proximity. Dynamic proximity is used to order DNS lookup results based on the shortest application response time (RTT) for ICMP or TCP probes sent by the local SLB to the DNS resolver that sent the DNS request.

The system caches the RTT results for the period specified by the timeout. When there are subsequent requests from clients that have a source IP address within the same network (as specified by the netmask affinity), the RTT is taken from the results table instead of a new, real-time probe. This reduces response time.

Before you begin:

- You must have read-write permission for global load balancing settings.

The settings you configure are applied if the dynamic-proximity RTT option is enabled in the virtual server pool configuration.

Syntax

```
config global-load-balance setting
   set proximity-cache-aging-period <integer>
   set proximity-cache-mask-length <integer>
   set proximity-cache-mask-length6 <integer>
   set proximity-detect-interval <integer>
   set proximity-detect-protocol {icmp|icmp-and-tcp}
   set proximity-detect-retry-count <integer>
end
```

`proximity-cache-aging-period`	RTT results are cached. This setting specifies the length of time in seconds for which the RTT cache entry is valid. The default is 86400. The valid range is 60-2,592,000 seconds.
`proximity-cache-mask-length`	Number of IPv4 netmask bits that define network affinity for the RTT table. The default is 24. For example, if the GLB records an RTT for a client with source IP address 192.168.1.100, the record is stored and applies to all requests from the 192.168.1.0/24 network.
`proximity-cache-mask-length6`	Number of IPv6 netmask bits that define network affinity for the RTT table. The default is 64.
`proximity-detect-interval`	Interval between retries if the probe fails. The default is 3. The valid range is 1-3600 seconds.
`proximity-detect-protocol`	• icmp • icmp-and-tcp

proximity-detect-retry-count	Retry count if the probe fails. The default is 3. The valid range is 1-10 times.

Example

```
FortiADC-docs # config global-load-balance setting
FortiADC-docs (setting) # get
password : *
proximity-detect-protocol : icmp
proximity-detect-retry-count : 3
proximity-cache-mask-length : 24
proximity-cache-mask-length6 : 64
proximity-detect-interval : 3
proximity-cache-aging-period : 86400
persistence-mask-length : 24
persistence-mask-length6 : 64
persistence-timeout : 60
FortiADC-docs (setting) # set proximity-detect-protocol icmp
FortiADC-docs (setting) # set proximity-detect-retry-count 2
FortiADC-docs (setting) # set proximity-cache-mask-length 24
FortiADC-docs (setting) # set proximity-cache-mask-length6 64
FortiADC-docs (setting) # set proximity-detect-interval 2
FortiADC-docs (setting) # set proximity-cache-aging-period 200
FortiADC-docs (setting) # end
```

Password

Use this command to set a password. This password is used for authentication between the GLB and the server. The same password must be set on both, otherwise the two will not be able to sync.

Before you begin:

- You must have read-write permission for global load balancing settings.

Syntax

```
config global-load-balance setting
   set auth-type <none/TCP_MD5SIG/auth_verify>
   set password <string>
end
```

auth-type	Select one of the following: • none • TCP_MD5SIG • auth_verify
password	If you choose TCP_MD5SIG or auth_verify for auth-type, then you must enter the corresponding password.

Example

```
FortiADC-docs # config global-load-balance setting
FortiADC-docs (setting) # get
password : *
proximity-detect-protocol : icmp
proximity-detect-retry-count : 3
proximity-cache-mask-length : 24
proximity-cache-mask-length6 : 64
proximity-detect-interval : 3
proximity-cache-aging-period : 86400
persistence-mask-length : 24
persistence-mask-length6 : 64
persistence-timeout : 60
set auth-type TCP_MD5SIG
FortiADC-docs (setting) #set password *
FortiADC-docs (setting) # end
```

config global-load-balance topology

Use this command to edit the member location list. This location is used when a vitual server pool is added to the host.

Starting from FortiADC 5.x.x, you can specify one location list as "any" to indicate any country other than the one that is already specified if you use DNS query origin method in a host.

Syntax

```
config global-load-balance host
   edit <No.>
      set member <country or city>
   next
end
```

member	The country or city code.

Example

```
FortiADC-VM # config global-load-balance topology
FortiADC-VM (topology) # edit "1"
FortiADC-VM (1) # set member CN11
FortiADC-VM (1) # next
FortiADC-VM (topology) # end
```

Note: Starting from FortiADC 5.x.x, you must use country or city code to indicate a country or city. In the example above, "CN11" stands for "China, Beijing".

config global-load-balance virtual-server-pool

The virtual server pool configuration defines the set of virtual servers that can be matched in DNS resource records, so it should include, for example, all the virtual servers that can be answers for DNS requests to resolve www.example.com.

You also specify the key parameters of the global load balancing algorithm, including proximity options, status checking options, load balancing method, and weight.

The DNS response is an ordered list of answers. Virtual servers that are unavailable are excluded. Available virtual servers are ordered based on the following priorities:

1. Geographic proximity
2. Dynamic proximity
3. Weighted round robin

A client that receives DNS response with a list of answers tries the first and only proceeds to the next answers if the first answer is unreachable.

Before you begin:

- You must have created the global load balance server configuration and you must know the names of the virtual servers that have been populated in that configuration.
- You must have read-write permission for global load balancing settings.

After you have created a virtual server pool configuration object, you can specify it global load balancing host configuration.

Syntax

```
config global-load-balance virtual-server-pool
   edit <name>
      set check-server-status {enable|disable}
      set check-virtual-server-existence {enable|disable}
      set preferred {None | GEO | GEO-ISP | RTT | Least-Connections | Connection-Limit |
          Bytes-Per-Second}
      set alternate {None | GEO | GEO-ISP | RTT | Least-Connections | Connection-Limit |
          Bytes-Per-Second}
      set load-balance-method wrr
      config member
         edit <No.>
            set backup {enable|disable}
            set server <datasource>
            set server-member-name <string>
            set weight <integer>
         next
      end
   next
end

config global-load-balance virtual-server-pool
   edit "vsp1"
      set preferred Connection-Limit
      set preferred Bytes-Per-Second
   next
```

```
end
```

check-server-status	Enable/disable polling of the local FortiADC SLB. If the server is unresponsive, its virtual servers are not selected for DNS answers.
check-virtual-server-existence	Enable/disable checks on whether the status of the virtual servers in the virtual server list is known. Virtual servers with unknown status are not selected for DNS answers.
preferred	The preferred schedule method for this virtual server pool.
alternate	The alternate schedule method for this virtual server pool.
load-balance-method	Only weighted round-robin is supported. **Note:** The preferred method will be used first when scheduling a DNS query in a virtual server pool. If the preferred method is selected GEO/GEO-ISP and the configured GEO IP/ISP can't match source IP of DNS query, then alternate method will be used. Also, when the preferred method is set to None, the alternate method will be used. When the preferred and the alternate methods are both set to None or do not match any of the result, the load-balance-method WRR will be used to schedule by default.
preferred Connection-Limit	Scheduling is done according to the current connection number of each virtual server in the virtual-server-pool members and each virtual server's configured connection-limit value.
preferred Bytes-Per-Second	If the BPS method is used, the virtual server with the least throughput should be the answer responded by GLB.
config member	
backup	Enable to designate the pool as a backup member of the group. All backup members are inactive until all main members are down.
server	Specify a global server load balancing servers configuration object.
server-member-name	Specify the name of the virtual server that is in the servers virtual server list configuration.
weight	Assigns relative preference among members—higher values are more preferred and are assigned connections more frequently. The default is 1. The valid range is 1-255.

Example

```
FortiADC-VM # config global-load-balance virtual-server-pool
FortiADC-VM (virtual-server~p) # edit pool_test
Add new entry 'pool_test' for node 2858
FortiADC-VM (pool_test) # get
preferred : NONE
check-server-status : disable
check-virtual-server-existence: disable
load-balance-method : wrr
FortiADC-VM (pool_test) # set preferred GEO-ISP
FortiADC-VM (pool_test) # config member
FortiADC-VM (member) # edit 1
Add new entry '1' for node 2864
FortiADC-VM (1) # get
server :
server-member-name :
weight : 1
backup : disable
FortiADC-VM (1) # set server neighbor1
FortiADC-VM (1) # set server-member-name vs-1
FortiADC-VM (1) # set weight 2
FortiADC-VM (1) # next
FortiADC-VM (member) # edit 2
Add new entry '2' for node 2864
FortiADC-VM (2) # set server neighbor1
FortiADC-VM (2) # set server-member-name vs-2
FortiADC-VM (2) # next
FortiADC-VM (member) # edit 3
Add new entry '3' for node 2864
FortiADC-VM (3) # set server neighbor2
FortiADC-VM (3) # set server-member-name vs-3
FortiADC-VM (3) # set weight 2
FortiADC-VM (3) # next
FortiADC-VM (member) # edit 4
Add new entry '4' for node 2864
FortiADC-VM (4) # set server neighbor2
FortiADC-VM (4) # set server-member-name vs-4
FortiADC-VM (4) # end
FortiADC-VM (pool_test) # end

config global-load-balance virtual-server-pool
   edit "vsp1"
      set preferred GEO
      set alternate RTT
   next
end
```

config global-load-balance host

Use this command to create host configurations. Host settings are used to form the zone configuration and resource records in the generated DNS zone used for global load balancing.

Before you begin:

- You must have created the global virtual server pools you want to use.
- You must have read-write permission for global load balancing settings.

After you have created a host configuration object, it can be used to form the zone and resource records in the generated DNS zone configuration.

Syntax

```
config global-load-balance host
   edit <name>
      set domain-name <string>
      set host-name <string>
      set response-single-record {enable|disable}
      set persistence {enable|disable}
      set default-feedback-ip <ip>
      set default-feedback-ip6 <ip>
      set load-balance-method {global availability|none|topology}
      config virtual-server-pool-list
         edit <No.>
            set virtual-server-pool <string>
         next
      end
   next
end
```

`domain-name`	The domain name must end with a period. For example: `example.com.`
`host-name`	The hostname part of the FQDN, such as `www`. **Note**: You can specify the @ symbol to denote the zone root. The value substituted for @ is the preceding $ORIGIN directive.
`respond-single-record`	Enable/disable an option to send only the top record in response to a query. Disabled by default. By default, the response is an ordered list of records.
`persistence`	Enable/disable the persistence table. Disabled by default. If you enable persistence, the client source address is recorded in the persistence table, and subsequent requests from the same network or the same host or domain are sent an answer with the virtual servers listed in the same order (unless a server becomes unavailable and is therefore omitted from the answer).
`default-feedback-ip`	Specify an IP address to return in the DNS answer if no virtual servers are available.
`default-feedback-ip6`	Specify an IPv6 address to return in the DNS answer if no virtual servers are available.
`load-balance-method`	Specify a virtual server pool selection method. Set to "weight" by default.

`virtual-server-pool`	Specify a virtual server pool configuration object to host, i.e., a virtual server pool name, location list (optional), and/or ISP (optional).

Example

```
FortiADC-VM # config global-load-balance host
FortiADC-VM (host) # edit www_fadc_com
Add new entry 'www_fadc_com' for node 2869
FortiADC-VM (www_fadc_com) # get
host-name :
domain-name :
respond-single-record : disable
persistence : disable
load-balance-method : weight
default-feedback-ip : 0.0.0.0
default-feedback-ip6 : ::
FortiADC-VM (www_fadc_com) # set host-name www
FortiADC-VM (www_fadc_com) # set domain-name fadc.com
FortiADC-VM (www_fadc_com) # config virtual-server-pool-list
FortiADC-VM (virtual-server~p) # edit "1"
FortiADC-VM (1) # set virtual-server-pool test
FortiADC-VM (1) # next
FortiADC-VM (virtual-server~p) # end
FortiADC-VM (www_fadc_com) # end
```

config link-load-balance

The `config link-load-balance` commands configure the link load balancing feature settings.

This chapter is a reference for the following commands:

- "config link-load-balance flow-policy" on page 83
- "config link-load-balance gateway" on page 86
- "config link-load-balance link-group" on page 88
- "config link-load-balance persistence" on page 90
- "config link-load-balance proximity-route" on page 92
- "config link-load-balance virtual-tunnel" on page 94

config link-load-balance flow-policy

Use this command to configure link load balancing policy rules.

A link policy matches traffic to rules that select a link group or virtual tunnel.

The policy uses a matching tuple: source, destination, service, and schedule. The policy match is a Boolean AND—All must match for the rule to be applied.

The elements of the tuple support specification by group objects. This is a Boolean OR—If source IP address belongs to member 1 OR member 2, then source matches.

The logical combinations enable you to subscribe multiple address spaces or services to a group of links, and create load balancing rules on that group basis.

The policy table is consulted from top to bottom. The first rule to match is applied.

The FortiADC system evaluates traffic to determine the routing rules to apply. With regard to link load balancing, the system evaluates rules in the following order and applies the first match:

1. LLB link policy
2. Policy route
3. Static/Dynamic route
4. LLB default link group

Before you begin:

- You must have configured any address, service, and schedule objects that you want to use as match criteria for your policy.
- You must have configured a link group or virtual tunnel group.
- You must have read-write permission for link load balancing settings.

Syntax

```
config link-load-balance flow-policy
   set default-link-group <datasource>
   config rule
      edit <name>
         set group-type {link-group | virtual-tunnel}
         set link-group <datasource>
         set virtual-tunnel <datasource>
         set destination-type {address|addrgrp|isp}
         set destination-address <datasource>
         set destination-addrgrp <datasource>
         set destination-isp <datasource>
         set in-interface <datasource>
         set schedule <datasource>
         set service-type {service|servicegrp}
         set service <datasource>
         set servicegrp <datasource>
         set source-type {address|addrgrp|isp}
         set source-address <datasource>
         set source-addrgrp <datasource>
         set source-isp <datasource>
   next
end
```

`default-link-group`	Specify a link group configuration object that is used as the default when traffic does not match policy rules.
config rule	
`group-type`	• link-group: Policy uses a link group. • virtual-tunnel: Policy uses a virtual tunnel.
`link-group`	If you specify the link group type, specify a link group configuration object.
`virtual-tunnel`	If you specify the virtual tunnel group type, specify a virtual tunnel configuration object.
`destination-type`	Specify whether to use address, address group, or ISP address objects for this rule.
`destination-address`	Specify an address object to match destination addresses. If you do not specify a destination address, the rule matches any destination.
`destination-addrgrp`	Specify an address object to match destination addresses. If you do not specify a destination address, the rule matches any destination.
`destination-isp`	Specify an address object to match destination addresses. If you do not specify a destination address, the rule matches any destination.
`in-interface`	Network interface to which the policy applies.

schedule	Specify the schedule object that determines the times the system uses the logic of this configuration. The link policy is active when the current time falls in a time period specified by one or more schedules in the schedule group. If you do not specify a schedule, the rule applies at all times.
service-type	Specify whether to use service or service group objects for this rule.
service	Specify a service object to match destination services. If you do not specify a service, the rule matches any service.
servicegrp	Specify a service group object to match destination services. If you do not specify a service, the rule matches any service.
source-type	Specify whether to use address, address group, or ISP address objects for this rule.
source-address	Specify an address object to match source addresses. If you do not specify a source address, the rule matches any source address.
source-addrgrp	Specify an address object to match source addresses. If you do not specify a source address, the rule matches any source address.
source-isp	Specify an address object to match source addresses. If you do not specify a source address, the rule matches any source address.

Example

```
FortiADC-docs # config link-load-balance flow-policy

FortiADC-docs (flow-policy) # config rule
FortiADC-docs (rule) # edit ISP-1
Add new entry 'ISP-1' for node 634

FortiADC-docs (ISP-1) # get
in-interface :
source-type : address
source-address :
destination-type : address
destination-address :
service-type : service
service :
schedule :
group-type : link-group
link-group :

FortiADC-docs (ISP-1) # set in-interface port2
FortiADC-docs (ISP-1) # set source-type addrgrp
FortiADC-docs (ISP-1) # set source-addrgrp LAN
FortiADC-docs (ISP-1) # set destination-type addrgrp
FortiADC-docs (ISP-1) # set destination-addrgrp WAN
FortiADC-docs (ISP-1) # set service-type servicegrp
FortiADC-docs (ISP-1) # set servicegrp Web
```

```
FortiADC-docs (ISP-1) # set link-group ISP1
FortiADC-docs (ISP-1) # end
FortiADC-docs (flow-policy) # end
```

config link-load-balance gateway

Use this command to configure gateway links.

The gateway link configuration enables you to specify health checks, bandwidth rate thresholds, and spillover threshold behavior for the gateway links you add to link groups.

Before you begin:

- You must know the IP addresses of the ISP gateway link used in the network segment where the FortiADC appliance is deployed.
- You must have added health check configuration objects that you want to use to probe the gateway links.
- You must have read-write permission for link load balancing settings.

After you have configured a gateway link configuration object, you can select it in the link group configuration.

Syntax

```
config link-load-balance gateway
   edit <name>
      set health-check-ctrl {enable|disable}
      set health-check-list {<datasource> ...}
      set health-check-relation {AND|OR}
      set inbound-bandwidth <integer>
      set ip <class_ip>
      set outbound-bandwidth <integer>
      set spillover-threshold-in <integer>
      set spillover-threshold-out <integer>
      set spillover-threshold-total <integer>
   next
end
```

health-check-ctrl	Enable/disable health checks.
health-check-list	Specify one or more health check configuration objects.
health-check-relation	• AND—All of the specified health checks must pass for the server to the considered available. • OR—One of the specified health checks must pass for the server to be considered available.
inbound-bandwidth	Maximum bandwidth rate for inbound traffic through this gateway link.
ip	IP address of the gateway link.

outbound-bandwidth	Maximum bandwidth rate for outbound traffic to this gateway link. If traffic exceeds this threshold, the FortiADC system considers the gateway to be full and does not dispatch new connections to it. The default is 2,000,000 Kbps. The valid range is 1 to 2,147,483,647. We recommend you tune bandwidth thresholds strategically, using the bandwidth rate and price structure agreement you have with your ISP to your advantage.
spillover-threshold-in	Maximum inbound bandwidth rate for a link in a spillover load balancing pool.
spillover-threshold-out	Maximum outbound bandwidth rate for a link in a spillover load balancing pool. If you enable spillover load balancing in the link group configuration, the system maintains a spillover list. It dispatches new connections to the link with the greatest priority until its spillover threshold is exceeded; then dispatches new connections to the link with the next greatest priority until its threshold is exceeded, and so on. The default is 2,000,000 Kbps. The valid range is 1 to 2,147,483,647.
spillover-threshold-total	Maximum total bandwidth rate (inbound plus outbound) for a link in a spillover load balancing pool.

Example

```
FortiADC-VM (gateway) # edit llb-gateway
Add new entry 'llb-gateway' for node 2501
FortiADC-VM (llb-gateway) # get
ip : 0.0.0.0
inbound-bandwidth : 2000000
outbound-bandwidth : 2000000
health-check-ctrl : disable
spillover-threshold-in: 2000000
spillover-threshold-out: 2000000
spillover-threshold-total: 2000000

FortiADC-VM (llb-gateway) # set ip 192.168.1.1
FortiADC-VM (llb-gateway) # end

FortiADC-VM # get link-load-balance gateway llb-gateway
ip : 192.168.1.1
inbound-bandwidth : 2000000
outbound-bandwidth : 2000000
health-check-ctrl : disable
spillover-threshold-in: 2000000
spillover-threshold-out: 2000000
spillover-threshold-total: 2000000
```

config link-load-balance link-group

Use this command to configure link groups.

Link groups include ISP gateways your company uses for outbound traffic. Grouping links reduces the risk of outages and provisions additional bandwidth to relieve potential traffic congestion.

The link group configuration specifies the load balancing algorithm and the gateway routers in the load balancing pool. You can enable LLB options, such as persistence rules and proximity routes.

Before you begin:

- You must have configured gateway links and persistence rules and before you can select them in the link group configuration.
- You must have read-write permission for link load balancing settings.

After you have configured a link group configuration object, you can select it in the link policy configuration.

Syntax

```
config link-load-balance link-group
   edit <name>
      set addr-type ipv4
      set persistence <datasource>
      set proximity-route {enable|disable}
      set route-method {consistent-hash-ip | least-connection | least-new-cps | least-
          throughput-all | least-throughput-in | least-throughput-out | spillover-
          throughput-all | spillover-throughput-in | spillover-throughput-out | wrr>
      config link-member
         edit <name>
            set backup {enable|disable}
            set gateway <datasource>
            set spillover-priority <integer>
            set status {enable|disable}
            set weight <integer>
         next
      end
   next
end
```

addr-type	Only IPv4 is supported.
persistence	Specify a persistence configuration. Optional.
proximity-route	Enable/disable use of proximity routes.

route-method	• consistent-hash-ip: Selects the gateway link based on a hash of the source IP address. • least-connection: Dispatches new connections to the link member with the lowest number of connections. • least-new-cps: Dispatches new connections to the link member that has the lowest rate of new connections per second. • least-throughput-all: Dispatches new connections to the link member with the least total traffic (that is, inbound plus outbound). • least-throughput-in: Dispatches new connections to the link member with the least inbound traffic. • least-throughput-out: Dispatches new connections to the link member with the least outbound traffic. • spillover-throughput-all: Spillover list based on total traffic (that is, inbound plus outbound). • spillover-throughput-in: Spillover list based on inbound traffic. • spillover-throughput-out: Dispatches new connections according to the spillover list based on outbound traffic. • wrr: Dispatches new connections to link members using a weighted round-robin method. This is the default.
config link member	
backup	• enable—Designate the link as a backup member of the group. All backup members are inactive until all main members are down. • disable—Designate the link as a main member of the group.
gateway	Specify a gateway configuration object.
spillover-priority	Assigns a priority to the link when using a spillover load balancing method. Higher values have greater priority. When a spillover method is enabled, the system dispatches new connections to the link that has the greatest spillover priority until its threshold is exceeded; then it dispatches new connections to the link with the next greatest priority until its threshold is exceeded, and so on. If multiple links in a link group have the same spillover priority, the system dispatches new connections among those links according to round robin. The default is 0. The valid range is 0-9.
status	• enable—The member is considered available for new traffic. • disable—The member is considered unavailable for new traffic.

`weight`	Assigns relative preference among members—higher values are more preferred and are assigned connections more frequently. The default is 1. The valid range is 1 to 255. All load balancing methods consider weight, except spillover, which uses its own priority configuration. Servers are dispatched requests proportional to their weight, relative to the sum of all weights. The following example shows the effect of weight on WRR: • Sever A, Weight 2; Server B, Weight 1: Requests are sent AABAAB. • Sever A, Weight 3; Server B, Weight 2: Requests are sent AABAB. For other methods, weight functions as a tie-breaker. For example, with the Least Connection algorithm, requests are sent to the server with the least connections. If the number of connections is equal, the request is sent to the server with the greater weight. For example: • Server A, Weight 1, 1 connection • Server B, Weight 2, 1 connection The next request is sent to Server B.

Example

```
FortiADC-VM (link-group) # edit llb-link-group
Add new entry 'llb-link-group' for node 618

FortiADC-VM (llb-link-group) # get
addr-type : ipv4
route-method : wrr
persistence :
proximity-route : disable

FortiADC-VM (llb-link-group) # config link-member

FortiADC-VM (link-member) # edit 1
Add new entry '1' for node 624

FortiADC-VM (1) # get
gateway :
weight : 1
spillover-priority : 0
status : enable

FortiADC-VM (1) # set gateway llb-gateway
FortiADC-VM (1) # end
```

config link-load-balance persistence

Use this command to configure persistence rules.

Persistence rules identify traffic that should be ignored by load balancing rules and instead be forwarded to the same gateway each time the traffic traverses the FortiADC appliance.

You should use persistence rules with applications that use a secure connection. Such applications drop connections when the server detects a change in a client's source IP address.

Before you begin:

- You must have an awareness of the types of outbound traffic from your network. Persistence rules are useful for traffic that requires an established session, such as secure connections (HTTPS and SSH, for example).
- You must have knowledge of the source and/or destination subnets to which the persistence rules should apply.
- You must have read-write permission for link load balancing settings.

You can use persistence rules in link groups but not virtual tunnels.

Syntax

```
config link-load-balance persistence
   edit <name>
      set timeout <integer>
      set type {destination-address | source-address | source-destination-address |
          source-destination-pair}
      set dst-ipv4-maskbits <integer>
      set src-ipv4-maskbits <integer>
   next
end
```

`timeout`	The default is 300 seconds.
`type`	• destination-address: Packets with a destination IP address that belongs to the same subnet take same outgoing gateway. • source-address: Packets with a source IP address that belongs to the same subnet take the same outgoing gateway. • source-destination-address: Packets with a source IP address and destination IP address that belong to the same subnet take the same outgoing gateway. • source-destination-pair: Packets with the same source IP address and destination IP address take same outgoing gateway.
`dst-ipv4-maskbits`	Number of bits in a subnet mask to specify a network segment that should following the persistence rule. For example, if you set this to 24, and the system chooses a particular gateway router for destination IP 192.168.1.100, the system will select that same gateway for traffic to all destination IPs in subnet 192.168.1.0/24.

src-ipv4-maskbits	Number of bits in a subnet mask to specify a network segment that should following the persistence rule. For example, if you set this to 24, and the system chooses a particular gateway router for client IP 192.168.1.100, the system will select that same gateway for subsequent client requests when the subsequent client belongs to subnet 192.168.1.0/24.

Example

```
FortiADC-VM # config link-load-balance persistence
FortiADC-VM (persistence) # edit llb-persistence
Add new entry 'llb-persistence' for node 674

FortiADC-VM (llb-persistence) # get
type : source-destination-pair
timeout : 300

FortiADC-VM (llb-persistence) # end
```

config link-load-balance proximity-route

Use this command to configure proximity routes.

The proximity route feature enables you to associate link groups with efficient routes. Proximity routes can improve user experience over the WAN because traffic is routed over fast routes.

You can use either or both of these methods:

- Dynamic Detection—The system polls the network for efficient routes. The algorithm selects a gateway based on latency. When the bandwidth usage of a gateway reaches 100%, the gateway is considered too busy and is not selected.
- Static Table—You specify the gateways to use for traffic on destination networks.

If you configure both, the system checks the static table first for a matching route and, if any, uses it. If there is no matching static route, the system uses dynamic detection.

Note: Adding a new static route does not affect existing sessions. Deleting or editing a static route causes the related sessions to be re-created.

Before you begin:

- You must have knowledge of IP addresses used in outbound network routes to configure a static route.
- You must have read-write permission for link load balancing settings.

Syntax

```
config link-load-balance proximity-route
      set mode {disable | dynamic-detect-only | static-table-first | static-table-only}
      set dynamic-cache-aging-period <integer>
      set dynamic-detect-protocol {icmp|icmp-and-tcp}
      set dynamic-detect-retry-count <class_ip>
```

```
        set dynamic-detect-retry-interval <integer>
        config static-table
           edit <No.>
              set type {isp|subnet}
              set ip-netmask <ip&netmask>
              set isp-name <datasource>
              set gateway <datasource>
           next
        end
     next
  end
```

`mode`	• disable • dynamic-detect-only • static-table-first • static-table-only
`dynamic-cache-aging-period`	The default is 86,400 seconds (24 hours).
`dynamic-detect-protocol`	• icmp—Use ICMP to detect routes. Calculate proximity by the smaller RTT. • icmp-and-tcp—Some hosts do not response ICMP requests. Specify this option to use both ICMP and TCP to detect routes and RTT. For TCP detection, port 7 (TCP echo) is used. A connection refused or connection reset by the destination is treated as successful detection.
`dynamic-detect-retry-count`	The default is 3.
`dynamic-detect-retry-interval`	The default is 3.
config static-table	
`type`	Specify the IP and netmask manually or use an ISP address object. Routes that are specified manually have priority over ISP address object entries.
`ip-netmask`	Destination IP address and netmask.
`isp-name`	Specify an ISP address book configuration object. If an address exists in multiple ISP address books, the route entries have priority as follows: 1. User-defined entries. 2. Entries from an address book that has been imported. 3. Entries from the predefined address book (default for the firmware image).

gateway	Specify a gateway configuration object. The gateway must be able to route packets to the destination IP address that you have specified.

Example

```
FortiADC-VM # config link-load-balance proximity-route
FortiADC-VM (proximity-route) # set mode static-table-first

FortiADC-VM (proximity-route) # get
mode : static-table-first
dynamic-detect-protocol: icmp
dynamic-detect-retry-count: 3
dynamic-detect-retry-interval: 3
dynamic-cache-aging-period: 86400

FortiADC-VM (proximity-route) # config static-table
FortiADC-VM (static-table) # edit 1
Add new entry '1' for node 687
FortiADC-VM (1) # set gateway 198.51.100.0
FortiADC-VM (1) # set destination 198.51.100.10
FortiADC-VM (1) # end

FortiADC-VM (proximity-route) # get
mode : static-table-first
dynamic-detect-protocol: icmp
dynamic-detect-retry-count: 3
dynamic-detect-retry-interval: 3
dynamic-cache-aging-period: 86400
== [ 1 ]

FortiADC-VM (proximity-route) # show
config link-load-balance proximity-route
set mode static-table-first
config static-table
edit 1
set destination 198.51.100.10/32
set gateway 198.51.100.0
next
end
end
```

config link-load-balance virtual-tunnel

Use this command to configure virtual tunnels.

Virtual tunnels enable reliable, site-to-site connectivity using Generic Routing Encapsulation (GRE) to tunnel traffic between pairs of FortiADC appliances.

The virtual tunnel group configuration sets the list of tunnel members, as well as load balancing options like algorithm and weight.

When you add members to a virtual tunnel configuration, you specify a local and remote IP address. These addresses are IP addresses assigned to a network interface on the local and remote FortiADC appliance.

Before you begin:

- You must have read-write permission for link load balance settings.

After you have configured a virtual tunnel configuration object, you can select it in the link policy configuration.

Syntax

```
config link-load-balance virtual-tunnel
   edit <name>
      set dispatch-method {vt-wrr|vt-chash}
      config vt-member
         edit <name>
            set health-check-ctrl {enable|disable}
            set status {enable|disable}
            set tunnel-local-addr <class_ip>
            set tunnel-remote-addr <class_ip>
            set weight <integer>
         next
      end
   next
end
```

`dispatch-method`	• vt-wrr: Dispatches packets to VT members using a weighted round-robin method. • vt-chash: Dispatches packets by source-destination IP address tuple.
`backup`	• enable—Designate the tunnel as a backup member of the group. All backup members are inactive until all main members are down. • disable—Designate the tunnel as a main member of the group.
`health-check-ctrl`	• enable—Send probes to test whether the link is available. • disable—Do not send probes to test the health of the link.
`status`	• enable—The member is considered available for new traffic. • disable—The member is considered unavailable for new traffic.
`tunnel-local-addr`	IP address for the network interface this system uses to form a VPN tunnel with the remote system.
`tunnel-remote-addr`	IP address that the remote FortiADC system uses to form a VPN tunnel with this system.
`weight`	Assigns relative preference among members—higher values are more preferred and are assigned connections more frequently.

Example

```
FortiADC-VM # config link-load-balance virtual-tunnel
```

```
FortiADC-VM (virtual-tunnel) # edit llb-vt
Add new entry 'llb-vt' for node 222

FortiADC-VM (llb-vt) # get
dispatch-method : vt-wrr

FortiADC-VM (llb-vt) # config vt-member
FortiADC-VM (vt-member) # edit vt-member-1
Add new entry 'vt-member-1' for node 225

FortiADC-VM (vt-member-1) # get
tunnel-local-addr : 0.0.0.0
tunnel-remote-addr : 0.0.0.0
weight : 1
status : enable
health-check-ctrl : disable

FortiADC-VM (vt-member-1) # set health-check-ctrl enable
FortiADC-VM (vt-member-1) # set tunnel-local-addr 192.0.2.10
FortiADC-VM (vt-member-1) # set tunnel-remote-addr 198.51.100.10
FortiADC-VM (vt-member-1) # end

FortiADC-VM (llb-vt) # get
dispatch-method : vt-wrr
== [ vt-member-1 ]

FortiADC-VM (llb-vt) # show
config link-load-balance virtual-tunnel
edit "llb-vt"
config vt-member
edit "vt-member-1"
set tunnel-local-addr 192.0.2.10
set tunnel-remote-addr 198.51.100.10
set health-check-ctrl enable
next
end
next
end
```

config load-balance

The `config load-balance` commands configure the load-balancing feature settings.

This chapter is a reference for the following commands:

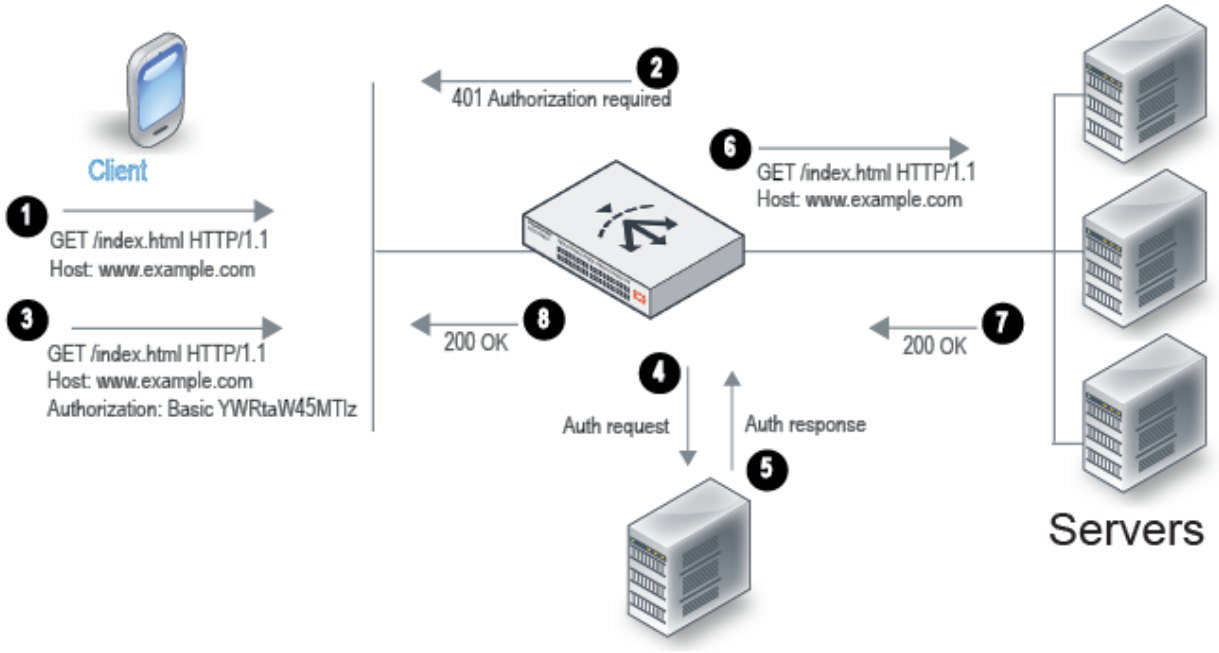
- "config load-balance auth-policy" on page 97
- "config load-balance caching" on page 99
- "config load-balance compression" on page 106
- "config load-balance connection-pool" on page 108
- "config load-balance content-rewriting" on page 110
- "config load-balance content-routing" on page 114
- "config load-balance error-page" on page 119
- "config load-balance geoip-list" on page 119
- "config load-balance ippool" on page 126
- "config load-balance l2-exception-list" on page 128
- "config load-balance method" on page 129
- "config load-balance persistence" on page 131
- "config load-balance pool" on page 134
- "config load-balance profile" on page 140
- "config load-balance real-server-ssl-profile" on page 169
- "config load-balance reputation" on page 172
- "config load-balance reputation-exception" on page 174
- "config load-balance virtual-server" on page 175
- "config load-balance web-category" on page 184
- "config load-balance web-filter-profile" on page 184
- "config load-balance web-sub-category" on page 185
- "config load-balance whitelist" on page 187
- "config load-balance pagespeed" on page 190
- "config load-balance pagespeed-profile" on page 192
- "config load-balance http2-profile" on page 189
- "config load-balance schedule-pool" on page 193

config load-balance auth-policy

Use this command to configure an auth policy. The parameters of the policy set the matching terms that mandate authentication and reference the user group that has authorization. For example, you can define an auth-policy that has the following logic: if the Host header matches example.com and the URI matches /index.html, then the group example-group is authorized. FortiADC supports the Basic Authentication Scheme described in RFC 2617.

Figure 3 illustrates the client-server communication when authorization is required.

Figure 3: Authorization and authentication



1. The client sends an HTTP request for a URL belonging to a FortiADC virtual server that has an authorization policy.
2. FortiADC replies with an HTTP 401 to require authorization. On the client computer, the user might be prompted with a dialog box to provide credentials.
3. The client reply includes an Authorization header that gives the credentials.
4. FortiADC sends a request to the server (local, LDAP, or RADIUS) to authenticate the user.
5. The authentication server sends its response, which can be cached according to your user group configuration.
6. If authentication is successful, FortiADC continues processing the traffic and forwards the request to the real server.
7. The real server responds with an HTTP 200 OK.
8. FortiADC processes the traffic and forwards the server response to the client.

Before you begin:

- You must have created the user groups to be authorized with the policy. You also configure users and authentication servers separately.
- You must have read-write permission for load balancing settings.

After you have configured an auth policy, you can select it in the virtual server configuration. Note the following requirements:

- Virtual server type must be Layer 2 or Layer 7.
- Profile type must be HTTP or HTTPS.
- The profile option once-only must be disabled.

Syntax

```
config load-balance auth-policy
   edit <name>
        config members
```

```
            edit 1
               set auth-path <path>
               set host <hostname>
               set host-status {enable|disable}
               set user-group <datasource>
               set user-realm <string>
            next
         end
      next
   end
```

auth-path	Require authorization only if the URI of the HTTP request matches this pathname. If none is specified, requests to any URI require authorization. The value is parsed as a match string prefix. For example, `/abc` matches `http://www.example.com/abcd` and `http://www.example.com/abc/11.html` but not `http://www.example.com/1abcd`.
host	Specify the HTTP Host header. If host-status is enabled, the policy matches only if the hostname header matches this value. Complete, exact matching is required. For example, `www.example.com` matches `www.example.com` but not `www.example.com.hk`.
host-status	If enabled, require authorization only for the specified host. If disabled, ignore hostname in the HTTP request header and require authorization for requests with any Host header. Disabled by default.
user-group	User group that is authorized to access the protected resource.
user-realm	Realm to which the auth-path URI belongs. If a request is authenticated and a realm specified, the same credentials should be valid for all other requests within this realm.

config load-balance caching

Use this command to configure the system cache.

The system RAM cache can store HTTP content and serve subsequent HTTP requests for that content without forwarding the requests to the backend servers, thereby reducing the load on the backend servers.

You can configure basic static caching or dynamic caching rules. For an overview of static and dynamic caching, see the FortiADC Handbook.

Before you begin:

- You must have a good understanding of caching and knowledge about the size of content objects clients access on the backend servers.
- You must have read-write permission for load balancing settings.

Caching is not enabled by default. After you have configured caching, you can select it in the profile configuration. To enable caching, select the profile when you configure the virtual server.

Syntax

```
config load-balance caching
   edit <name>
      set max-age <integer>
      set max-cache-size <integer>
      set max-entries <integer>
      set max-object-size <integer>
      config uri_exclude_list
         edit <No.>
            set uri <string>
         next
      end
      config dyn-cache-list
         edit <No.>
            set uri <string>
            set age <integer>
            set invalid-uri <string>
         next
      end
   next
end
```

max-age	The default is 43,200 seconds. The valid range is 60 to 86,400. The backend real server response header also includes a maximum age value. The FortiADC system enforces whichever value is smaller.
max-cache-size	The default is 100 MB. The valid range is 1 byte to 500 MB.
max-entries	The default is 10,000. The valid range is 1 to 262,144.
max-object-size	The default is 1 MB. The valid range is 1 byte to 10 MB.
config uri_exclude_list	
uri	Specify URIs to build a list or sites to exclude from caching. You can use regular expressions. This list has precedence over the Dynamic Cache Rule List. In other words, if a URI matches this list, it is ineligible for caching, even if it also matches the Dynamic Cache Rule list.
config dyn-uri-list	
uri	Pattern to match the URIs that have content you want cached and served by FortiADC. Be careful with matching patterns and the order rules in the list. Rules are consulted from lowest rule ID to highest. The first rule that matches is applied.

age	Timeout for the dynamic cache entry. The default is 60 seconds. The valid range is 1-86,400. This age applies instead of any age value in the backend server response header.
invalid-uri	Pattern to match URIs that trigger cache invalidation. Be careful with matching patterns and the order rules in the list. Rules are consulted from lowest rule ID to highest. The first rule that matches is applied. This list has precence over the Dynamic Cache URI list. In other words, if a URI matches this list, it is ineligible for caching, even if it also matches the Dynamic Cache URI list.

Example

```
FortiADC-VM # config load-balance caching

FortiADC-VM (caching) # edit lb-caching
Add new entry 'lb-caching' for node 2054
FortiADC-VM (lb-caching) # get
max-object-size : 1M
max-cache-size : 100M
max-entries : 10000
max-age : 43200

FortiADC-VM (lb-caching) # set max-cache-size 50M
FortiADC-VM (lb-caching) # end
```

config load-balance certificate-caching

Use the command to set certificate-caching related configuration. Certificate caching is used to restore re-signed certificates.

Note: This command is related to "config load-balance client-ssl-profile" on page 102.

Syntax

```
config load-balance certificate-caching
   edit "1"
      set max-certificate-cache-size <size>
      set max-entries <entries>
   next
```

max-certificate-cache-size	The maximum cache size used to store certificates. Valid values range from 10 Mb to 500 Mb.
max-entries	The maximum number of certificates that can be stored on the appliance (FortiADC), which can range from 1 to 2,621,444.

Example

```
config load-balance certificate-caching
   edit "1"
      set max-certificate-cache-size 100M
      set max-entries 10000
   next
```

config load-balance client-ssl-profile

Use this command to configure SSL-type real servers using the client-ssl-profile.

Note: This command is related to "config load-balance certificate-caching" on page 101.

Profile	Description
LB_CLIENT_SSL_PROF_DEFAULT	This is the default client SSL load-balancing profile. It's a basic profile that can be used for all client SSL load-balancing scenarios. Recommended SSL versions: • SSLv3 • TLSv1.0 • TLSv1.1 • TLSv1.2
LB_CLIENT_SSL_PROF_FORWARD_PROXY	This profile is used when the SSL Forward Proxy feature is enabled. It works in tandem with Forward Proxy Certificate Caching, i.e., LB_CERT_RAM_CACHING_DEFAULT), and Forward Proxy Local Signing CA, i.e., SSLPROXY_LOCAL_CA. Recommended SSL versions: • SSLv3 • TLSv1.0 • TLSv1.1 • TLSv1.2
LB_CLIENT_SSL_PROF_HTTP2	This profile applies to HTTP2 protocol only. Recommended SSL version: • TLSv1.2

Syntax

```
config load-balance client-ssl-profile
   edit <name>
```

```
        set client-certificate-verify <verify_profile_name>
        set client-sni-required <enable/disable>
        set forward-proxy <enable/disable>
        set local-certificate-group <local_certificate_group_name>
        set ssl-allowed-versions <sslv3 tlsv1.0 tlsv1.1 tlsv1.2 >
        set ssl-ciphers <one or more ciphers>
        set ssl-customize-ciphers-flag <enable/disable>
        set forward-client-certificate <enable/disable>
        set forward-client-certificate-header <customized_header_name>
        set forward-proxy-certificate-caching <cache_name>
        set forward-proxy-local-signing-CA <local_ca>
        set forward-proxy-intermediate-ca-group <intermediate_ca>
        set backend-ssl-sni-forward <enable/disable >
        set backend-ssl-customize-ciphers-flag <enable/disable>
        set backend-ssl-customized-ciphers <ciphers_name>
        set backend-ssl-customize-ciphers-flag <enable/disable>
        set backend-ssl-ciphers <one or more ciphers>
        set backend-allow-ssl-versions < sslv3 tlsv1.0 tlsv1.1 tlsv1.2 >
        set backend-ssl-OCSP-stapling-support <enable/disable>
        set reject-ocsp-stapling-with-missing-nextupdate <enable/disable>
        set reject-revoked-unknown-ocsp-stapling <enable/disable>
        set ocsp-stapling-skew-time <integer>
        set ssl-auto-chain-flag <enable/disable>
        set client-certificate-verify-option required/ optional
        set ssl-session-cache-flag enable/disable
        set use-tls-tickets enable/disable
    next
  end
```

`client-certificate-verify`	Specify a certificate validation policy.
`client-sni-required`	If enabled, clients are required to use the TLS server name indication (SNI) extension to include the server hostname in the TLS client hello message. This will allow FortiADC to select the appropriate local server certificate to present to the client.
`forward-proxy`	Enable/disable SSL forward proxy.
`local-certificate-group`	Configure the local certificate group that includes the certificates the virtual server presents to SSL/TLS clients. **Note:** This MUST be the backend server's certificate, NOT the appliance's GUI web server certificate.
`ssl-allowed-versions`	Specify the allowed SSL versions in a space-separated list.
`ssl-ciphers`	Specify the supported SSL ciphers in a space-separated list.
`ssl-customize-ciphers-flag`	Enable/disable the use of user-specified cipher suites.

`forward-client-certificate`	Enable/disable. If enabled, FortiADC will send the whole client certificate encoded in the BASE64 code in the specified HTTP header, which is either the X-Client-Cert or a user-defined header.
`forward-client-certificate-header`	The default is X-Client-Cert, but you can customize it using this command.
`forward-proxy-certificate-caching`	Select cache RAM to store re_signed certificates.
`forward-proxy-local-signing-CA`	Set the CA used to sign the server certificate.
`forward-proxy-intermediate-ca-group`	Set the intermediate CA group used to sign the server certificate.
`backend-ssl-sni-forward`	Enable/disable forwarding the server's SNI.
`backend-ssl-customize-ciphers-flag`	Enable/disable customized ciphers used to connect to the real server.
`backend-ssl-customized-ciphers ECDSA`	Set the cipher used to connect to the real server.
`backend-allow-ssl-versions`	Set the SSL version used to connect to the real server.
`backend-ssl-OCSP-stapling-support`	Enable or disable. Disabled by default. Note: This parameter is available only when `backend-certificate-verify` is configured and `forward-proxy` is enabled.
`reject-ocsp-stapling-with-missing-nextupdate`	Enable or disable reject-ocsp-response-with-missing-nextupdate. Disabled by default. **Note:** When disabled, FortiADC will accept OCSP responses without the next-update time. If enabled, FortiADC will reject OCSP responses without the next-update time.
`reject-revoked-unknown-ocsp-stapling`	Enable or disable reject-revoked-unknown-ocsp-stapling. Enabled by default. **Note:** When enabled, FortiADC will reject OCSP responses whose status is revoked or unknown.
`ocsp-stapling-skew-time`	The default is 0 (in seconds). It means the skew time of this updated time and next updated time.

ssl-auto-chain-flag	Enabled by default. It means that when the configured certificate is used in the same client-ssl-profile as the local certificate, and the local certificate is issued by the CA set in the Client Certificate Verify section, ADC will automatically form a certificate chain to the client.
client-certificate-verify-option	Choose either of the following: • required—If this option is set as required, then a client certificate is required for verification. • optional—If this option is set as optional, then the system needs to work with a script such as OPTIONAL_CLIENT_AUTHENTICATION. In that case, FortiADC will accept SSL handshake for the initial transaction, and then lets the script to control the subsequent actions.
ssl-session-cache-flag	Enable to store SSL session in cache. This option is automatically disabled when the client-certificate-verify-option is set to optional.
use-tls-tickets	Enable to allow reusing SSL tickets. This option is automatically disabled when the client-certificate-verify-option is set to optional.

Example 1: Create a new client-SSL profile and quote it in virtual server configuration

Step 1: Configure a client SSL profile

```
config load-balance client-sssl-profile
   edit "csp1"
      set ssl-customize-ciphers-flag disable
      set ssl-ciphers DHE-RSA-AES256-GCM-SHA384 DHE-RSA-AES256-SHA256 DHE-RSA-AES256-SHA
          AES256-GCM-SHA384 AES256-SHA256 AES256-SHA DHE-RSA-AES128-GCM-SHA256 DHE-RSA-
          AES128-SHA256 DHE-RSA-AES128-SHA AES128-GCM-SHA256 AES128-SHA256 AES128-SHA RC4-
          SHA RC4-MD5 EDH-RSA-DES-CBC3-SHA DES-CBC3-SHA EDH-RSA-DES-CBC-SHA DES-CBC-SHA
      set ssl-allowed-versions sslv3 tlsv1.0 tlsv1.1 tlsv1.2
      set forward-proxy enable
      unset client-certificate-verify
      set forward-proxy-certificate-caching LB_CERT_RAM_CACHING_DEFAULT
      set forward-proxy-local-signing-CA SSLPROXY_LOCAL_CA
      unset forward-proxy-intermediate-ca-group
      unset backend-certificate-verify
      set backend-ssl-sni-forward enable
      set backend-ssl-customize-ciphers-flag enable
      set backend-ssl-customized-ciphers test
      set backend-ssl-allowed-versions sslv3 tlsv1.0 tlsv1.1 tlsv1.2
      set ssl-auto-chain-flag-enable
next
```

Step 2: Quote the client SSL profile in virtual server configuration:

```
config load-balance virtual-server
   edit "https_vS1"
      set client-ssl-profile csp1
   next
end
```

Example 2: Create a certificate-caching object and quote it in the client SSL profile

```
config load-balance certificate-caching
   edit "1"
      set max-certificate-cache-size 100M
      set max-entries 10000
      next
      config load-balance client-ssl-profile
      edit "test"
      set forward-proxy-certificate-caching 1
      set forward-proxy-local-signing-CA ca1
      set forward-proxy-intermediate-ca-group inter_group
      set backend-ssl-sni-forward enable
      set backend-ssl-customize-ciphers-flag disable
      set backend-ssl-customized-ciphers ECDHE-ECDSA-AES256-GCM-SHA384 (when backend-ssl-
          customize-ciphers-flag dis enable)
      set backend-ssl-customize-ciphers-flag enable/disable
      set backend-ssl-ciphers DHE-RSA-AES256-SHA DES-CBC3-SHA
      set backend-allow-ssl-versions tlsv1.1 tlsv1.2
End
```

Example 3: Create a client-certificate-verify object and quote it in the client SSL profile

```
config load-balance client-sssl-profile
   edit "csp1"
      set ssl-customize-ciphers-flag disable
      set ssl-ciphers DHE-RSA-AES256-GCM-SHA384 DHE-RSA-AES256-SHA256 DHE-RSA-AES256-SHA
          AES256-GCM-SHA384 AES256-SHA256 AES256-SHA DHE-RSA-AES128-GCM-SHA256 DHE-RSA-
          AES128-SHA256 DHE-RSA-AES128-SHA AES128-GCM-SHA256 AES128-SHA256 AES128-SHA RC4-
          SHA RC4-MD5 EDH-RSA-DES-CBC3-SHA DES-CBC3-SHA EDH-RSA-DES-CBC-SHA DES-CBC-SHA
      set ssl-allowed-versions sslv3 tlsv1.0 tlsv1.1 tlsv1.2 set forward-proxy enable
      unset client-certificate-verify
      set forward-proxy-certificate-caching LB_CERT_RAM_CACHING_DEFAULT set forward-proxy-
          local-signing-CA SSLPROXY_LOCAL_CA
      unset forward-proxy-intermediate-ca-group
      set client-certificate-verify verify
      set client-certificate-verify-option required
      set ssl-session-cache-flag enable
      set use-tls-tickets enable
      set backend-ssl-sni-forward enable
      set backend-ssl-customize-ciphers-flag enable
      set backend-ssl-customized-ciphers test
      set backend-ssl-allowed-versions sslv3 tlsv1.0 tlsv1.1 tlsv1.2
   set ssl-auto-chain-flag-enable
next
```

config load-balance compression

Use this command to configure compression options.

The following content types can be compressed:

- application/javascript
- application/soap+xml
- application/x-javascript
- application/xml
- text/css
- text/html
- text/javascript
- text/plain
- text/xml

Not all HTTP responses should be compressed. Compression offers the greatest performance improvements when applied to URLs whose media types compress well, such as repetitive text such as tagged HTML, and scripts such as JavaScript. Files that already contain efficient compression such as GIF images usually should not be compressed, as the CPU usage and time spent compressing them will result in an increased delay rather than network throughput improvement. Plain text files where no words are repeated, such as configurations with unique URLs or IPs, also may not be appropriate for compression.

Before you begin:

- You must have a good understanding of HTTP compression and knowledge of the content types served from the backend real servers.
- You must have read-write permission for load balancing settings.

Compression is not enabled by default. After you have configured a compression rule, you can select it in the profile configuration. To enable compression, select the profile when you configure the virtual server.

Syntax

```
config load-balance compression
   edit <name>
      set cpu-limit <integer>
      set max-cpu-usage <integer>
      set min-content-length <integer>
      set uri-list-type {include | exclude>
      config uri_list
         edit <No.>
            set uri <string>
         next
      end
      config content_types
         edit <No.>
            set content-type {application/javascript | application/soap+xml |
                application/x-javascript | application/xml | text/css | text/html |
                text/javascript | text/plain | text/xml}
         next
      end
   next
end
```

`cpu-limit`	Enable/disable application of a CPU limit.
`max-cpu-usage`	Maximum CPU usage for compression operations. The default is 80.

min-content-length	Do not compress files smaller than this size. The default is 1024 bytes.
uri-list-type	Specify whether to include or exclude items in the list from compression.
config uri_list	
uri	Specify URIs to build a list or sites to include/exclude from compression. You can use regular expressions.
config content_type	
content-type	• application/javascript • application/soap+xml • application/x-javascript • application/xml • text/css • text/html • text/javascript • text/plain • text/xml

Example

```
FortiADC-VM (compression) # config load-balance compression
FortiADC-VM (compression) # edit lb-compression
Add new entry 'lb-compression' for node 1627

FortiADC-VM (lb-compression) # get
min-content-length : 1024
cpu-limit : enable
max-cpu-usage : 80
uri-list-type : exclude

FortiADC-VM (lb-compression) # set max-cpu-usage 50
FortiADC-VM (lb-compression) # end
```

config load-balance connection-pool

Use this command to configure connection pool settings.

A connection pool enables Layer 7 load balancing virtual servers to “reuse” existing TCP connections. Using a connection pool can reduce the impact of TCP overhead on web server and application performance.

Before you begin:

- You must have read-write permission for load balancing feature settings.

After you have created a connection pool configuration, you can specify it in a virtual server configuration.

Note: The feature is not supported for profiles with the Source Address option enabled.

Syntax

```
config load-balance connection-pool
   edit <name>
      set age <integer>
      set reuse <integer>
      set size <integer>
      set timeout <integer>
   next
end
```

age	Maximum duration of a connection in seconds. The recommended value is 3000.
reuse	Maximum number of times that the virtual server can reuse the connection. The recommended value is 2000.
size	Maximum number of connections in the connection pool. The recommended value is 0, which specifies that there is no limit on the connection size.
timeout	Maximum number of seconds a connection can be idle before the system deletes it. The recommended value is 30.

Predefined connection-pool

```
config load-balance connection-pool
   edit "LB_CONNECTION_POOL_DEFAULT"
      set size 10000
      set age 86400
      set reuse 10000
      set timeout 50
   next
end
```

Example

```
FortiADC-VM # config load-balance connection-pool

FortiADC-VM (connection-pool) # edit lb-connection-pool
Add new entry 'lb-connection-pool' for node 1698

FortiADC-VM (lb-connec~i) # get
size : 10000
age : 86400
reuse : 10000
timeout : 50

FortiADC-VM (lb-connec~i) # set age 3000
FortiADC-VM (lb-connec~i) # set reuse 2000
FortiADC-VM (lb-connec~i) # set size 0
FortiADC-VM (lb-connec~i) # set timeout 30

FortiADC-VM (lb-connec~i) # get
size : 0
```

```
age : 3000
reuse : 2000
timeout : 30

FortiADC-VM (example-connec~i) # end
```

config load-balance content-rewriting

Use this command to configure content rewriting rules.

You might rewrite the HTTP headers for various reasons, including the following:

- Redirect HTTP to HTTPS—You can use the content rewriting feature to send redirects when the requested resource requires a secure connection. For example, create a rule that matches requests to `http://example.com/resource` with an action to send a redirect that has the secure URL in the Location header: `https://example.com/resource`.
- External-to-internal URL translation—It is standard for web servers to have external and internal domain names. You can use content-based routing to forward HTTP requests to example.com to a server pool that includes server1.example.com, server2.example.com, and server3.example.com. When you use content routing like this, you should also rewrite the Location header in the HTTP response so that the client receives HTTP with example.com in the header and not the internal domain server1.example.com. Create a rule that matches the regular expression `server.*\.example\.com` in the Location header of the HTTP response with an action to rewrite the Location header with the public URL `http://example.com`.
- Other security reasons—Another use case for external-to-internal URL translation involves masking pathnames that give attackers information about your web applications. For example, the unmasked URL for a blog might be http://www.example.com/wordpress/?feed=rss2, which exposes that the blog is a wordpress application. In this case, you want to publish an external URL that does not have clues of the underlying technology. For example, in your web pages, you create links to http://www.example.com/blog. On FortiADC, you create a rule that matches requests to http://www.example.com/resource2 with an action to rewrite the URL to the internal URL `http://www.example.com/wordpress/?feed=rss2`. For the return traffic, you create another rule that matches `http://www.example.com/wordpress/?feed=rss2` in the Location header of the HTTP response with an action to rewrite it with the public URL `http://www.example.com/blog`.

Table 7 summarizes the HTTP header fields that can be rewritten.

Table 7: HTTP header rewriting

Direction	HTTP Header
HTTP Request	Host Referer
HTTP Redirect	Location
HTTP Response	Location

The first line of an HTTP request includes the HTTP method, relative URL, and HTTP version. The next lines are headers that communicate additional information. The following example shows the HTTP request for the URL http://www.example.com/index.html:

```
GET /index.html HTTP/1.1
Host: www.example.com
Referer: http://www.google.com
```

The following is an example of an HTTP redirect including the HTTP Location header:

```
HTTP/1.1 302 Found
Location: http://www.iana.org/domains/example/
```

You can use literal strings or regular expressions to match traffic to rules. To match a request URL such as http://www.example.com/index, you create two match conditions: one for the Host header `www.example.com` and another for the relative URL that is in the GET line: `/index.html`.

For HTTP redirect rules, you can specify the rewritten location as a literal string or as a regular expression. For all other types or rules, you must specify the complete URL as a literal string.

Before you begin:

- You must have a good understanding of HTTP header fields.
- You must have a good understanding of Perl-compatible regular expressions (PCRE) if you want to use them in rule matching or rewriting.
- You must have read-write permission for load balancing settings.

After you have configured a content rewriting rule, you can select it in the virtual server configuration.

Note: You can select multiple content rewriting rules in the virtual server configuration. Rules you add to that configuration are consulted from top to bottom. The first to match is applied. If the traffic does not match any of the content rewriting rule conditions, the header is not rewritten.

Syntax

```
config load-balance content-rewriting
   edit <name>
      set action-type {request|response>
      set action {add_http_header | delete_http_header | redirect | rewrite_http_header |
          rewrite_http_location | send-403-forbidden}
      set header-name [string/regular express]
      set header-value [string/regular express]
      set redirect <string>
      set host-status {enable|disable}
      set host <string>
      set referer-status {enable|disable}
      set referer <string>
      set url-status {enable|disable}
      set url <string>
      set location <string>
      set comments <string>
      config match-condition
         edit <No.>
            set content <string>
            set object {http-host-header | http-location-header | http-referer-header |
                http-request-url | ip-source-address}
            set reverse {enable|disable}
            set type {string | regular-expression}
         next
      end
   next
end
```

`action-type`	Specify whether to rewrite the HTTP request or HTTP response.
`action`	If you configure a rule based on the HTTP request, you can specify the following actions: • add_http_header • delete_http_header • rewrite_http_header • redirect • send-403-forbidden If you configure a rule based on the HTTP response, you can specify the following action: • rewrite_http_location
`header-name`	Creates a new header or deletes an existing header with the header name. Use this command only if action is set to add_http_header or delete_http_header.
`header-value`	Creates a new header or deletes an existing header with the header value. Use this command only if action is set to add_http_header or delete_http_header.
`redirect`	Sends a redirect with the URL you specify in the HTTP Location header field. For Redirect rules, specify an absolute URL. For example: `https://example.com/content/index.html` Use this command only if action is set to redirect. **Note**: The rewrite string can be a literal string or a regular expression.
`host-status`	Enable/disable rewriting the Host header by replacing the hostname with the string you specify. Use this command only if action is set to rewrite_http_header.
`host`	Rewrites the Host header by replacing the hostname with the string you specify. For Host rules, specify a replacement domain and/or port. Use this command only if action is set to rewrite_http_header. **Note**: The rewrite string is a literal string. Regular expression syntax is not supported.
`referer-status`	Enable/disable rewriting the Referer header with the URL you specify. Use this command only if action is set to rewrite_http_header.

`referer`	Rewrites the Referer header with the URL you specify. For Referer rules, you must specify an absolute URL. **Note**: The rewrite string is a literal string. Regular expression syntax is not supported.
`url-status`	Enable/disable rewriting the Host header by replacing the whole URL with the string you specify.
`url`	Rewrites the request URL and Host header using the string you specify. For URL rules, specify a URL in one of the following formats: • Absolute URL — `https://example.com/content/index.html` • Relative URL — `content/index.html` If you specify a relative URL, the host header is not rewritten. **Note**: The rewrite string is a literal string. Regular expression syntax is not supported.
`location`	For Location rules, specify an absolute URL. For example: `https://example.com/content/index.html` **Note**: The rewrite string is a literal string. Regular expression syntax is not supported.
`comments`	Optional administrator note.

config match-condition

`content`	Specify the string or regular expression syntax.
`object`	Specify content matching conditions based on the following parameters: • http-host-header • http-location-header • http-referer-header • http-request-url • ip-source-address **Note**: When you add multiple conditions, FortiADC joins them with an AND operator. For example, if you specify both a HTTP Host Header and HTTP Request URL to match, the rule is a match only for traffic that meets both conditions.
`reverse`	Rule matches if traffic does not match the expression.
`type`	• string • regular-expression

Example

The following example creates a configuration to rewrite a literal string:

```
FortiADC-VM # config load-balance content-rewriting
FortiADC-VM (content-rewrit~n) # edit c-rewrite-0
Add new entry 'c-rewrite-0' for node 1737

FortiADC-VM (c-rewrite-0) # set action redirect
FortiADC-VM (c-rewrite-0) # set redirect https://example.com/resource
FortiADC-VM (c-rewrite-0) # set comments http-to-https

FortiADC-VM (c-rewrite-0) # config match-condition
FortiADC-VM (match-condition) # edit 1
FortiADC-VM (1) # set type string
FortiADC-VM (1) # set object http-host-header
FortiADC-VM (1) # set content www.example.com
FortiADC-VM (1) # next

FortiADC-VM (match-condition) # edit 2
FortiADC-VM (2) # set type string
FortiADC-VM (2) # set object http-request-url
FortiADC-VM (2) # set content /resource
FortiADC-VM (2) # end
```

The following example creates a configuration to rewrite using a regular expression:

```
FortiADC-VM (content-rewrit~n) # edit c-rewrite-1

FortiADC-VM (c-rewrite-1) # set action redirect
FortiADC-VM (c-rewrite-1) # set redirect https://$0/$1
FortiADC-VM (c-rewrite-1) # set comments http-to-https

FortiADC-VM (c-rewrite-1) # config match-condition

FortiADC-VM (match-condition) # edit 1
FortiADC-VM (1) # set type regular-expression
FortiADC-VM (1) # set object http-host-header
FortiADC-VM (1) # set content (.*)
FortiADC-VM (1) # next

FortiADC-VM (match-condition) # edit 2
FortiADC-VM (2) # set type regular-expression
FortiADC-VM (2) # set object http-request-url
FortiADC-VM (2) # set content ^/(.*)$
FortiADC-VM (2) # end
```

config load-balance content-routing

Use this command to configure content routing.

Content routes select the backend server pool based on matches to TCP/IP or HTTP header values.

Layer 7 content route rules are based on matches to the following header values:

- HTTP Host
- HTTP Referer
- HTTP Request URL
- SNI
- Source IP address

You might want to use Layer 7 content routes to simplify front-end coding of your web pages or to obfuscate the precise server names from clients. For example, you can publish links to a simple URL named example.com and use content route rules to direct traffic for requests to example.com to a server pool that includes server1.example.com, server2.example.com, and server3.example.com.

Layer 4 content route rules are based on matches to the following header values:

- Source IP address

Before you begin:

- You must have a good understanding of HTTP header fields.
- You must have a good understanding of Perl-compatible regular expressions (PCRE) if you want to use them in rule matching.
- You must have read-write permission for load balancing settings.

After you have configured a content routing rule, you can select it in the virtual server configuration.

Note: You can select multiple content routing rules in the virtual server configuration. Rules you add to that configuration are consulted from top to bottom. The first rule to match is applied. If the traffic does not match any of the content routing rule conditions specified in the virtual server configuration, the system behaves unexpectedly. Therefore, it is important that you create a “catch all” rule that has no match conditions. In the virtual server configuration, this rule should be ordered last so it can be used to forward traffic to a default pool.

Syntax

```
config load-balance content-routing
   edit <name>
      set type {l4-content-routing | l7-content-routing}
      set ip <ip&netmask>
      set ip6 <ip&netmask>
      set connection-pool inherit {enable|disable}
      set connection-pool <datasource>
      set load-balance-pool <datasource>
      set method-inherit {enable|disable}
      set load-balance-method <datasource>
      set persistence-inherit {enable|disable}
      set load-balance-persistence <datasource>
      set comments <string>
      set schedule-list enable/disable
      set schedule-pool-list <datasource>
      config match-condition
         edit <No.>
            set content <string>
            set object {http-host-header | http-referer-header | http-request-url | ip-
                source-address | sni}
            set reverse {enable|disable}
            set type {string | regular-expression}
         next
      end
```

```
    next
  end
```

type	l4-content-routing l7-content-routing
ip	Address/mask notation to match the source IP address in the packet header.
ip6	Address/mask notation to match the source IP address in the packet header.
connection-pool-inherit	Enable to use the connection pool configuration object specified in the virtual server configuration.
connection-pool	If not using inheritance, specify the connection pool.
load-balance-pool	Specify a real server pool.
method-inherit	Enable (default) to use the method specified in the virtual server configuration.
load-balance-method	If not using inheritance, select a load balancing method type.
persistence-inherit	Enable (default) to use the persistence object specified in the virtual server configuration.
load-balance-persistence	If not using inheritance, select a session persistence type.
comments	Optional administrator note.
schedule-list	Enable/disable schedule pool list.
schedule-pool-list	Specify the schedule-pool.
config match-condition	
content	Specify the string or regular expression syntax.

object	Specify content matching conditions based on the following parameters: • http-host-header • http-referrer-header • http-request-url • sni • ip-source-address **Note**: When you add multiple conditions, FortiADC joins them with an AND operator. For example, if you specify both a HTTP Host Header and HTTP Request URL to match, the rule is a match only for traffic that meets both conditions.
reverse	Rule matches if traffic does not match the expression.
type	• string • regular-expression

Example

```
FortiADC-VM # config load-balance content-routing
FortiADC-VM (content-routing) # edit example.com
Add new entry 'example.com' for node 1756

FortiADC-VM (example.com) # get
type : l7-content-routing
persistence-inherit : enable
load-balance-persistence:
method-inherit : enable
load-balance-method :
connection-pool :
connection-pool-inherit: disable
load-balance-pool :
comments : comments

FortiADC-VM (example.com) # set persistence-inherit enable
FortiADC-VM (example.com) # set method-inherit enable
FortiADC-VM (example.com) # set load-balance-pool example-pool
FortiADC-VM (example.com) # set comments external-to-internal-name-map
FortiADC-VM (example.com) # config match-condition
FortiADC-VM (match-condition) # edit 1
Add new entry '1' for node 1768

FortiADC-VM (1) # get
object : http-host-header
type : regular-expression
content : match
reverse : disable

FortiADC-VM (1) # set type string
FortiADC-VM (1) # set content http://example.com
FortiADC-VM (1) # set object http-request-url
```

```
FortiADC-VM (1) # end


FortiADC-VM (example.com) # get
type : l7-content-routing
persistence-inherit : enable
method-inherit : enable
connection-pool :
connection-pool-inherit: disable
load-balance-pool : example-pool
== [ 1 ]
comments : external-to-internal-name-map

FortiADC-VM (example.com) # show
config load-balance content-routing
edit "example.com"
set persistence-inherit enable
set method-inherit enable
set load-balance-pool example-pool
config match-condition
edit 1
set object http-request-url
set type string
set content http://example.com
next
end
set comments external-to-internal-name-map
next
end
FortiADC-VM (example.com) # end
```

config load-balance decompression

The decompression function is used in the Web Application Firewall (WAF) module. If this feature is enabled, FortiADC will decompress content before checking it for potential issues.

Syntax

```
config load-balance decompression
   edit <name>
      set cpu-limit {enable | disable}
      set max-cpu-usage [1-100]
      set uri-list-type {include | exclude}
      config uri_list
         edit <ID>
            set uri <regex_pattern>
         next
      end
      config content-types
         edit <ID>
               set content-type <types>
         next
      end
   end
```

cpu-limit	Enable/disable setting CPU limit.
max-cpu-usage	The maximum CPU usage, which ranges from 1 to 100.
uri-list-type	The type of URI list
content-type	Supported content types include: • application/javascript • application/soap+xml • application/x-javascript • application/xml • custom <plain-string> • text/css • text/html • text/javascript • text/plain • text/xml

Example

```
config load-balance decompression
   edit "get"
      set cpu-limit enable
      set max-cpu-usage 80
      set uri-list-type exclude
      config uri_list
      end
         config content_types
               edit 1
                  set content-type application/soap+xml
               next
         end
   next
end
```

config load-balance error-page

Deprecated. You must use the web UI to upload an error page and create an error page configuration object.

config load-balance geoip-list

Use this command to configure the Geo IP address block list.

The FortiGuard Geo IP service provides a database that maps IP addresses to countries, satellite providers, and anonymous proxies. The database is updated periodically.

The Geo IP block list is a policy that takes the action you specify when the virtual server receives requests from IP addresses in the blocked country's IP address space.

For Layer 4 virtual servers, FortiADC blocks access when the first TCP SYN packet arrives. For Layer 7 virtual servers, FortiADC blocks access after the handshake, allowing it to redirect the traffic if you have configured it to do so.

Basic Steps

1. Configure the connection to FortiGuard so the system can receive periodic Geo IP Database updates.
2. Create rules to block traffic from locations.
3. Maintain a whitelist to allow traffic from specified subnets even if they belong to the address space blocked by the Geo IP block list.
4. Select the Geo IP block list and whitelist in the profiles you associate with virtual servers.

Before you begin:

- You must have read-write permission for load balancing settings.

Syntax

```
config load-balance geoip-list
   edit <name>
      set action {deny | pass | redirect | send-403-forbidden}
      set log {enable|disable}
      set severity {high | low | medium}
      set status {enable|disable}
      config geoip-member
      edit <No.>
         set region-list <country-code>
      next
   next
end
```

`action`	• Pass • Deny • Redirect (you can specify a redirect URL in the virtual server configuration) • Send 403 Forbidden **Note**: Layer 4 and TCPS virtual servers do not support Redirect or Send 403 Forbidden. If you apply a configuration that uses these options to a Layer 4 or TCPS virtual server, FortiADC logs the action as Redirect or Send 403 Forbidden, but in fact denies the traffic.
`log`	Enable/disable logging.
`severity`	The severity to apply to the event. Severity is useful when you filter and sort logs: • low • medium • high

status	Enable/disable the list.
config geoip-member	
region-list	Specify a geolocation object. Type ? to see a list. The list includes countries as well as selections for anonymous proxies and satellite providers.

Example

```
FortiADC-VM # config load-balance geoip-list

FortiADC-VM (geoip-list) # edit demo
Add new entry 'demo' for node 2883

FortiADC-VM (demo) # get
log : disable
action : deny
severity : low
status : enable

FortiADC-VM (demo) # set log enable
FortiADC-VM (demo) # set severity high

FortiADC-VM (demo) # config geoip-member
FortiADC-VM (geoip-member) # edit 1
Add new entry '1' for node 2888

FortiADC-VM (1) # set region-list ?
ZZ Reserved
A1 Anonymous Proxy
A2 Satellite Provider
O1 Other Country
AD Andorra
AE United Arab Emirates
AF Afghanistan
AG Antigua and Barbuda
AI Anguilla
AL Albania
AM Armenia
AN Netherlands Antilles
AO Angola
AP Asia/Pacific Region
AQ Antarctica
AR Argentina
AS American Samoa
AT Austria
AU Australia
AW Aruba
AX Aland Islands
AZ Azerbaijan
BA Bosnia and Herzegovina
BB Barbados
BD Bangladesh
BE Belgium
```

```
BF Burkina Faso
BG Bulgaria
BH Bahrain
BI Burundi
BJ Benin
BL Saint Bartelemey
BM Bermuda
BN Brunei Darussalam
BO Bolivia
BQ Bonaire, Saint Eustatius and Saba
BR Brazil
BS Bahamas
BT Bhutan
BV Bouvet Island
BW Botswana
BY Belarus
BZ Belize
CA Canada
CC Cocos (Keeling) Islands
CD Congo, The Democratic Republic of the
CF Central African Republic
CG Congo
CH Switzerland
CI Cote d'Ivoire
CK Cook Islands
CL Chile
CM Cameroon
CN China
CO Colombia
CR Costa Rica
CU Cuba
CV Cape Verde
CW Curacao
CX Christmas Island
CY Cyprus
CZ Czech Republic
DE Germany
DJ Djibouti
DK Denmark
DM Dominica
DO Dominican Republic
DZ Algeria
EC Ecuador
EE Estonia
EG Egypt
EH Western Sahara
ER Eritrea
ES Spain
ET Ethiopia
EU Europe
FI Finland
FJ Fiji
FK Falkland Islands (Malvinas)
FM Micronesia, Federated States of
FO Faroe Islands
FR France
GA Gabon
```

```
GB United Kingdom
GD Grenada
GE Georgia
GF French Guiana
GG Guernsey
GH Ghana
GI Gibraltar
GL Greenland
GM Gambia
GN Guinea
GP Guadeloupe
GQ Equatorial Guinea
GR Greece
GS South Georgia and the South Sandwich Islands
GT Guatemala
GU Guam
GW Guinea-Bissau
GY Guyana
HK Hong Kong
HM Heard Island and McDonald Islands
HN Honduras
HR Croatia
HT Haiti
HU Hungary
ID Indonesia
IE Ireland
IL Israel
IM Isle of Man
IN India
IO British Indian Ocean Territory
IQ Iraq
IR Iran, Islamic Republic of
IS Iceland
IT Italy
JE Jersey
JM Jamaica
JO Jordan
JP Japan
KE Kenya
KG Kyrgyzstan
KH Cambodia
KI Kiribati
KM Comoros
KN Saint Kitts and Nevis
KP Korea, Democratic People's Republic of
KR Korea, Republic of
KW Kuwait
KY Cayman Islands
KZ Kazakhstan
LA Lao People's Democratic Republic
LB Lebanon
LC Saint Lucia
LI Liechtenstein
LK Sri Lanka
LR Liberia
LS Lesotho
LT Lithuania
```

```
LU Luxembourg
LV Latvia
LY Libyan Arab Jamahiriya
MA Morocco
MC Monaco
MD Moldova, Republic of
ME Montenegro
MF Saint Martin
MG Madagascar
MH Marshall Islands
MK Macedonia
ML Mali
MM Myanmar
MN Mongolia
MO Macao
MP Northern Mariana Islands
MQ Martinique
MR Mauritania
MS Montserrat
MT Malta
MU Mauritius
MV Maldives
MW Malawi
MX Mexico
MY Malaysia
MZ Mozambique
NA Namibia
NC New Caledonia
NE Niger
NF Norfolk Island
NG Nigeria
NI Nicaragua
NL Netherlands
NO Norway
NP Nepal
NR Nauru
NU Niue
NZ New Zealand
OM Oman
PA Panama
PE Peru
PF French Polynesia
PG Papua New Guinea
PH Philippines
PK Pakistan
PL Poland
PM Saint Pierre and Miquelon
PN Pitcairn
PR Puerto Rico
PS Palestinian Territory
PT Portugal
PW Palau
PY Paraguay
QA Qatar
RE Reunion
RO Romania
RS Serbia
```

```
RU Russian Federation
RW Rwanda
SA Saudi Arabia
SB Solomon Islands
SC Seychelles
SD Sudan
SE Sweden
SG Singapore
SH Saint Helena
SI Slovenia
SJ Svalbard and Jan Mayen
SK Slovakia
SL Sierra Leone
SM San Marino
SN Senegal
SO Somalia
SR Suriname
SS South Sudan
ST Sao Tome and Principe
SV El Salvador
SX Sint Maarten
SY Syrian Arab Republic
SZ Swaziland
TC Turks and Caicos Islands
TD Chad
TF French Southern Territories
TG Togo
TH Thailand
TJ Tajikistan
TK Tokelau
TL Timor-Leste
TM Turkmenistan
TN Tunisia
TO Tonga
TR Turkey
TT Trinidad and Tobago
TV Tuvalu
TW Taiwan
TZ Tanzania, United Republic of
UA Ukraine
UG Uganda
UM United States Minor Outlying Islands
US United States
UY Uruguay
UZ Uzbekistan
VA Holy See (Vatican City State)
VC Saint Vincent and the Grenadines
VE Venezuela
VG Virgin Islands, British
VI Virgin Islands, U.S.
VN Vietnam
VU Vanuatu
WF Wallis and Futuna
WS Samoa
XK Kosovo
YE Yemen
YT Mayotte
```

```
ZA South Africa
ZM Zambia
ZW Zimbabwe
CN11 China,Beijing
CN12 China,Tianjin
CN13 China,Hebei
CN14 China,Shanxi(Taiyuan)
CN15 China,Neimenggu
CN21 China,Liaoning
CN22 China,Jilin
CN23 China,Heilongjiang
CN31 China,Shanghai
CN32 China,Jiangsu
CN33 China,Zhejiang
CN34 China,Anhui
CN35 China,Fujian
CN36 China,Jiangxi
CN37 China,Shandong
CN41 China,Henan
CN42 China,Hubei
CN43 China,Hunan
CN44 China,Guangdong
CN45 China,Guangxi
CN46 China,Hainan
CN50 China,Chongqing
CN51 China,Sichuan
CN52 China,Guizhou
CN53 China,Yunnan
CN54 China,Xizang
CN61 China,Shaanxi(Xian)
CN62 China,Gansu
CN63 China,Qinghai
CN64 China,Ningxia
CN65 China,Xinjiang

FortiADC-VM (1) # set region-list FM

FortiADC-VM (1) # get
region-list : FM
FortiADC-VM (1) # end

FortiADC-VM (demo) # get
log : enable
action : deny
severity : high
status : enable
== [ 1 ]

FortiADC-VM (demo) # end
```

config load-balance ippool

Use this command to configure a NAT IP address range pool to be used in a Layer 4 virtual server deployment

In a Layer 4 virtual server configuration, you select a “packet forwarding method” that includes the following network address translation (NAT) options:

- Direct Routing—Does not rewrite source or destination IP addresses.
- DNAT—Rewrites the destination IP address for packets before it forwards them.
- Full NAT—Rewrites both the source and destination IP addresses. Use for standard NAT, when client and server IP addresses are all IPv4 or all IPv6.
- NAT46—Rewrites both the source and destination IP addresses. Use for NAT 46, when client IP addresses are IPv4 and server IP addresses are IPv6.
- NAT64—Rewrites both the source and destination IP addresses. Use for NAT 64, when client IP addresses are IPv6 and server IP addresses are IPv4.

In a Layer 7 virtual server configuration, you do not select a packet forwarding option. Layer 7 virtual servers use NAT46 and NAT64 to support those traffic flows, but they do not use the Source Pool configuration.

See the FortiADC Handbook for example usage.

Before you begin:

- You must have a good understanding of NAT. You must know the address ranges your network has provisioned for NAT.
- Be sure to configure the backend servers to use the FortiADC address as the default gateway so that server responses are also rewritten by the NAT module.
- You must have read-write permission for load balancing settings.

After you have configured a source pool IP address range configuration object, you can select it in the virtual server configuration. You can assign a virtual server multiple source pools (with the same or different source pool interface associated with it).

Syntax

```
config load-balance ippool
   edit <No.>
      set interface <datasource>
      set addr-type {ipv4|ipv6}
      set ip-min <class_ip>
      set ip-max <class_ip>
      config node-member
         edit <name>
            set ha-node <integer>
            set interface <datasource>
            set addr-type {ipv4|ipv6}
            set ip-min <class_ip>
            set ip-max <class_ip>
         next
      end
   next
end
```

`interface`	Interface to receive responses from the backend server. The interface used for the initial client traffic is determined by the virtual server configuration.
`addr-type`	IPv4 or IPv6

ip-min	The first address in the address pool.
ip-max	The last address in the address pool.
config node-member	
<name>	Create a node member list to be used in an HA active-active deployment when the node interfaces have multiple IP addresses. Name is a configuration name. Valid characters are A-Z, a-z, 0-9, _, and -. No spaces. You reference this name in the virtual server configuration. **Note**: After you initially save the configuration, you cannot edit the name.
ha-node	Specify the HA cluster node ID.
interface	Interface to receive responses from the backend server. The interface used for the initial client traffic is determined by the virtual server configuration.
addr-type	IPv4 or IPv6
ip-min	The first address in the address pool.
ip-max	The last address in the address pool.

config load-balance l2-exception-list

Use this command to configure an exception list for SSL forward proxy decryption. You can leverage FortiGuard web filter categories, and you can configure a list of additional destinations.

Before you begin:

- You must have created a web-filter-profile configuration if you want to specify it in the exception list.
- You must have hostname or IP address details on additional destinations you want to exclude from SSL decryption.
- You must have read-write permission for load balancing settings.

After you have configured an exception list, you can specify it in the virtual server configuration.

Syntax

```
config load-balance l2-exception-list
   edit <name>
      set description <string>
      set web-filter-profile <datasource>
      config member
         edit <No.>
            set type {host|ip}
            set host-pattern <string>
            set ip-netmask <ip&netmask>
         next
      end
```

```
    next
  end
```

description	A string to describe the purpose of the configuration, to help you and other administrators more easily identify its use. Put phrases in quotes. For example: "Customer ABC".
web-filter-profile	Specify a web filter profile.
config member	
type	How you want to define the exception: • host • ip
host-pattern	Specify a wildcard pattern, such as *.example.com.
ip-network	Specify the IP address and CIDR-formatted subnet mask, separated by a forward slash, such as 192.0.2.0/24. Dotted quad formatted subnet masks are not accepted. IPv6 addresses are not supported.

Example

```
FortiADC-docs # config load-balance l2-exception-list
FortiADC-docs (l2-exception-l~s) # edit financial
Add new entry 'financial' for node 3880
FortiADC-docs (financial) # set description "financial websites"
FortiADC-docs (financial) # config member
FortiADC-docs (member) # edit 1
Add new entry '1' for node 3883
FortiADC-docs (1) # set type host
FortiADC-docs (1) # set host-pattern *.bankofamerica.com
FortiADC-docs (1) # next
FortiADC-docs (member) # edit 2
Add new entry '2' for node 3883
FortiADC-docs (2) # set type host
FortiADC-docs (2) # set host-pattern *.schwab.com
FortiADC-docs (2) # end
FortiADC-docs (financial) # end
```

config load-balance method

Use this command to add method configuration objects.

The system includes predefined configuration objects for all supported load balancing methods, and there is no need to create additional configuration objects. You may choose to do so, however, for various reasons, for example, to use a naming convention that makes the purpose of the configuration clear to other administrators.

Table 8 describes the predefined methods.

Table 8: Predefined methods

Predefined	Description
LB_METHOD_ROUND_ROBIN	Selects the next server in the series: server 1, then server 2, then server 3, and so on.
LB_METHOD_LEAST_ CONNECTION	Selects the server with the least connections.
LB_METHOD_FASTEST_ RESPONSE	Selects the server with the fastest response to health check tests.
LB_METHOD_URI	Selects the server based on a hash of the URI found in the HTTP header, excluding hostname.
LB_METHOD_FULL_URI	Selects the server based on a hash of the full URI string found in the HTTP header. The full URI string includes the hostname and path.
LB_METHOD_HOST	Selects the server based on a hash of the hostname in the HTTP Request header Host field.
LB_METHOD_HOST_DOMAIN	Selects the server based on a hash of the domain name in the HTTP Request header Host field.
LB_METHOD_DEST_IP_HASH	Selects the next hop based on a hash of the destination IP address. This method can be used with the Layer 2 virtual server.

Before you begin:

- You must have read-write permission for load balancing settings.

Syntax

```
config load-balance method
   edit <name>
      set type {dest-ip-hash | fastest-response | full-uri-hash | host-domain-hash | host-
          hash | least-connection | round-robin | uri-hash}
   next
end
```

`type`	Specify the method.

config load-balance persistence

Use this command to configure persistence rules.

Persistence rules identify traffic that should not be load balanced, but instead forwarded to the same backend server that has seen requests from that source before. Typically, you configure persistence rules to support server transactions that depend on an established client-server session, like e-commerce transactions or SIP voice calls.

The system maintains persistence session tables to map client traffic to backend servers based on the session attribute specified by the persistence rule.

The persistence table is evaluated before load balancing rules. If the packets received by the ADC match an entry in the persistence session table, the packets are forwarded to the server that established the connection, and load balancing rules are not applicable.

Most persistence rule types have a timeout. When the time that has elapsed since the system last received a request from the client IP address is greater than the timeout, the system does not use the mapping table to forward the request. Instead, it again selects the server using the method specified in the virtual server configuration. Hash-based rule types have a timeout built into the hash algorithm. For other types, you can specify the timeout.

Table 9 describes the predefined persistence rules. You can get started with these commonly used persistence methods or create custom objects.

Table 9: Predefined persistence rules

Predefined	Description
LB_PERSIS_SIP	Persistence based on source IP address or subnet.
LB_PERSIS_ CONSISTENT_SIP	Persistence based on a hash of source IP address.
LB_PERSIS_HASH_SRC_ ADDR_PORT	Persistence based on a hash that includes source IP address and port.
LB_PERSIS_HASH_ COOKIE	Persistence based on a hash of a session cookie provided by the backend server.
LB_PERSIS_RDP_COOKIE	Persistence based on RDP cookie sent by RDP clients in the initial connection request.
LB_PERSIS_SSL_SESS_ID	Persistence based on the SSL session ID.
LB_PERSIS_SIP_CALL_ID	Persistence based on the SIP call ID.

Before you begin:

- You must have a good understanding and knowledge of the applications that require persistent sessions and the methods that can be used to identify application sessions.
- You must have read-write permission for load balancing settings.

After you have configured a persistence rule, you can select it in the virtual server configuration.

Syntax

```
config load-balance persistence
   edit <name>
      set type {consistent-hash-ip | embedded-cookie | hash-cookie | hash-http-header |
          hash-http-request | hash-source-address-port | insert-cookie | persistent-cookie
          | radius-attribute | rdp-cookie | rewrite-cookie | source-address | ssl-session-
          id}
      set timeout <integer>
      set keyword <string>
      set match-across-servers {enable|disable}
      set ipv4-maskbits <integer>
      set ipv6-maskbits <integer>
      set override-connection-limit {enable|disable}
      set radius-attribute-relation {AND|OR}
         config radius-attribute
            edit <No.>
               set type {1-user-name | 4-nas-ip-address | 5-nas-port | 6-service-type | 7-
                   framed-protocol | 8-framed-ip-address | 9-framed-ip-netmask | 12-framed-
                   mtu | 13-framed-compression | 14-login-ip-host | 19-callback-number |
                   24-state | 26-vendor-specific | 30-called-station-id | 31-calling-
                   station-id | 32-nas-identifier | 33-proxy-state | 34-login-lat-service |
                   35-login-lat-node | 36-login-lat-group | 60-chap-challenge | 61-nas-
                   port-type | 62-port-limit | 63-login-lat-port}
               set vendor-id <integer>
               set vendor-type <integer>
               next
            end
   next
end
```

`type`	Specify the persistence type: • consistent-hash-ip: Persistence is based on a hash of the IP address of the client making an initial request. • embedded-cookie: Persistence is based on the cookie provided in the backend server response. • hash-cookie: Persistence is based on a hash of the cookie provided by the backend server. • hash-http-header: Persistence is based on a hash of the specified header value found in an initial client request. • hash-http-request: • hash-source-address-port: Persistence is based on a hash of the IP address and port of an initial client request. • insert-cookie: Persistence is based on a cookie inserted by the FortiADC system. • persistent-cookie: Persistence is based on the cookie provided in the backend server response. • radius-attribute: Persistence is based on a specified RADIUS attribute. • rewrite-cookie: Persistence is based on the cookie provided in the backend server response, but the system rewrites the cookie. • rdp-cookie: Persistence based on RDP cookie sent by RDP clients in the initial connection request. • sip-call-id: Persistence is based on SIP call ID. • source-address: Persistence is based on source IP address. • ssl-session-id: Persistence is based on SSL session ID. After you have specified the type, the CLI commands are constrained to the ones that are applicable to the specified type, not all of the settings described in this table.
`timeout`	Timeout for an inactive persistence session table entry. The default is 300 seconds. The valid range is 1-86,400. When the time that has elapsed since the system last received a request from the client IP is greater than the timeout, the system does not use the mapping table to forward the request. Instead, it again selects the server using the method specified in the virtual server configuration.
`keyword`	A value found in an HTTP header or cookie.
`match-across-servers`	An option for radius-attribute and source-address persistence methods. Enable so clients continue to access the same backend server through different virtual servers for the duration of a session.

ipv4-maskbits	Number of bits in a subnet mask to specify a network segment that should following the persistence rule. For example, if IPv4 maskbits is set to 24, and the backend server A responds to a client with the source IP 192.168.1.100, server A also responds to all clients from subnet 192.168.1.0/24.
ipv6-maskbits	Number of bits in a subnet mask to specify a network segment that should following the persistence rule.
override-connection-limit	An option for radius-attribute only. Disabled by default. If the real server connection limit is reached and this option is enabled, the new connection will neither persist to the new server nor go to another node.
radius-attribute-relation	An option for radius-attribute only. The relation when multiple radius attributes are configured. AND—All of the specified radius attributes must be the same in the hash table to be persistent. OR—Search the first radius attribute in the hash table for persistence if the first radius attribute exists. If not, search the following radius attributes in sequence.
config radius-attribute	
type	Radius attribute type.
vendor-id	An option for radius attribute type 26-vendor-specific only. The number specifies vendor id. 0 means the entire attribute will be used as a persistence input.
vendor-type	An option for radius attribute type 26-vendor-specific only. The number specifies vendor type. 0 means the entire attribute will be used as a persistence input.

config load-balance pool

Use this command to configure real server pool settings.

A server pool is a group of the real servers that host the applications that you load balance.

To configure a server pool:

1. Create a server pool object.
2. Add members.

Before you begin:

- You must have a good understanding and knowledge of the backend server boot behavior, for example, how many seconds it takes to “warm up” after a restart before it can process traffic.
- You must know the IP address and port of the applications.
- You must have already created real server SSL profiles if you want to specify them in the real server configuration.
- You must have read-write permission for load balancing settings.

After you have configured a real server pool, you can select it in the virtual server configuration.

Syntax

```
config load-balance pool
   edit <name>
      set addr-type {ipv4|ipv6}
      set health-check-ctrl {enable|disable}
      set health-check-list {<datasource> ...}
      set health-check-relation {AND|OR}
      set real-server-profile <datasource>
      config pool_member
         edit <No.>
            set backup {enable|disable}
            set connection-limit <integer>
            set connection-rate-limit <integer>
            set health-check-inherit {enable|disable}
            set health-check-ctrl {enable|disable}
            set health-check-list {<datasource> ...}
            set health-check-relation {AND|OR}
            set ip <class_ip>
            set ip6 <class_ip>
            set pool_member_cookie <string>
            set pool_member_server_name <string>
            set pool_member_service_port <integer>
            set pool_member_weight <integer>
            set recover <integer>
            set rs-profile-inherit {enable|disable}
            set real-server-profile <datasource>
            set ssl {enable|disable}
            set status {enable|disable|maintain}
            set warm-rate <integer>
            set warm-up <integer>
         next
      end
   next
end
```

addr-type	• IPv4 • IPv6
health-check-ctrl	Enable health checking for the pool. The health check settings at this configuration level are the parent configuration. When you configure the pool members, you can specify whether to inherit or override the parent configuration.

health-check-list	Specify one or more health check configuration objects.
health-check-relation	• AND—All of the specified health checks must pass for the server to be considered available. • OR—One of the specified health checks must pass for the server to be considered available.
real-server-profile	Specify a real server profile. Real server profiles determine settings for communication between FortiADC and the backend real servers.
config pool_member	
backup	Server that the ADC directs traffic to only when other servers in the pool are down. The backup server receives connections when all the other pool members fail the health check or you have manually disabled them, for example. **Note**: Not applicable for SIP servers.
connection-limit	Maximum number of concurrent connections to the backend server. The default is 0 (disabled). The valid range is 1 to 1,048,576 concurrent connections. **Note**: Connection Limit is not supported for FTP or SIP servers.
connection-rate-limit	Limit the number of new connections per second to this server. The default is 0 (disabled). The valid range is 1 to 86,400 connections per second. In Layer 4 deployments, you can apply a connection rate limit per real server and per virtual server. Both limits are enforced. **Note**: The connection rate limit applies only when the real servers belong to a Layer 4 virtual server. If you add a real server pool with this setting configured to a Layer 7 virtual server, for example, the setting is ignored. **Note**: Connection Rate Limit is not supported for FTP or SIP servers.
health-check-inherit	Enable to inherit the health check settings from the parent configuration. Disable to specify health check settings in this member configuration.
health-check-ctrl	Enable health checking for the pool.
health-check-list	Specify one or more health check configuration objects.
health-check-relation	• AND—All of the selected health checks must pass for the server to the considered available. • OR—One of the selected health checks must pass for the server to be considered available.

ip	Backend server IP address. In a Layer 2 virtual server deployment, specify the IP address of the next hop to the destination server. Configure a pseudo default gateway in the static route since Layer 2 virtual servers need to use this default route internally to match all the destinations that the client wants to access. However, this default gateway is not used because the next hop is the pool member and not the pseudo gateway. In a Layer 2 virtual server deployment, ensure the backend servers have been configured to route responses through the FortiADC IP address.
ip6	Backend server IP address. In a Layer 2 virtual server deployment, specify the IP address of the next hop to the destination server. Configure a pseudo default gateway in the static route since Layer 2 virtual servers need to use this default route internally to match all the destinations that the client wants to access. However, this default gateway is not used because the next hop is the pool member and not the pseudo gateway. In a Layer 2 virtual server deployment, ensure the backend servers have been configured to route responses through the FortiADC IP address.
pool_member_cookie	Cookie name to be used when cookie-based Layer 7 session persistence is enabled. The cookie is used to create a FortiADC session ID, which enables the system to forward subsequent related requests to the same backend server. If you do not specify a cookie name, it is set to the pool member server name string. **Note**: Not applicable for SIP servers.
pool_member_server_name	Real server member configuration name to appear in logs and reports. Alphabetic, numeric, underscore (_), and hyphen (-) characters are allowed. The setting is required.
pool_member_service_port	Backend server listening port number. Usually HTTP is 80, HTTPS is 443, FTP is 21, SMTP is 25, DNS is 53, POP3 is 110, IMAP4 is 143, RADIUS is 1812, and SNMP is 161. **Tip**: The system handles port 0 as a “wildcard” port. When configured to use port 0, the system uses the destination port from the client request. For example, if you specify 0, and the destination port in the client request is 50000, the traffic is forwarded to port 50000.

pool_member_weight	Assigns relative preference among members—higher values are more preferred and are assigned connections more frequently. The default is 1. The valid range is 1 to 256. All load balancing methods consider weight. Servers are dispatched requests proportional to their weight, relative to the sum of all weights. The following example shows the effect of weight on Round Robin: • Sever A, Weight 2; Server B, Weight 1: Requests are sent AABAAB. • Sever A, Weight 3; Server B, Weight 2: Requests are sent AABAB. For other methods, weight functions as a tie-breaker. For example, with the Least Connection algorithm, requests are sent to the server with the least connections. If the number of connections is equal, the request is sent to the server with the greater weight. For example: • Server A, Weight 1, 1 connection • Server B, Weight 2, 1 connection The next request is sent to Server B.
recover	Seconds to postpone forwarding traffic after downtime, when a health check indicates that this server has become available again. The default is 0 (disabled). The valid range is 1 to 86,400 seconds. After the recovery period elapses, the FortiADC assigns connections at the warm rate. Examples of when the server experiences a recovery and warm-up period: • A server is coming back online after the health check monitor detected it was down. • A network service is brought up before other daemons have finished initializing and therefore the server is using more CPU and memory resources than when startup is complete. To avoid connection problems, specify the separate warm-up rate, recovery rate, or both. **Tip**: During scheduled maintenance, you can also manually apply these limits by setting Status to Maintenance instead of Enable. **Note**: Not applicable for SIP servers.
rs-profile-inherit	Enable to inherit the real server profile from the pool configuration. Disable to specify the real server profile in this member configuration.
real-server-profile	If not configured to inherit the pool setting, specify a real server profile. Real server profiles determine settings for communication between FortiADC and the backend real servers.

status	• enable—The server can receive new sessions. • disable—The server does not receive new sessions and closes any current sessions as soon as possible. • maintain—The server does not receive new sessions but maintains any current connections.
warm-rate	Maximum connection rate while the server is starting up. The default is 10 connections per second. The valid range is 1 to 86,400 connections per second. The warm up calibration is useful with servers that have the network service brought up before other daemons have finished initializing. As the servers are brought online, CPU and memory are more utilized than they are during normal operation. For these servers, you define separate rates based on warm-up and recovery behavior. For example, if Warm Up is 5 and Warm Rate is 2, the number of allowed new connections increases at the following rate: • 1st second—Total of 2 new connections allowed (0+2). • 2nd second—2 new connections added for a total of 4 new connections allowed (2+2). • 3rd second—2 new connections added for a total of 6 new connections allowed (4+2). • 4th second—2 new connections added for a total of 8 new connections allowed (6+2). • 5th second—2 new connections added for a total of 10 new connections allowed (8+2). **Note**: Not applicable for SIP servers.
warm-up	If the server cannot initially handle full connection load when it begins to respond to health checks (for example, if it begins to respond when startup is not fully complete), indicate how long to forward traffic at a lesser rate. The default is 0 (disabled). The valid range is 1 to 86,400 seconds. **Note**: Not applicable for SIP servers.

Example

```
FortiADC-VM # config load-balance pool
FortiADC-VM (pool) # edit lb-pool
Add new entry 'lb-pool' for node 1705

FortiADC-VM (lb-pool) # get
addr-type : ipv4
health-check-ctrl : disable

FortiADC-VM (lb-pool) # set health-check-ctrl enable
FortiADC-VM (lb-pool) # set ?
addr-type address type
```

```
health-check-ctrl health check control
*health-check-list health check list
health-check-relation health check relationship

FortiADC-VM (lb-pool) # set health-check-list lb-health-check

FortiADC-VM (lb-pool) # config pool_member
FortiADC-VM (pool_member) # edit 1
Add new entry '1' for node 1710

FortiADC-VM (1) # get
health-check-inherit: enable
status : enable
ssl : disable
backup : disable
ip : 0.0.0.0
ip6 :
pool_member_service_port: 80
pool_member_weight : 1
connection-limit : 0
recover : 0
warm-up : 0
warm-rate : 10
connection-rate-limit: 0
pool_member_cookie : cookie

FortiADC-VM (1) # set ip 192.168.100.1
FortiADC-VM (1) # end
FortiADC-VM (lb-pool) # end
```

config load-balance profile

Use this command to configure virtual server profiles. A profile is a configuration object that defines how you want the FortiADC virtual server to handle traffic for specific protocols. Virtual server profiles determine settings used in network communication on the client-FortiADC segment, in contrast to real server profiles, which determine the settings used in network communication on the FortiADC-real server segment.

Table 10 describes usage for profile type, including compatible virtual server types, load balancing methods, and persistence methods.

Table 10: Profile usage

Profile	Usage	VS Type	LB Methods	Persistence
FTP	Use with FTP servers.	Layer 4	Round Robin, Least Connections, Fastest Response	Source Address, Source Address Hash

Profile	Usage	VS Type	LB Methods	Persistence
HTTP	Use for standard, unsecured web server traffic.	Layer 7, Layer 2	Layer 7: Round Robin, Least Connections, URI Hash, Full URI Hash, Host Hash, Host Domain Hash Layer 2: Same as Layer 7, plus Destination IP Hash	Source Address, Source Address Hash, Source Address-Port Hash, HTTP Header Hash, HTTP Request Hash, Cookie Hash, Persistent Cookie, Insert Cookie, Embedded Cookie, Rewrite Cookie
HTTPS	Use for secured web server traffic when offloading TLS/SSL from the backend servers. You must import the backend server certificates into FortiADC and select them in the HTTPS profile.	Layer 7, Layer 2	Same as HTTP	Same as HTTP, plus SSL Session ID

Profile	Usage	VS Type	LB Methods	Persistence
HTTP Turbo	Use for unsecured HTTP traffic that does not require advanced features like caching, compression, content rewriting, rate limiting, Geo IP blocking, or source NAT. The profile can be used with content routes and destination NAT, but the HTTP request must be in the first data packet. This profile enables packet-based forwarding that reduces network latency and system CPU usage. However, packet-based forwarding for HTTP is advisable only when you do not anticipate dropped packets or out-of-order packets.	Layer 7	Round Robin, Least Connections, Fastest Response	Source Address
RADIUS	Use with RADIUS servers.	Layer 7	Round Robin	RADIUS attribute
RDP	Use with Windows Terminal Server (remote desktop protocol).	Layer 7	Round Robin, Least Connections	Source Address, Source Address Hash, Source Address-Port Hash, RDP Cookie
SIP	Use with applications that use session initiation protocol (SIP), such as VoIP, instant messaging, and video.	Layer 7	Round Robin, URI Hash, Full URI Hash	Source Address, Source Address Hash, Source Address-Port Hash, SIP Call ID

Profile	Usage	VS Type	LB Methods	Persistence
TCP	Use for other TCP protocols.	Layer 4, Layer 2	Layer 4: Round Robin, Least Connections, Fastest Response Layer 2: Round Robin, Least Connections, Fastest Response, Destination IP Hash	Source Address, Source Address Hash
TCPS	Use for secured TCP when offloading TLS/SSL from the backend servers. Like the HTTPS profile, you must import the backend server certificates into FortiADC and select them in the TCPS profile.	Layer 7, Layer 2	Layer 7: Round Robin, Least Connections Layer 2: Round Robin, Least Connections, Destination IP Hash	Source Address, Source Address Hash, Source Address-Port Hash, SSL Session ID
UDP	Use for other UDP protocols.	Layer 4, Layer 2	Layer 4: Round Robin, Least Connections, Fastest Response Layer 2: Round Robin, Least Connections, Fastest Response, Destination IP Hash	Source Address, Source Address Hash
DNS	Used with DNS servers	Layer 7	Round Robbin, Least Connections	Not supported.
IP	Combines with Layer 2 TCP/UDP/HTTP virtual server to balance the rest of the IP packets passed through FortiADC. When running the IP protocol 0 virtual servers, the traffic always tries to match none protocol 0 virtual servers first.	Layer 2	Round Robbin only	Source Address, Source Address Hash

Profile	Usage	VS Type	LB Methods	Persistence
DIAMETER	Used with Diameter server.	Layer 7	Round Robbin only	Source Address
MySQL	Used with MySQL service to load- balance MySQL requests among the MySQL servers. It has two working modes: one is "single-master" and the other is "sharding-data". Creating an MySQL profile also adds the MySQL-type health-check.	Layer 7	Round Robbin, Least Connections	Not supported
RTMP	Used to configure RTSP profiles.	Layer 7	Round Robbin, Least Connections	Source Address, Source Address Hash
RTSP	Used to configure RTMP profiles.	Layer 7	Round Robbin, Least Connections	Source Address, Source Address Hash

Table 11 provides a summary of the predefined profiles. You can select predefined profiles in the virtual server configuration, or you can create user-defined profiles, especially to include configuration objects like certificates, caching settings, compression options, and IP reputation.

Table 11: Predefined profiles

Profile	Defaults
LB_PROF_TCP	Session Timeout —100 seconds Session Timeout after FIN —100 seconds IP Reputation—disabled Geo IP block list—none
LB_PROF_UDP	Session Timeout —100 seconds IP Reputation—disabled Geo IP block list—none

Profile	Defaults
LB_PROF_HTTP	Client Timeout—50 seconds Server Timeout—50 seconds Connect Timeout—5 seconds Queue Timeout—5 seconds HTTP Request Timeout—50 seconds HTTP Keepalive Timeout—50 seconds Buffer Pool—enabled Source Address—disabled X-Forwarded-For—disabled HTTP Mode—ServerClose Compression—none Caching—none IP Reputation—disabled Geo IP block list—none
LB_PROF_TURBOHTTP	Session Timeout—100 seconds Session Timeout after FIN—100 seconds IP Reputation—disabled
LB_PROF_FTP	Session Timeout—100 seconds Session Timeout after FIN—100 seconds IP Reputation—disabled Geo IP block list—none
LB_PROF_RADIUS	Session Timeout—300 seconds

Profile	Defaults
LB_PROF_RDP	Client Timeout—50 seconds Server Timeout—50 seconds Connect Timeout—5 seconds Queue Timeout—5 seconds Buffer Pool—enabled Source Address—disabled IP Reputation—disabled Geo IP block list—none
LB_PROF_SIP	SIP Max Size—65535 bytes Server Keepalive—enabled Server Keepalive Timeout—30 seconds Client Keepalive—disabled Client Protocol—UDP Server Protocol—unset Failed Client Type—Drop Failed Server Type—Drop Insert Client IP—disabled

Profile	Defaults
LB_PROF_TCPS	Client Timeout—50 seconds Server Timeout—50 seconds Connect Timeout—5 seconds Queue Timeout—5 seconds Buffer Pool—enabled Source Address—disabled IP Reputation—disabled Geo IP block list—none SSL Ciphers—none Allow SSL Versions—SSLv3, TLSv1.0, TLSv1.1, TLSv1.2 Client SNI Required—disabled Certificate Group—LOCAL_CERT_GROUP

Profile	Defaults
LB_PROF_HTTPS	Client Timeout—50 seconds Server Timeout—50 seconds Connect Timeout—5 seconds Queue Timeout—5 seconds HTTP Request Timeout—50 seconds HTTP Keepalive Timeout—50 seconds Buffer Pool—enabled Source Address—disabled X-Forwarded-For—disabled HTTP Mode—ServerClose Compression—none Caching—none IP Reputation—disabled Geo IP block list—none SSL Ciphers—none Allow SSL Versions—SSLv3, TLSv1.0, TLSv1.1, TLSv1.2 Client SNI Required—disabled Certificate Group—LOCAL_CERT_GROUP
LB_PROF_DNS	DNS Cache Flag—Enabled DNS Cache Ageout Time—3600 DNS Cache Size—10 DNS Cache Entry Size—512 DNS Cache Response Type—All Records DNS Malform Query Action—Drop DNA Max Query Length—512 DNS Authentication Flag—Disabled

Profile	Defaults
LB_PROF_IP	IP Reputation—Disabled Customized SSL Ciphers Flag—Disabled Geo IP Block List—None Geo IP Whitelist—None Timeout IP Session—100
LB_PROF_RTSP	Max-header-size—4096 Client-address —Disable
LB_PROF_RTMP	Client-address —Disable
LB_PROF_HTTP2_H2C	HTTP/HTTP2 profile: LB_HTTP2_PROFILE_DEFAULT
LB_PROF_HTTP2_H2	HTTP/HTTP2 profile: LB_HTTP2_PROFILE_DEFAULT
LB_PROF_DIAMETER	server-close-propagation—Disable Idle-timeout —300

Before you begin:

- You must have already created configuration objects for certificates, caching, and compression if you want the profile to use them.
- You must have read-write permission for load balance settings.

Syntax

```
config load-balance profile
   edit <name>
      set type {ftp | http | https | radius | rdp | sip | tcp | tcps | turbohttp | udp |
          diameter}
      set timeout_tcp_session <integer>
      set timeout_tcp_session_after_FIN <integer>
      set timeout-radius-session <integer>
      set timeout_udp_session <integer>
      set buffer-pool {enable|disable}
      set caching <datasource>
      set cache-response-type {single-answer | round-robin}
      set client-address {enable|disable}
      set client-timeout <integer>
      set compression <datasource>
      set connect-timeout <integer>
      set http-keepalive-timeout <integer>
      set http-mode {KeepAlive|OnceOnly|ServerClose}
      set http-request-timeout <integer>
```

```
set http-x-forwarded-for {enable|disable}
set http-x-forwarded-for-header <string>
set queue-timeout <integer>
set server-timeout <integer>
set tune-bufsize <integer>
set tune-maxrewrite <integer>
set ip-reputation {enable|disable}
set geoip-list <datasource>
set whitelist <datasource>
set geoip-redirect <string>
set client-keepalive {enable|disable}
set client-protocol {tcp|udp}
set failed-client {drop|send}
set failed-client-str <string>
set failed-server {drop|send}
set failed-server-str <string>
set max-size <integer>
set server-keepalive {enable|disable}
set server-keepalive-timeout <integer>
set server-protocol {tcp|udp}
set sip-insert-client-ip {enable|disable}
config client-request-header-erase
   edit <No.>
      set type {all|first}
      set string <string>
   next
end
config client-request-header-insert
   edit <No.>
      set type {append-always | append-if-not-exist | insert-always insert-if-not-
          exist}
      set string <string>
   next
end
config client-response-header-erase
   edit <No.>
      set type {all|first}
      set string <string>
   next
end
config client-response-header-insert
   edit <No.>
      set type {append-always | append-if-not-exist | insert-always insert-if-not-
          exist}
      set string <string>
   next
end
config server-request-header-erase
   edit <No.>
      set type {all|first}
      set string <string>
   next
end
config server-request-header-insert
   edit <No.>
      set type {append-always | append-if-not-exist | insert-always insert-if-not-
          exist}
```

```
            set string <string>
         next
      end
      config server-response-header-erase
         edit <No.>
            set type {all|first}
            set string <string>
         next
      end
      config server-response-header-insert
         edit <No.>
            set type {append-always | append-if-not-exist | insert-always insert-if-not-
                exist}
            set string <string>
         next
      end
   next
end
```

The following commands are used to invoke the "LB_PROF_DNS" profile in Layer-7 virtual servers.

```
config load-balance profile
   edit "dns"
      set caching {enable|disable}
      set malform-query-action {drop|forward}
      set max-cache-age <integer>
      set max-cache-entry-size <integer>
      set max-cache-size <integer>
      set max-query-length <integer>
      set redirect-to-tcp-port {enable|disable}
   next
end

config load-balance virtual-server
   edit "vs1"
      set load-balance-profile LB_PROF_DNS
   next
end
```

The following commands are used to invoke the "LB_PROF_IP" profile in Layer-2 virtual servers. When the profile of a Layer-2 virtual server is set to "LB_PROF_IP", you must specify the protocol numbers the virtual server can accept.

```
config load-balance profile
   edit "ip"
      set type ip
      set timeout-ip-session <integer>
      set ip-reputation {enable|disable}
      set geoip-list <string>
      set whitelist <string>
   next
end

config load-balance virtual-server
   edit "LB_PROF_IP"
      set type l2-load-balance
      set load-balance-profile LB_PROF_IP
```

```
      set protocol-numbers <value> protocol range "A-B" or single protocol number "A"
   next
end
```

The following commands are used to configure MySQL load-balancing:

```
config system health-check
   edit <health-check name>
      set type mysql
      set user <user name>
      set password <password>
      set dest-addr <ip addr>
      set port <port>
   next
end
```

The following commands are used to create a new MySQL profile (basic configuration):

```
config load-balance profile
   edit <name>
      config mysql-user-password
         edit <id>
               set username <username>
               set password <password>
         next
      end
   next
end
```

The following commands are used to configure a MySQL profile in basic single-master mode:

```
config load-balance profile
   edit <name>
      config mysql-rule
         edit <rule id>
               set type [master | slave]
               set database <database name> <database name> ...
               set user <user name> <user name> ...
               set table <table name> <table name> ...
               set client-ip <client ip> <client ip> ...
               set sql <sql statement> <sql statement> ...
         next
      end
   next
end
```

The following commands are used to configure a MySQL profile in data-sharding mode:

```
config load-balance profile
   edit <name>
      set mysql-mode sharding
      config mysql-sharding
         edit <id>
               set type range
               set table <table name>
               set key <column name>
               set group <group id>:<range> <group id>:<range> ... # such as set groups
                   0:0-999 1:1000-9999
         next
         edit <id>
               set type hash
```

```
            set database <database name>
            set table <table name>
            set key <column name>
            set group <group id> <group id>
         next
      end
   next
end
```

The following commands are used to configure MySQL profile-specific pool members:

```
config load-balance pool
   edit <pool name>
      config pool_member
         edit 1
            set mysql-group-id <group id> #for Data Sharding
            set mysql-read-only enable #for Slave
         next
      end
   next
end
```

The following commands are used to create an RTSP profile:

```
config load-balance profile
edit "RTSP"
      set type rtsp
      set max-header-size <size>
      set client-address <enable/disable>
   next
```

The following commands are used to configure an RTMP profile:

```
config load-balance profile
edit "RTMP"
      set type rtmp
      set client-address <enable/disable>
   next
```

The following commands are used to configure a diameter proxy_mode profile:

```
config load-balance profile
   edit "diameter_proxy"
      set type diameter
      set identity <string>
      set realm <string>
      set vendor-id <integer>
      set product-name <string>
      set idle-timeout <integer>
      set server-close-propagation <enable/disable>
   next
end
```

The following commands are used to configure a diameter relay_mode profile:

```
config load-balance profile
   edit "diameter_proxy"
      set type diameter
      set idle-timeout <integer>
      set server-close-propagation <enable/disable>
   next
end
```

type	Specify the profile type. After you have specified the type, the CLI commands are constrained to the ones that are applicable to the specified type, not all of the settings described in this table.
IP	
geoip-list	Specify the Geo IP block list.
ip-reputation	Specify the IP Reputation.
timeout-ip-session	Specify the timeout of the IP session.
whitelist	Specify the Geo IP whitelist.
RTSP	
max-header-sizet	Specify the maximum size of RTSP packets, which can range from 16 to 65, 536.
client-address	Enable/disable the use of a client IP as the source IP to connect to the real server.
RTMP	
client-address	Enable/disable the use of a client IP as the source IP to connect to the real server.
DNS	
caching	Enable or disable the cache for the DNS virtual server.
malform-query-action	Specify the reaction for the malformed requests.
max-cache-age	Specify the cache age-out time (in seconds).
max-cache-entry-size	Specify the maximum cache entry size.
max-cache-size	Specify the maximum cache size (in Megabytes).
max-query-length	Specify the maximum query length.
redirect-to-tcp-port	Enable or disable TCP authentication.
FTP	

timeout_tcp_session	Client-side timeout for connections where the client has not sent a FIN signal, but the connection has been idle. The default is 100 seconds. The valid range is 1 to 86,400.
timeout_tcp_session_after_FIN	Client-side connection timeout. The default is 100 seconds. The valid range is 1 to 86,400.
ip-reputation	Enable to apply the FortiGuard IP reputation service.
geoip-list	Specify a Geo IP block list configuration object.
whitelist	Specify a Geo IP whitelist configuration object.
HTTP	
buffer-pool	Enable to use buffering.
tune-bufsize	Specify the buffer size for a session when buffer-pool is enabled. Specify lower values to allow more sessions to coexist in the same amount of RAM, and higher values for traffic with larger HTTP body content. The default is 8,030 bytes. The valid range is 128 to 2,147,483,647.
caching	Specify the name of the caching configuration object.
client-address	Use the original client IP address as the source address in the connection to the real server.
client-timeout	Client-side TCP connection timeout. The default is 50 seconds. The valid range is from 1 to 3,600.
compression	Specify a compression configuration object.
connect-timeout	Multiplexed server-side TCP connection timeout. Usually less than the client-side timeout. The default is 5 seconds. The valid range is 1 to 3,600.
http-keepalive-timeout	The default is 50 seconds. The valid range is 1 to 3,600.

`http-mode`	• KeepAlive. Do not close the connection to the real server after each HTTP transaction. Instead, keep the connection between FortiADC and the real server open until the client-side connection is closed. This option is required for applications like Microsoft SharePoint. • OnceOnly. An HTTP transaction can consist of multiple HTTP requests (separate requests for an HTML page and the images contained therein, for example). To improve performance, the "once only" flag instructs the FortiADC to evaluate only the first set of headers in a connection. Subsequent requests belonging to the connection are not load balanced, but sent to the same server as the first request. • ServerClose. Close the connection to the real server after each HTTP transaction.
`http-request-timeout`	Client-side HTTP request timeout. The default is 50 seconds. The valid range is 1 to 3,600.
`http-x-forwarded-for`	Append the client IP address found in IP layer packets to the HTTP header that you have specified in the X-Forwarded-For Header setting. If there is no existing X-Forwarded-For header, the system creates it.
`http-x-forwarded-for-header`	Specify the HTTP header to which to write the client IP address. Typically, this is the X-Forwarded-For header, but it is customizable because you might support traffic that uses different headers for this. Do not include the 'X-' prefix. Examples: Forwarded-For, Real-IP, or True-IP.
`queue-timeout`	Specifies how long connection requests to a backend server remain in a queue if the server has reached its maximum number of connections. If the timeout period expires before the client can connect, FortiADC drops the connection and sends a 503 error to the client. The default is 5 seconds. The valid range is 1 to 3,600.
`server-timeout`	Server-side IP session timeout. The default is 50 seconds. The valid range is 1 to 3,600.

`tune-maxrewrite`	Specify the buffer space reserved for content rewriting. The default is 1,024 bytes. The valid range is 128 to 2,147,483,647.
`ip-reputation`	Enable to apply the FortiGuard IP reputation service.
`geoip-list`	Specify a Geo IP block list configuration object.
`geoip-redirect`	For HTTP/HTTPS, if you have configured a Geo IP redirect action, specify a redirect URL.
`whitelist`	Specify a Geo IP whitelist configuration object.
`http2-profile`	Specify an HTTP2 profile configuration object.
HTTPS - same as HTTP plus the following	
`allow-ssl-versions`	You have the following options: • SSLv2 • SSLv3 • TLSv1.0 • TLSv1.1 • TLSv1.2 We recommend retaining the default list. If necessary, you can specify a space-separated list of SSL versions you want to support for this profile.
`cert-verify verify`	Specify a certificate validation policy.
`client-sni-required`	Require clients to use the TLS server name indication (SNI) extension to include the server hostname in the TLS client hello message. Then, the FortiADC system can select the appropriate local server certificate to present to the client.
`local-cert-group`	A configuration group that includes the certificates this virtual server presents to SSL/TLS clients. This should be the backend servers' certificate, NOT the appliance's GUI web server certificate.
`forward-client-certificate`	Enable/disable. If enabled, FortiADC will send the whole client certificate encoded in the BASE64 code in the specified HTTP header, which is either the X-Client-Cert or a user-defined header.

forward-client-certificate-header	The default is X-Client-Cert, but you can customize it using this command.
ssl-ciphers	Ciphers are listed from strongest to weakest: ECDHE-ECDSA-AES256-GCM-SHA384 ECDHE-ECDSA-AES256-SHA384 ECDHE-ECDSA-AES256-SHA ECDHE-ECDSA-AES128-GCM-SHA256 ECDHE-ECDSA-AES128-SHA256 ECDHE-ECDSA-AES128-SHA ECDHE-ECDSA-DES-CBC3-SHA ECDHE-ECDSA-RC4-SHA ECDHE-RSA-AES256-GCM-SHA384 ECDHE-RSA-AES256-SHA384 ECDHE-RSA-AES256-SHA DHE-RSA-AES256-GCM-SHA384 DHE-RSA-AES256-SHA256 DHE-RSA-AES256-SHA AES256-GCM-SHA384 AES256-SHA256 AES256-SHA ECDHE-RSA-AES128-GCM-SHA256 ECDHE-RSA-AES128-SHA256 ECDHE-RSA-AES128-SHA DHE-RSA-AES128-GCM-SHA256 DHE-RSA-AES128-SHA256 DHE-RSA-AES128-SHA AES128-GCM-SHA256 AES128-SHA256 AES128-SHA ECDHE-RSA-RC4-SHA RC4-SHA RC4-MD5 ECDHE-RSA-DES-CBC3-SHA EDH-RSA-DES-CBC3-SHA DES-CBC3-SHA EDH-RSA-DES-CBC-SHA DES-CBC-SHA eNULL We recommend retaining the default list. If necessary, you can specify a different space-separated list of supported ciphers.
ssl-customize-ciphers-flag	Enable/disable use of user-specified cipher suites.
ssl-customized-ciphers	If the customize cipher flag is enabled, specify a colon-separated, ordered list of cipher suites. An empty string is allowed. If empty, the default cipher suite list is used.
ssl-proxy	Enable/disable SSL forward proxy.
RADIUS	
timeout-radius-session	The default is 300 seconds. The valid range is 1 to 3,600.
RDP	
buffer-pool	Enable to use buffering.

tune-bufsize	Specify the buffer size for a session when buffer-pool is enabled. Specify lower values to allow more sessions to coexist in the same amount of RAM, and higher values for traffic with larger HTTP body content. The default is 8,030 bytes. The valid range is 128 to 2,147,483,647.
client-address	Use the original client IP address as the source address in the connection to the real server.
ip-reputation	Enable to apply the FortiGuard IP reputation service.
geoip-list	Specify a Geo IP block list configuration object.
whitelist	Specify a Geo IP whitelist configuration object.
TCP	
timeout_tcp_session	Client-side timeout for connections where the client has not sent a FIN signal, but the connection has been idle. The default is 100 seconds. The valid range is 1 to 86,400.
timeout_tcp_session_ after_FIN	Client-side connection timeout. The default is 100 seconds. The valid range is 1 to 86,400.
ip-reputation	Enable to apply the FortiGuard IP reputation service.
geoip-list	Specify a Geo IP block list configuration object.
whitelist	Specify a Geo IP whitelist configuration object.
TCPS	
buffer-pool	Enable to use buffering.
tune-bufsize	Specify the buffer size for a session when buffer-pool is enabled. Specify lower values to allow more sessions to coexist in the same amount of RAM, and higher values for traffic with larger HTTP body content. The default is 8,030 bytes. The valid range is 128 to 2,147,483,647.
client-timeout	Client-side TCP connection timeout. The default is 50 seconds. The valid range is 1 to 3,600.

`server-timeout`	Server-side IP session timeout. The default is 50 seconds. The valid range is 1 to 3,600.
`connect-timeout`	Multiplexed server-side TCP connection timeout. Usually less than the client-side timeout. The default is 5 seconds. The valid range is 1 to 3,600.
TurboHTTP	
`timeout_tcp_session`	Client-side timeout for connections where the client has not sent a FIN signal, but the connection has been idle. The default is 100 seconds. The valid range is 1 to 86,400.
`timeout_tcp_session_after_FIN`	Client-side connection timeout. The default is 100 seconds. The valid range is 1 to 86,400.
`ip-reputation`	Enable to apply the FortiGuard IP reputation service.
UDP	
`timeout_udp_session`	Client-side session timeout. The default is 100 seconds. The valid range is 1 to 86,400.
`ip-reputation`	Enable to apply the FortiGuard IP reputation service.
`geoip-list`	Specify a Geo IP block list configuration object.
`whitelist`	Specify a Geo IP whitelist configuration object.
SIP	
`client-keepalive`	Enable/disable a keepalive period for new client-side requests. Supports CRLF ping-pong for TCP connections. Disabled by default.
`client-protocol`	Client-side transport protocol: • tcp • udp (default)
`failed-client`	Action when the SIP client cannot be reached: • drop—Drop the connection. • send—Drop the connection and send a message, for example, a status code and error message.

`fail-client-str`	Message string. Use double-quotation marks for strings with spaces.
`failed-server`	Action when the SIP server cannot be reached: • drop—Drop the connection. • send—Drop the connection and send a message, for example, a status code and error message.
`fail-server-str`	Message string. Use double-quotation marks for strings with spaces. For example: `"404 Not Found"`
`max-size`	Maximum message size. The default is 65535 bytes. The valid range is 1-65535.
`server-keepalive`	Enable/disable a keepalive period for new server-side requests. Supports CRLF ping-pong for TCP connections. Enabled by default.
`server-keepalive-timeout`	Maximum wait for a new server-side request to appear. The default is 30 seconds. The valid range is 5-300.
`server-protocol`	Server-side transport protocol. • tcp • udp Default is "unset", so the client-side protocol determines the server-side protocol.
`sip-insert-client-ip`	Enable/disable option to insert the client source IP address into the X-Forwarded-For header of the SIP request.
config client-request-header-erase	Configuration to erase headers from client requests. Table setting. Maximum 4 members.
`type`	• all—Parse all headers for a match. • first—Parse the first header for a match.
`string`	Header to be erased.
config client-request-header-insert	Configuration to insert headers into client requests. Table setting. Maximum 4 members.

type	• append-always—Append after the last header. • append-if-not-exist—Append only if the header is not present. • insert-always—Insert before the first header even if the header is already present. • insert-if-not-exist—Insert before the first header only if the header is not already present.
string	The header:value pair to be inserted.
config client-response-header-erase	Configuration to erase headers from client responses. Table setting. Maximum 4 members.
type	• all • first
string	Header to be erased.
config client-response-header-insert	Configuration to insert headers into client responses. Table setting. Maximum 4 members.
type	• append-always • append-if-not-exist • insert-always • insert-if-not-exist
string	The header:value pair to be inserted.
config server-request-header-erase	Configuration to erase headers from server requests. Table setting. Maximum 4 members.
type	• all • first
string	Header to be erased.
config server-request-header-insert	Configuration to insert headers into server requests. Table setting. Maximum 4 members.
type	• append-always • append-if-not-exist • insert-always • insert-if-not-exist
string	The header:value pair to be inserted.

server-response-header-erase	Configuration to erase headers from server responses. Table setting. Maximum 4 members.
`type`	• all • first
`string`	Header to be erased.
server-response-header-insert	Configuration to insert headers into server responses. Table setting. Maximum 4 members.
`type`	• append-always • append-if-not-exist • insert-always • insert-if-not-exist
`string`	The header:value pair to be inserted.
Diameter	
`Identity`	Sets the value of Diameter AVP 264. This AVP can be a character string and specifies the identity of the originating host for Diameter messages. ADC will modify the origin-host avp on client request with the setting value, then transfer it to RS. ADC will modify the origin-host avp on server response with the setting value, then transfer it to the client. Specify the identity in the following format: vs.realm The host is a string unique to the client. The realm is the Diameter realm, specified by the Realm option (described below). If Identity is set with an empty value (nothing), ADC will not change the value of the origin-host in the client or server when it transfer thems The default is empty value.

`Realm`	Sets the value of Diameter AVP 296. This AVP can be a character string and specifies the Diameter realm from which Diameter messages, including requests, are originated. ADC will modify the origin-realm avp on client request with the setting value, then transfer it to RS. ADC will modify the origin-realm avp on server response with the setting value, then transfer it to the client. If Realm is set with an empty value(nothing),ADC will not change the value of the origin-realm in the client or server when it transfers them. The default is empty value.
`product-name`	Sets the value of Diameter AVP 269. This AVP can be a character string and specifies the product; for example, “fortiadc”. ADC will modify the Product-Name avp on client request with the setting value, then transfer it to RS. ADC will modify the Product-Name avp on server response with the setting value, then transfer it to the client. If product-name is set with an empty value (nothing), ADC will not change the value of the origin-realm in the client or server when it transfers them. The default is empty value.

`Vendor-id`	Sets the value of Diameter AVP 266. This AVP can be a character string and specifies the vendor; for example, “156”. ADC will modify the vendor-id avp on client request with the setting value, then transfer it to RS. ADC will modify the vendor-id avp on server response with the setting value, then transfer it to the client. If vendor-ide is set to 0, ADC will not change the value of vendor-id in the client or server when it transfers them. The default is 0.The valid range is 0-4294967295.
`Idle-timeout`	Default, for different requests with the same session_id avp, if their interval is less than idle-timeout, ADC will dispatch them to the same RS. The default is 300 seconds. The valid range is 1-86400. When this parameter is set, ADC will act in proxy mode.
`server-close-propagation`	When transfering diameter traffic with server-close-propagation enabled, if one of the servers resets or sends DPR to ADC, ADC will close connection with the client and other servers at the same time. When transfering diameter traffic with server-close-propagation disabled, if one of the servers resets or sends DPR to ADC, ADC will transfer the requests from the client to the other servers. Disabled by default.

Example

The following example shows the list of predefined profiles:

```
FortiADC-VM # get load-balance profile
== [ LB_PROF_TCP ]
== [ LB_PROF_UDP ]
== [ LB_PROF_HTTP ]
== [ LB_PROF_TURBOHTTP ]
== [ LB_PROF_FTP ]
== [ LB_PROF_RADIUS ]
== [ LB_PROF_SIP ]
== [ LB_PROF_TCPS ]
```

```
== [ LB_PROF_HTTPS ]
== [ LB_PROF_HTTP2_H2C]
== [ LB_PROF_HTTP2_H2 ]
== [ LB_PROF_SMTP ]
== [ LB_PROF_RTSP ]
== [ LB_PROF_RTMP ]
== [ LB_PROF_DIAMETER ]
== [ LB_PROF_IP ]
== [ LB_PROF_RDP ]
== [ LB_PROF_HTTP_SERVERCLOSE ]
== [ LB_PROF_HTTPS-SERVERCLOSE ]
== [ LB_PROF_DNS ]
```

The following example shows the details of the predefined HTTPS profile:

```
FortiADC-VM (profile) # get load-balance profile LB_PROF_HTTPS
type : https
tune-bufsize : 8030
tune-maxrewrite : 1024
client-timeout : 50
server-timeout : 50
connect-timeout : 5
queue-timeout : 5
http-request-timeout : 50
http-keepalive-timeout : 50
buffer-pool : enable
client-address : disable
http-x-forwarded-for : disable
http-x-forwarded-for-header :
http-mode : ServerClose
compression :
caching :
ip-reputation : disable
geoip-list :
whitelist :
geoip-redirect : http://
```

The following example creates a user-defined SIP profile:

```
FortiADC-VM # config load-balance profile
FortiADC-VM (profile) # edit sip-profile
Add new entry 'sip-profile' for node 1643
FortiADC-VM (sip-profile) # set type sip
FortiADC-VM (sip-profile) # get
type : sip
max-size : 65535
server-keepalive-timeout : 30
server-keepalive : enable
client-keepalive : disable
client-protocol : udp
server-protocol :
sip-insert-client-ip : disable
failed-client : drop
failed-server : drop
FortiADC-VM (sip-profile) # set timeout 120
FortiADC-VM (sip-profile) # set max-size 2048
FortiADC-VM (sip-profile) # set server-keepalive-timeout 180
FortiADC-VM (sip-profile) # set failed-server send
```

```
FortiADC-VM (sip-profile) # set fail-server-str "404 Not Found"
FortiADC-VM (sip-profile) # config ?
client-request-header-erase erase header from client request
client-request-header-insert insert header into client request
client-response-header-erase erase header from client response
client-response-header-insert insert header into client response
server-request-header-erase erase header from server request
server-request-header-insert insert header into server request
server-response-header-erase erase header from server response
server-response-header-insert insert header into server response

FortiADC-VM (sip-profile) # config client-request-header-insert
FortiADC-VM (client-request~h) # edit 1
Add new entry '1' for node 4554
FortiADC-VM (1) # set type insert-if-not-exist
FortiADC-VM (1) # set string "Via: SIP/2.0/UDP 1.1.1.100:5060"
FortiADC-VM (1) # end
FortiADC-VM (sip-profile) # end
FortiADC-VM #

FortiADC#config load-balance profile
FortiADC (profile) #edit "HTTPS"
FortiADC (HTTPS) #set type https
FortiADC (HTTPS) #set cert-verify verify
FortiADC (HTTPS) #set forward-client-certificate enable
FortiADC (HTTPS) #set forward-client-certificate-header X-MY-Client-Cert
FortiADC (HTTPS) #end

config load-balance profile
   edit "dns"
      set type dns
      set malform-query-action drop
      set redirect-to-tcp-port disable
      set caching enable
      set max-query-length 512
      set max-cache-age 3600
      set max-cache-entry-size 512
      set max-cache-size 10
   next
end

config load-balance virtual-server
   edit "vs1"
      set load-balance-profile dns
   next
end

config load-balance profile
   edit "ip"
      set type ip
      set timeout-ip-session 100
   next
end

config load-balance virtual-server
   edit "vs2"
      set type l2-load-balance
```

```
      set protocol-numbers 0 1
      set load-balance-profile ip
   next
end
```

The following example creates a MySQL profile:

```
config system health-check
   edit mysql
      set type mysql
      set user root
      set password fortinet
      set port 3306
   next
end

config load-balance real-server
   edit "rs1"
      set ip 192.168.1.1
   next
end


config load-balance pool
   edit "pool_mysql"
      set health-check-ctrl enable
      set health-check-list icmp
      set real-server-ssl-profile NONE
      config pool_member
         edit 1
               set pool_member_cookie rs1
               set real-server rs1
         next
      end
   next
end


config load-balance virtual-server
   edit "mysql"
      set type l7-load-balance
      set interface port2
      set ip 10.1.1.1
      set port 3306
      set load-balance-profile mysql
      set load-balance-method LB_METHOD_ROUND_ROBIN
      set load-balance-pool pool_mysql
   next
end
```

The following example creates an RTSP profile:

```
config load-balance profile
edit "RTSP"
      set type rtsp
      set max-header-size 2048
      set client-address enable
   next
```

The following example creates an RTMP profile:

```
config load-balance profile
edit "RTMP"
      set type rtmp
      set client-address enable
   next
```

config load-balance real-server-ssl-profile

Use this command to configure real server profiles. A real server profile determines settings used in network communication on the FortiADC-server segment, in contrast to a virtual server profile, which determines the settings used in network communication on the client-FortiADC segment.

Table 12 provides a summary of the predefined profiles. You can select predefined profiles in the real server configuration, or you can create user-defined profiles.

Table 12: Predefined real server profiles

Profile	Defaults
LB_RS_SSL_PROF_DEFAULT	• Allow version: SSLv3, TLSv1.0, TLSv1.1, and TLSv1.2 • Cipher suite list: custom
LB_RS_SSL_PROF_ECDSA	• Allow version: SSLv3, TLSv1.0, TLSv1.1, and TLSv1.2 • Cipher suite list: ECDHE-ECDSA-AES256-GCM-SHA384, ECDHE-ECDSA-AES256-SHA384, ECDHE-ECDSA-AES256-SHA, ECDHE-ECDSA-AES128-GCM-SHA256,ECDHE-ECDSA-AES128-SHA256,ECDHE-ECDSA-AES128-SHA,ECDHE-ECDSA-RC4-SHA,ECDHE-ECDSA-DES-CBC3-SHA
LB_RS_SSL_PROF_ECDSA_SSLV3	• Allow version: SSLv3 • Cipher suite list: ECDHE-ECDSA-AES256-SHA, ECDHE-ECDSA-AES128-SHA,ECDHE-ECDSA-RC4-SHA,ECDHE-ECDSA-DES-CBC3-SHA
LB_RS_SSL_PROF_ECDSA_TLS12	• Allow version: TLSv1.2 • Cipher suite list: ECDHE-ECDSA-AES256-GCM-SHA384, ECDHE-ECDSA-AES256-SHA384, ECDHE-ECDSA-AES128-GCM-SHA256,ECDHE-ECDSA-AES128-SHA256
LB_RS_SSL_PROF_ENULL	• Allow version: SSLv3, TLSv1.0, TLSv1.1, and TLSv1.2 • Cipher suite list: eNull Recommended for Microsoft Direct Access servers where the application data is already encrypted and no more encryption is needed.

Profile	Defaults
LB_RS_SSL_PROF_HIGH	• Allow version TLSv1.2 • Cipher suite list: ECDHE-RSA-AES256-GCM-SHA384 ECDHE-RSA-AES256-SHA384 ECDHE-RSA-AES256-SHA DHE-RSA-AES256-GCM-SHA384 DHE-RSA-AES256-SHA256 AES256-GCM-SHA384 AES256-SHA256
LB_RS_SSL_PROF_LOW_SSLV2	• Allow version SSLv2 • Cipher suite list: RC4-MD5
LB_RS_SSL_PROF_LOW_SSLV3	• Allow version SSLv3 • Cipher suite list: DHE-RSA-AES128-GCM-SHA256 DHE-RSA-AES128-SHA256 DHE-RSA-AES128-SHA AES128-GCM-SHA256 AES128-SHA256 AES128-SHA ECDHE-RSA-RC4-SHA RC4-MD5 ECDHE-RSA-DES-CBC3-SHA EDH-RSA-DES-CBC3-SHA DES-CBC3-SHA EDH-RSA-DES-CBC-SHA DES-CBC-SHA
LB_RS_SSL_PROF_MEDIUM	• Allow version: TLSv1.0, TLSv1.1, and TLSv1.2 • Cipher suite list: ECDHE-RSA-AES128-GCM-SHA256 ECDHE-RSA-AES128-SHA256 ECDHE-RSA-AES128-SHA DHE-RSA-AES128-GCM-SHA256 DHE-RSA-AES128-SHA256 DHE-RSA-AES128-SHA AES128-GCM-SHA256 AES128-SHA256 AES128-SHA RC4-SHA EDH-RSA-DES-CBC3-SHA DES-CBC3-SHA
LB_RS_SSL_PROF_NONE	SSL is disabled.

Before you begin:

- You must have read-write permission for load balance settings.

Syntax

```
config load-balance real-sever-ssl-profile
   edit <name>
      set ssl {enable|disable}
      set allow-ssl-versions {sslv3 tlsv1.0 tlsv1.1 tlsv1.2}
      set server-cert-verify <datasource>
      set ssl-ciphers {ECDHE-ECDSA-AES256-GCM-SHA384 ECDHE-ECDSA-AES256-SHA384 ECDHE-
          ECDSA-AES256-SHA ECDHE-ECDSA-AES128-GCM-SHA256 ECDHE-ECDSA-AES128-SHA256 ECDHE-
          ECDSA-AES128-SHA ECDHE-ECDSA-DES-CBC3-SHA ECDHE-ECDSA-RC4-SHA ECDHE-RSA-AES256-
          GCM-SHA384 ECDHE-RSA-AES256-SHA384 ECDHE-RSA-AES256-SHA DHE-RSA-AES256-GCM-
          SHA384 DHE-RSA-AES256-SHA256 DHE-RSA-AES256-SHA AES256-GCM-SHA384 AES256-SHA256
          AES256-SHA ECDHE-RSA-AES128-GCM-SHA256 ECDHE-RSA-AES128-SHA256 ECDHE-RSA-AES128-
          SHA DHE-RSA-AES128-GCM-SHA256 DHE-RSA-AES128-SHA256 DHE-RSA-AES128-SHA AES128-
          GCM-SHA256 AES128-SHA256 AES128-SHA ECDHE-RSA-RC4-SHA RC4-SHA RC4-MD5 ECDHE-RSA-
          DES-CBC3-SHA EDH-RSA-DES-CBC3-SHA DES-CBC3-SHA EDH-RSA-DES-CBC-SHA DES-CBC-SHA
          eNULL }
      set ssl-customize-ciphers-flag {enable|disable}
      set ssl-customized-ciphers <string>
      set ssl-session-reuse {enable|disable}
      set ssl-session-reuse-limit <integer>
```

```
        set ssl-sni-forward {enable|disable}
        set ssl-tls-ticket-reuse {enable|disable}
        set server-OCSP-stapling-support {enable|disable}
    next
end
```

`ssl`	Enable/disable SSL for the connection between the FortiADC and the real server.
`allow-ssl-versions`	Specify a space-separated list of allowed SSL versions.
`server-cert-verify`	Specify a Certificate Verify configuration object to validate server certificates. This Certificate Verify object must include a CA group and can include OCSP and CRL checks.
`ssl-ciphers`	Specify a space-separated, ordered list of supported SSL ciphers.
`ssl-customize-ciphers-flag`	Enable/disable use of user-specified cipher suites.
`ssl-customized-ciphers`	If the customize cipher flag is enabled, specify a colon-separated, ordered list of cipher suites. An empty string is allowed. If empty, the default cipher suite list is used.
`ssl-session-reuse`	Enable/disable SSL session reuse.
`ssl-session-reuse-limit`	The default is 0 (disabled). The valid range is 0-1048576.
`ssl-sni-forward`	Enable/disable forwarding the client SNI value to the server. The SNI value will be forwarded to the real server only when the client-side ClientHello message contains a valid SNI value; otherwise, nothing is forwarded.
`ssl-tls-ticket-reuse`	Enable/disable TLS ticket-based session reuse.
`server-OCSP-stapling-support`	Enable/disable server `ocsp_stapling`. The default is disable. **Note:** Only when verify is enabled does this command take effect.

Example

```
FortiADC-VM # config load-balance real-server-ssl-profile
FortiADC-VM (real-server-ss~-) # get
== [ LB_RS_SSL_PROF_NONE ]
== [ LB_RS_SSL_PROF_LOW_SSLV2 ]
== [ LB_RS_SSL_PROF_LOW_SSLV3 ]
== [ LB_RS_SSL_PROF_MEDIUM ]
== [ LB_RS_SSL_PROF_HIGH ]
== [ LB_RS_SSL_PROF_ECDSA ]
== [ LB_RS_SSL_PROF_ECDSA_SSLV3 ]
== [ LB_RS_SSL_PROF_ECDSA_TLS12 ]
== [ LB_RS_SSL_PROF_ENULL ]
```

```
== [ LB_RS_SSL_PROF_DEFAULT ]

FortiADC-VM (real-server-ss~-) # edit RS-SSL-PROFILE-USER-DEFINED
Add new entry 'RS-SSL-PROFILE-USER-DEFINED' for node 3862
FortiADC-VM (RS-SSL-PROFILE~U) # set ssl enable
FortiADC-VM (RS-SSL-PROFILE~U) # get
ssl : enable
server-cert-verify :
ssl-sni-forward : disable
ssl-session-reuse : disable
ssl-customize-ciphers-flag : disable
ssl-ciphers : DHE-RSA-AES256-GCM-SHA384 DHE-RSA-AES256-SHA256 DHE-RSA-AES256-SHA AES256-
    GCM-SHA384 AES256-SHA256 AES256-SHA DHE-RSA-AES128-GCM-SHA256 DHE-RSA-AES128-SHA256
    DHE-RSA-AES128-SHA AES128-GCM-SHA256 AES128-SHA256 AES128-SHA RC4-SHA RC4-MD5 EDH-RSA-
    DES-CBC3-SHA DES-CBC3-SHA EDH-RSA-DES-CBC-SHA DES-CBC-SHA
allow-ssl-versions : sslv3 tlsv1.0 tlsv1.1 tlsv1.2
FortiADC-VM (RS-SSL-PROFILE~U) # set ssl-session-reuse enable
FortiADC-VM (RS-SSL-PROFILE~U) # set allow-ssl-versions tlsv1.2
FortiADC-VM (RS-SSL-PROFILE~U) # end
FortiADC-VM #
```

config load-balance reputation

Use this command to configure IP reputation policies.

The FortiGuard IP Reputation service provides a regularly updated data set that identifies compromised and malicious clients.

The IP reputation configuration allows you to specify the action the system takes when it receives traffic from a client with an IP address on the list. Table 13 lists limitations for IP reputation actions.

Table 13: IP reputation actions

Action		Profile Limitations
Pass	IPv4 only	Not supported for RADIUS.
Deny	IPv4 only	Not supported for RADIUS.
Redirect	IPv4 only	Not supported for RADIUS, FTP, TCP, UDP.
Send 403 Forbidden	IPv4 only	Not supported for RADIUS, FTP, TCP, UDP.

Note: IP reputation is also not supported for Layer 4 virtual servers when the Packet Forwarding Mode is Direct Routing.

Basic Steps

1. Configure the connection to the FortiGuard IP Reputation Service.

2. Optionally, customize the actions you want to take when the system encounters a request from an IP source that matches the list; and add exceptions. If a source IP appears on the exceptions list, the system does not look it up on the IP reputation list. See below.
3. Enable IP reputation in the profiles you associate with virtual servers.

Before you begin:

- You must have read-write permission for load balancing settings.

Syntax

```
config load-balance reputation
   edit <No.>
      set action {deny | pass | redirect | send-403-forbidden}
      set category <string>
      set log {enable|disable}
      set severity {high | low | medium}
      set status {enable|disable}
   next
end
```

`action`	• Pass • Deny • Redirect • Send 403 Forbidden *Note*: Layer 4 and TCPS virtual servers do not support Redirect or Send 403 Forbidden. If you apply an IP reputation configuration that uses these options to a Layer 4 or TCPS virtual server, FortiADC logs the action as Redirect or Send 403 Forbidden, but in fact denies the traffic.
`category`	Specify a FortiGuard IP Reputation category: • Botnet • Anonymous Proxy • Phishing • Spam • Others
`log`	Enable/disable logging.
`severity`	The severity to apply to the event. Severity is useful when you filter and sort logs: • Low • Medium • High
`status`	Enable/disable the category.

Example

```
FortiADC-VM # get load-balance reputation
```

```
== [ 1 ]
== [ 2 ]
== [ 3 ]
== [ 4 ]
== [ 5 ]

FortiADC-VM # get load-balance reputation 1
category : Botnet
status : enable
action : pass
severity : low
log : disable

FortiADC-VM # get load-balance reputation 2
category : "Anonymous Proxy"
status : enable
action : pass
severity : low
log : disable

FortiADC-VM # get load-balance reputation 3
category : Phishing
status : enable
action : pass
severity : low
log : disable

FortiADC-VM # get load-balance reputation 4
category : Spam
status : enable
action : pass
severity : low
log : disable

FortiADC-VM # get load-balance reputation 5
category : Others
status : enable
action : pass
severity : low
log : disable
```

config load-balance reputation-exception

Use this command to add exceptions to IP reputation rules. If enabled, the specified IP address or range of IP addresses will be allowed to pass through.

Before you begin:

- You must have read-write permission for load balancing feature settings.

Syntax

```
config load-balance reputation-exception
   edit <No.>
```

```
        set status {enable|disable}
        set type {ip-netmask | ip-range}
        set ip-network <ip&netmask>
        set start-ip <classip>
        set end-ip <classip>
    next
end
```

status	Enable or disable the exception. You might have occasion to toggle to exception off and on.
type	• ip-netmask: address block • ip-range: address range
ip-network	Specify a subnet using the address/mask notation.
start-ip	Specify the start of an address range.
end-ip	Specify the end of an address range.

config load-balance virtual-server

Use this command to configure virtual servers.

The virtual server configuration supports three classes of application delivery control:

- Layer 7—Persistence, load-balancing, and routing are based on Layer-7 objects, such as HTTP headers, cookies, and so on.
- Layer 4—Persistence, load-balancing, and network address translation are based on Layer-4 objects, such as source and destination IP address.
- Layer 2—This feature is useful when the request's destination IP is unknown and you need to load-balance connections between multiple next-hop gateways.

Before you begin:

- You must have a deep understanding of the backend servers and your load balancing objectives.
- You must have configured a real server pool (required) and other configuration objects that you can incorporate into the virtual server configuration, such as persistence rules, user-defined profiles, source IP address pools if you are deploying full NAT, content routes and rewriting rules, and error messages.
- You must have read-write permission for load balancing settings.

Unlike virtual IPs on FortiGate or virtual servers on FortiWeb, virtual servers on FortiADC are activated as soon as you configure them and set status to `enable`. You do not apply them by selecting them in a policy.

Syntax

```
config load-balance virtual-server
   edit <vs-name>
```

```
        set type {l2-load-balance | l4-load-balance | l7-load-balance}
        set addr-type {ipv4|ipv6}
        set alone {enable|disable}
        set auth-policy <datasource>
        set comments <string>
        set connection-limit <integer>
        set connection-pool <datasource>
        set connection-rate-limit <integer>
        set content-rewriting {enable|disable}
        set content-rewriting-list <string>
        set content-routing {enable|disable}
        set content-routing-list <string>
        set error-msg <string>
        set geoip-block-list <datasource>
        set whitelist <datasource>
        set interface <datasource>
        set ip <class_ip>
        set l2-exception-list <datasource>
        set port <value> port range "portA-portB" or single port number "portA"
        set port <number>
        set load-balance-method <datasource>
        set load-balance-persistence <datasource>
        set load-balance-pool <datasource>
        set load-balance-profile <datasource>
        set multi-process <integer>
        set packet-forwarding-method { FullNAT|NAT|NAT46|NAT64|direct_routing| tunneling}
        set ippool-list <datasource> <datasource> ...
        set scripting-flag enable
        set scripting-list <datasource> <datasource> ...
        set status {enable|disable|maintain}
        set traffic-log {enable|disable}
        set event-log {enable|disable}
        set trans-rate-limit <integer>
        set waf-profile <datasource>
        set warm-rate <integer>
        set warm-up <integer>
        set traffic-group <string>
        set ssl-mirror <enable/disable>
        set ssl-mirror-intf <port>
        set pagespeed <datasource>
        set http2https enable
        set http2https-port <portA-portB portC portD>
        set max-persistence-entries <integer>
        set schedule-list <enable/disable>
        set schedule-pool-list <datasource>
    next
end
```

`type`	Specify the virtual server type: • l7-load-balance: Persistence, load balancing, and routing are based on Layer 7 objects, such as HTTP headers, cookies, and so on. • l4-load-balance: Persistence, load balancing, and network address translation are based on Layer 4 objects, such as source and destination IP address. • l2-load-balance: This feature is useful when the request's destination IP is unknown and you need to load balance connections between multiple next-hop gateways. After you have specified the type, the CLI commands are constrained to the ones that are applicable to the specified type, not all of the settings described in this table.
`addr-type`	IPv4 or IPv6 **Note**: IPv6 is not supported for FTP, HTTP Turbo, RDP, or SIP profiles.
`alone`	Enable/disable alone mode. Enabled by default. When enabled, the virtual server is handled by a separate httproxy daemon. When disabled, the virtual server belongs to a group that is handled by one httproxy daemon. Alone mode boosts performance but impacts memory utilization. If memory utilization becomes an issue, consider enabling alone mode only for key virtual servers and disabling for less important ones. **Note**: HTTP, HTTPS, and TCPS only.
`auth-policy`	Specify an auth policy configuration object. HTTP/HTTPS only.
`comments`	A string to describe the purpose of the configuration, to help you and other administrators more easily identify its use. Put phrases in quotes. For example: "Customer ABC".
`connection-limit`	Limit the number of concurrent connections. The default is 0 (disabled). The valid range is 1 to 1,048,576 concurrent connections. You can apply a connection limit per real server and per virtual server. Both limits are enforced. Attempted connections that are dropped by security rules are not counted. **Note**: Not supported for FTP or SIP profiles.
`connection-pool`	Specify a connection pool configuration object. **Note**: Not supported for SIP profiles.

`connection-rate-limit`	With all Layer 4 profiles, and with the Layer 2 TCP profile, you can limit the number of new connections per second. The default is 0 (disabled). The valid range is 1 to 86,400 connections per second. You can apply a connection rate limit per real server and per virtual server. Both limits are enforced. Attempted connections that are dropped by security rules are not counted. **Note**: Not supported for FTP profiles.
`content-rewriting`	Enable to rewrite HTTP headers. **Note**: Not supported for SIP profiles.
`content-rewriting-list`	Specify content rewriting rules. **Note**: You can select multiple content rewriting rules in the virtual server configuration. Rules that you add are consulted from top to bottom. The first rule to match is applied. If the traffic does not match any of the content rewriting rule conditions, the header is not rewritten.
`content-routing`	Enable to route packets to backend servers based on IP address (Layer 4) or HTTP headers (Layer 7 content). **Note**: Not supported for SIP profiles.
`content-routing-list`	Specify content route configuration objects. **Note**: You can specify multiple content routing rules in the virtual server configuration. Rules that you add are consulted from top to bottom. The first rule to match is applied. If the traffic does not match any of the content routing rule conditions specified in the virtual server configuration, the system behaves unexpectedly. Therefore, it is important that you create a “catch all” rule that has no match conditions. In the virtual server configuration, this rule should be ordered last so it can be used to forward traffic to a default pool.
`error-msg`	Specify an error page configuration object. **Note**: Not supported for SIP profiles.
`error-page`	If you do not use an error page, you can enter an error message to be returned to clients in the event no server is available. **Note**: Not supported for SIP profiles.
`geoip-blocklist`	Specify a geography IP address block list configuration object.
`whitelist`	Specify a geography IP address whitelist configuration object.
`interface`	Network interface that receives client traffic for this virtual server.

`ip`	IP address provisioned for the virtual server. **Note**: You do not specify an IP address for a Layer 2 virtual server. A Layer 2 virtual server is not aware of IP addresses. Instead of routing data for a specific destination, this type of server simply forwards data from the specified network interface and port.
`port`	Port number to listen for client requests. **Note**: If a Layer 2 virtual server is assigned a network interface that uses port 80 or 443, ensure that the HTTPS and HTTP administrative access options are not enabled for the interface. **Note:** A L7 virtual server can have up to 256 ports, but there is no such a limit for L4 virtual servers. **Note:** Port number can be set to 0 if load-balance type is L4 or L2 and the profile is TCP or UDP.
`port range`	Specify the number of ports in a port range. For example, if port is 80, and port-range is 254, then the virtual port range starts at 80 and goes to 334. The default is 0 (no range). The valid range is 0-255. For SIP, the valid range is 0-5. The port-range option is useful in deployments where it is desirable to have a virtual IP address with a large number of virtual ports, such as data centers or web hosting companies that use port number to identify their specific customers. Statistics and configurations are applied to the virtual port range as a whole and not to the individual ports within the specified range. **Note**: Not supported for FTP, HTTP Turbo, RADIUS, or Layer 2 TCP profiles **Note:** You can define up to eight port ranges.
`load-balance-method`	Specify a predefined or user-defined method configuration object.
`load-balance-persistence`	Specify a predefined or user-defined persistence configuration object.
`load-balance-pool`	Specify a server pool configuration object.
`load-balance-profile`	Specify a predefined or user-defined profile configuration object. After you have specified the profile, the CLI commands are constrained to the ones that are applicable to the specified profile type, not all of the settings described in this table.
`l2-exception-list`	Specify a user-defined SSL forward proxy exception configuration object.

`multi-process`	If your system has a multicore CPU, you can assign the number of CPU cores to handle traffic for a virtual server. The valid range is 1 to 15. **Note**: HTTP, HTTPS, and TCPS only.
`packet-forwarding-method`	In Layer 4 virtual server deployments, select one of the following packet forwarding methods: • direct_routing — Forwards the source and destination IP addresses with no changes. **Note**: For FTP profiles, when Direct Routing is selected, you must also configure a persistence method. • NAT— Replaces the destination IP address with the IP address of the backend server selected by the load balancer. The destination IP address of the initial request is the IP address of the virtual server. Be sure to configure FortiADC as the default gateway on the backend server so that the reply goes through FortiADC and can also be translated. • FullNAT—Replaces both the destination and source IP addresses. IPv4 to IPv4 or IPv6 to IPv6 translation. • NAT46—Replaces both the destination and source IP addresses, translating IPv4 addresses to IPv6 addresses. • NAT64—Replaces both the destination and source IP addresses, translating IPv6 addresses to IPv4 addresses. • Tunneling- In tunnel mode, the load balancer sends requests to real servers through an IP tunnel. When a user accesses the virtual server, a packet destined for the virtual IP address arrives, a real server is chosen from the cluster according to the connection scheduling algorithm. Then the load balancer encapsulates the packet within an IP datagram and forwards it to the chosen server. **Note**: For Full NAT, NAT46, and NAT64, the source IP address is replaced by an IP address from the pool you specify with `ippool`. The destination IP address is replaced with the IP address of the backend server selected by the load balancer.
`ippool-list`	If you are configuring a Layer 4 virtual server and enable Full NAT, NAT46, or NAT64, specify a space-separated list of IP address pool configuration objects to be used for SNAT.
`scripting-flag`	Enable by default.
`scripting-list`	Specify a scripting policy configuration object. HTTP/HTTPS only. **Note:** The maximum number of scripts in "`set scripting-list <>`" is 256.

`status`	• enable—The server can receive new sessions. • disable—The server does not receive new sessions and closes any current sessions as soon as possible. • maintain—The server does not receive new sessions but maintains any current connections.
`traffic-log`	Enable to record traffic logs for this virtual server. **Note**: Local logging is constrained by available disk space. We recommend that if you enable traffic logs, you monitor your disk space closely. We also recommend that you use local logging during evaluation and verification of your initial deployment, and then configure remote logging to send logs to a log management repository.
`event-log`	Enable to record event logs for this virtual server.
`trans-rate-limit`	Limit the number of HTTP or SIP requests per second. The default is 0 (disabled). The valid range is 1 to 1,048,567 transactions per second. The system counts each client request against the limit. When the request rate exceeds the limit, the virtual server sends an HTTP 503 error response to the client. **Note**: Not supported for HTTP Turbo profiles.
`waf-profile`	Specify a web application firewall (WAF) profile configuration object. HTTP/HTTPS only.
`warm-rate`	Maximum connection rate while the virtual server is starting up. The default is 10 connections per second. The valid range is 1 to 86,400 connections per second. If Warm Up is 5 and Warm Rate is 2, the number of allowed new connections increases at the following rate: • 1st second—Total of 2 new connections allowed (0+2). • 2nd second—2 new connections added for a total of 4 new connections allowed (2+2). • 3rd second—2 new connections added for a total of 6 new connections allowed (4+2). • 4th second—2 new connections added for a total of 8 new connections allowed (6+2). • 5th second—2 new connections added for a total of 10 new connections allowed (8+2). **Note**: Not supported for SIP profiles.

warm-up	If the server cannot initially handle full connection load when it begins to respond to health checks (for example, if it begins to respond when startup is not fully complete), indicate how long to forward traffic at a lesser rate. The default is 0 (disabled). The valid range is 1 to 86,400 seconds. **Note**: Not supported for SIP profiles.
ssl-mirror	Enable/disable SSL mirroring. When ssl-mirror is enabled, FortiADC will mirror the client HTTPS/TCPS packets traffic by the SSL-mirror-interface port after decrypting the SSL. Note: Use this command send mirror packets of HTTPS or TCPS virtual servers to third-party solutions via the designated network interfaces. See below.
ssl-miror-intf	Specify the outgoing interfaces be ssl-mirror interfaces. You can set up to four outgoing interfaces.
pagespeed	Set PageSpeed to let FortiADC speed up HTTP responses using its Web Performance Optimization solutions.
http2https	Enable/disable redirect HTTP request to HTTPS
http2https-port	HTTP service port list for redirecting HTTP to HTTPS. Format: portA-portB portC portD.
max-persistence-entries	Maximum persistence entries size. This command only works if load-balance-persistence is enabled with type source-address.
schedule-list	Enable/disable schedule pool list.
schedule-pool-list	Specify the schedule-pool.

Example

```
FortiADC-VM # config load-balance virtual-server
FortiADC-VM (virtual-server) # edit lb-vs1
Add new entry 'lb-vs1' for node 1775

config load-balance virtual-server
   edit "l7vs"
      set type l7-load-balance
      set interface port1
      set ip 172.1.1.2
      set traffic-group traffic-group-1
   next
end

config load-balance virtual-server
   edit "VS"
      set type l7-load-balance
```

```
      set interface port3
      set ip 192.168.1.1
      set load-balance-profile LB_PROF_HTTP
      set load-balance-method LB_METHOD_ROUND_ROBIN
      set load-balance-pool pool
      set scripting-flag enable
      set scripting-list HTTP_2_HTTPS_REDIRECTION REWRITE_HOST_n_PATH REDIRECTION_by_
          STATUS_CODE
      set traffic-group default
   next
end


FortiADC-VM (lb-vs1) # get
status : enable
type : l4-load-balance
multi-process : 1
packet-forwarding-method: NAT
interface :
addr-type : ipv4
ip : 0.0.0.0
port : 80
connection-limit : 10000
load-balance-profile:
content-routing : disable
load-balance-persistence:
load-balance-method :
load-balance-pool :
traffic-log : disable
warm-up : 0
warm-rate : 10
connection-rate-limit: 0
id : 0
FortiADC-VM (lb-vs1) # set ip 192.168.200.1
FortiADC-VM (lb-vs1) # set interface port4
FortiADC-VM (lb-vs1) # set load-balance-profile LB_PROF_TCP
FortiADC-VM (lb-vs1) # set load-balance-method LB_METHOD_ROUND_ROBIN
FortiADC-VM (lb-vs1) # set load-balance-pool lb-pool
FortiADC-VM (lb-vs1) # end

FortiADC-VM # get load-balance virtual-server lb-vs1
status : enable
type : l4-load-balance
multi-process : 1
packet-forwarding-method: NAT
interface : port4
addr-type : ipv4
ip : 192.168.200.1
port : 80
connection-limit : 10000
load-balance-profile: LB_PROF_TCP
content-routing : disable
load-balance-persistence:
load-balance-method : LB_METHOD_ROUND_ROBIN
load-balance-pool : lb-pool
traffic-log : disable
warm-up : 0
warm-rate : 10
```

```
connection-rate-limit: 0
id : 1
```

config load-balance web-category

Read-only. Displays the web filter categories imported from FortiGuard. You specify web categories when you create web filter groups with the config load-balance web-filter-profile command.

For information on FortiGuard web categories, go to the FortiGuard website:

http://fortiguard.com/webfilter

Before you begin:

- You must have read permission for load balancing settings.

Example

```
docs-1 # get load-balance web-category
== [ Potentially Liable ]
== [ Adult/Mature Content ]
== [ Bandwidth Consuming ]
== [ Security Risk ]
== [ General Interest - Personal ]
== [ General Interest - Business ]
```

See Also

- config system web-filter

config load-balance web-filter-profile

Use this command to configure web filter profile. The web filter profile should include categories that should not be processed by the outbound L2 SSL forward proxy feature. To address privacy concerns, you can include categories such as "Personal Privacy", "Finance and Banking", "Health and Wellness", and Medicine.

Before you begin:

- You must have read-write permission for load balancing settings.

After you have configured web filter profile, you can specify it in an L2 exception list.

Syntax

```
config load-balance web-filter-profile
   edit <name>
      set description <string>
      config category-members
         edit <No.>
```

```
            set category <datasource>
        next
    end
  next
end
```

description	A string to describe the purpose of the configuration, to help you and other administrators more easily identify its use. Put phrases in quotes. For example: "Customer ABC".
config member	
category	Specify a FortiGuard category or subcategory. Put phrases in quotes. For example: "Personal Privacy".

Example

```
FortiADC-docs # config load-balance web-filter-profile
FortiADC-VM (web-filter-pro~i) # edit fortiguard-categories2passthrough
Add new entry 'fortiguard-categories2passthrough' for node 4622
FortiADC-VM (fortiguard-cat~g) # set description "Finance and Banking Personal Privacy
    Health and Wellness"
FortiADC-VM (fortiguard-cat~g) # config category-members
FortiADC-VM (category-members) # edit 1
Add new entry '1' for node 4625
FortiADC-VM (1) # set category "Finance and Banking"

FortiADC-VM (1) # next
FortiADC-VM (category-members) # edit 2
Add new entry '2' for node 4625
FortiADC-VM (2) # set category "Personal Privacy"
FortiADC-VM (2) # next
FortiADC-VM (category-members) # edit 3
Add new entry '3' for node 4625
FortiADC-VM (3) # set category "Health and Wellness"
FortiADC-VM (3) # next
FortiADC-VM (category-members) # edit 4
Add new entry '4' for node 4625
FortiADC-VM (4) # set category Medicine
FortiADC-VM (4) # end
FortiADC-VM (fortiguard-cat~g) # end
```

config load-balance web-sub-category

Read-only. Displays the web filter subcategories imported from FortiGuard. You specify web subcategories when you create web filter groups with the config load-balance web-filter-profile command.

For information on FortiGuard web categories, go to the FortiGuard website:

http://fortiguard.com/webfilter

Before you begin:

- You must have read permission for load balancing settings.

Example

```
docs-1 # get load-balance web-sub-category
== [ Unrated ]
== [ Drug Abuse ]
== [ Alternative Beliefs ]
== [ Hacking ]
== [ Illegal or Unethical ]
== [ Discrimination ]
== [ Explicit Violence ]
== [ Abortion ]
== [ Other Adult Materials ]
== [ Advocacy Organizations ]
== [ Gambling ]
== [ Extremist Groups ]
== [ Nudity and Risque ]
== [ Pornography ]
== [ Dating ]
== [ Weapons (Sales) ]
== [ Advertising ]
== [ Brokerage and Trading ]
== [ Freeware and Software Downloads ]
== [ Games ]
== [ Web-based Email ]
== [ File Sharing and Storage ]
== [ Streaming Media and Download ]
== [ Malicious Websites ]
== [ Entertainment ]
== [ Arts and Culture ]
== [ Education ]
== [ Finance and Banking ]
== [ Health and Wellness ]
== [ Job Search ]
== [ Medicine ]
== [ News and Media ]
== [ Social Networking ]
== [ Political Organizations ]
== [ Reference ]
== [ Global Religion ]
== [ Search Engines and Portals ]
== [ Shopping ]
== [ General Organizations ]
== [ Society and Lifestyles ]
== [ Sports ]
== [ Travel ]
== [ Personal Vehicles ]
== [ Business ]
== [ Information and Computer Security ]
```

```
== [ Government and Legal Organizations ]
== [ Information Technology ]
== [ Armed Forces ]
== [ Dynamic Content ]
== [ Meaningless Content ]
== [ Web Hosting ]
== [ Marijuana ]
== [ Folklore ]
== [ Proxy Avoidance ]
== [ Phishing ]
== [ Plagiarism ]
== [ Sex Education ]
== [ Alcohol ]
== [ Tobacco ]
== [ Lingerie and Swimsuit ]
== [ Sports Hunting and War Games ]
== [ Web Chat ]
== [ Instant Messaging ]
== [ Newsgroups and Message Boards ]
== [ Digital Postcards ]
== [ Peer-to-peer File Sharing ]
== [ Internet Radio and TV ]
== [ Internet Telephony ]
== [ Child Education ]
== [ Real Estate ]
== [ Restaurant and Dining ]
== [ Personal Websites and Blogs ]
== [ Secure Websites ]
== [ Content Servers ]
== [ Child Abuse ]
== [ Web-based Applications ]
== [ Domain Parking ]
== [ Spam URLs ]
== [ Personal Privacy ]
== [ Dynamic DNS ]
== [ Auction ]
```

See Also

- config system web-filter

config load-balance whitelist

Use this command to configure the Geography IP address whitelist.You use the whitelist to permit requests from clients that otherwise might be denied by the Geography IP address block list. For example, you might have a good reason to block requests from the whole address range for a country, except for the addresses for your known customers.

Before you begin:

- You must have read-write permission for load balancing settings.

After you have configured a Geography IP address whitelist, you can specify it in the virtual server configuration.

Syntax

```
config load-balance geoip-whitelist
   edit <name>
      set description <string>
      set status {enable|disable}
      config whitelist-member
      edit <No.>
         set ip-network <ip&netmask>
      next
   next
end
```

description	A string to describe the purpose of the configuration, to help you and other administrators more easily identify its use. Put phrases in quotes. For example: "Customer ABC".
status	Enable/disable the list.
config whitelist-member	
ip-network	Specify the IP address and CIDR-formatted subnet mask, separated by a forward slash, such as 192.0.2.0/24. Dotted quad formatted subnet masks are not accepted. IPv6 addresses are not supported.

Example

```
FortiADC-VM # config load-balance whitelist

FortiADC-VM (whitelist) # edit demo
Add new entry 'demo' for node 2893

FortiADC-VM (demo) # get
description : IP-geo-white-list
status : enable

FortiADC-VM (demo) # set description "Customer ABC."

FortiADC-VM (demo) # config whitelist-member

FortiADC-VM (whitelist-member) # edit 1
Add new entry '1' for node 2897

FortiADC-VM (1) # get
ip-network : 0.0.0.0/0

FortiADC-VM (1) # set ip-network 192.0.2.0/24
```

```
FortiADC-VM (1) # end

FortiADC-VM (demo) # get
description : "Customer ABC."
status : enable
== [ 1 ]

FortiADC-VM (demo) # end
```

config load-balance http2-profile

This command is used by HTTP or HTTPS profiles. You must enable the HTTP/2 gateway function to use this profile.

Profile	Description
LB_HTTP2_PROFILE_DEFAULT	Set max-concurrent-stream 5, max-receive-window 32767, max-frame-size 16384, header-table-size 4096, max-header-list-size 65536, ssl-constraint enabled.

Syntax

```
config load-balance http2-profile
   edit <profile name>
      set priority-mode best-effort
      set upgrade-mode upgradeable
      set max-concurrent-stream <integer>
      set max-receive-window <integer>
      set max-frame-size <integer>
      set header-table-size <integer>
      set max-header-list-size <integer>
      set ssl-constraint disable/enable
```

Parameter	Description
`header-table-size`	The size of header table for HPACK.
`max-concurrent-stream`	The maximum number of concurrent streams.
`max-frame-size`	The maximum size of a frame.
`max-header-list-size`	The maximum size of the header list.
`max-receive-window`	The maximum size of the receive window.
`priority-mode`	The priority of stream mode.

ssl-constraint	The SSL constraint check.
upgrade-mode	The protocol upgrade to HTTP/2 mode.

Example:

```
config load-balance http2-profile
   edit "http2"
      set priority-mode best-effort
      set upgrade-mode upgradeable
      set max-concurrent-stream 5
      set max-receive-window 32767
      set max-frame-size 16384
      set header-table-size 4096
      set max-header-list-size 65536
      set ssl-constraint disable
   next
end
```

config load-balance pagespeed

Use this command to set which kind of HTTP requests will be handled by PageSpeed and how to accelerate.

Syntax

```
config load-balance pagespeed
   edit <name>
      set file-cache-inode-limit <1-100000>
      set file-cache-size-limit <1-512>
      set profile <datasource>

   config page-control
      edit <id>
         set type include/exclude
         set uri-pattern <uri regex>
      next
   end

   config resource-control
      edit <id>
         set fetch-domain <string>
         set origin-domain-pattern <regex string>
         set rewrite-domain <string>
      next
   end
end
```

Parameter	Description

`file-cache-inode-limit`	The maximum file cache inode.
`file-cache-size-limit`	The maximum file cache size (1M ~512M).
`profile`	The name of the PageSpeed profile.
config page-control	
`Type`	The include/exclude type.
`full-uri-pattern`	The full URI regex, such as http(s)://*example.com/*/htmls/*.html. **Note:** Wildcards include * which matches any 0 or more characters, and ?, which matches exactly one character. Unlike Unix shells, the / directory separator is not special, and can be matched by either * or ?. The resources are always expanded into their absolute form before expanding.
Config resource-control	
`origin-domain-pattern`	The origin domain regex, such as (http(s)://)*.example.com.
`fetch-domain`	The fetch domain string, such as http://www.example.com.
`rewrite-domain`	The rewrite domain string, such as http://www.example.com. **Note:** In the HTTP response body, the HTML sometimes links with certain resource URL. If the resource contain a domain name, FortiADC will perform the activity according to the fetch-domain setting or the rewrite-domain setting.

Example:

```
config load-balance pagespeed
   edit "all"
      set profile all
      set file-cache-inode-limit 10000
      set file-cache-size-limit 128
      config page-control
         edit 1
            set type include
            set uri-pattern *
         next
      end
      config resource-control
      end
   next
end
```

config load-balance pagespeed-profile

Use this command to specify the resources that will be handled by PageSpeed.

Syntax

```
config load-balance pagespeed-profile
   edit <name>
      set html enable/disable
      set css enable/disable
      set image enable/disable
      set combine-css enable/disable
      set max-combine-css-byte <1-10240>
      set jpeg-sampling enable/disable
      set resize-image enable/disable
      set move-css-to-head enable/disable
   next
end
```

Parameter	Description
`html`	Enable/disable HTML optimizer.
`move-css-to-head`	Moves CSS elements above the script tags.
`css`	Enable/disable CSS optimizer.
`combine-css`	Combines multiple CSS elements into one.
`max-combine-css-byte Image`	The maximum number of combined CSS bytes.
`jpeg-sampling`	Reduces the color sampling of .jpeg images to 4:2:0.
`resize-image`	Resizes images when the corresponding img tag specifies a smaller width and height.

Example:

```
config load-balance pagespeed-profile
   edit "all"
      set html enable
      set css enable
      set image enable
      set combine-css enable
      set max-combine-css-byte 4096
      set jpeg-sampling disable
      set resize-image enable
      set move-css-to-head enable
   next
end
```

config load-balance schedule-pool

Use this command to create a new schedule-pool which can control the working real server by schedule-group (config system schedule-group).

Syntax

```
config load-balance schedule-pool
   edit <name>
      set load-balance-pool <datasource>
      set schedule <datasource>
   next
end
```

load-balance-pool	Specify a real server pool.
schedule	Schedule-group (configured by "config system schedule-group").

Example

```
config load-balance schedule-pool
   edit "new"
      set load-balance-pool example-pool
      set schedule example-schedule
   next
end
```

config log

The `config log` commands configure logging.

This chapter is a reference for the following commands:

- "config log fast_report" on page 194
- "config log report" on page 196
- "config log report email" on page 198
- "config log report_queryset" on page 198
- "config log setting fast_stats" on page 200
- "config log setting highspeed" on page 201
- "config log setting local" on page 202
- "config log setting remote" on page 205

config log fast_report

Use this command to configure fast reports.

Before you begin:

- You must have read-write permission for log settings.

Syntax

```
config log fast_report
   edit <Name>
      set module {slb|attack}
      set history_runchart {enable|disable}
      set range {1DAY | 1HOUR | 1MONTH| 1WEEK | 10MINS}
      set traffic_data_type {bytes|sessions}
      set slb_subtype {top_browser | top_dest | top_dev | top_domain | top_os | top_
          referrer | top_session | top_source_country | top_src | top_url }
      set filter_object {srccountry|dstcountry}
      set filter_value <string>
      set topx <integer>
      set topy <integer>
   next
end
```

`module`	Either of the following modules: • slb • attack
`history_runchart`	Enable/disable the history runchart.
`range`	Past day, hour, month, week, or 10 minutes.

traffic_data_type	Query by session count or bytes.
slb_subtype	Query subtype.
filter_object	Filter by source country or destination country. *Optional.*
filter_value	The country to be filtered.
topx	The number of the top x results.
topy	The number of the top y results.

Example

```
FortiADC-VM # config log fast_report
FortiADC-VM (fast_report) # edit fast-report
Add new entry 'fast-report' for node 4590
FortiADC-VM (fast-report) # get
module : slb
history_runchart : disable
range : 10MINS
traffic_data_type : bytes
slb_subtype : top_src
filter_object :
filter_value :
FortiADC-VM (fast-report) # set filter_object srccountry
FortiADC-VM (fast-report) # set filter_value "United States"
FortiADC-VM (fast-report) # end
```

Example

```
FortiADC-VM # config log fast_report
FortiADC-VM (fast_report) # edit "all_attack"
Add new entry 'all_attack' for node 4590
FortiADC-VM (all_attack) # set module attack
FortiADC-VM (all_attack) # set history_runchart enable
FortiADC-VM (all_attack) # set attack_sort_type count
FortiADC-VM (all_attack) # set attack_subtype top_attack_type_for_all
FortiADC-VM (all_attack) # unset filter_object
FortiADC-VM (all_attack) # unset filter_value
FortiADC-VM (all_attack) # set topx 5
FortiADC-VM (all_attack) # set topy 5
FortiADC-VM (all_attack) # get
module : attack
history_runchart : enable
attack_sort_type : count
attack_subtype : top_attack_type_for_all
filter_object :
filter_value :
topx : 5
topy : 5
FortiADC-VM (all_attack) #set filter_object srccountry
```

```
FortiADC-VM (all_attack) # set filter_value "United States"
FortiADC-VM (all_attack) # end
```

config log report

Use this command to configure on-demand or scheduled reports.

Before you begin:

- You must have read-write permission for log settings.

Syntax

```
config log report
   edit <name>
      set email-format pdf
      set email-attachname <string>
      set email-body <string>
      set email-compress {enable|disable}
      set email-subject <string>
      set on-schedule {enable|disable}
      set period-relative {absolute|last-2-weeks|last-7-days|last-14-days|last-30-
          days|last-N-days|last-N-hours|last-N-weeks| last-month|last-quarter|last-
          week|this-month|this-quarter|this-week|this-year|today|yesterday}
      set period-absolute-from <YYYY-MM-DD-HH:MM:SS>
      set period-absolute-to <YYYY-MM-DD-HH:MM:SS>
      set queryset <datasource>
      set schedule-hour <integer>
      set schedule-type {daily|weekdays}
      set schedule-weekdays {friday monday saturday sunday thursday tuesday wednesday}
   next
end
```

email-format	Attachment format. Only PDF is supported. If you schedule reports and set this option, the report is sent on schedule to all addresses in the config log report email list.
email-attachname	Filename for attachment.
email-body	Message body.
email-compress	Enable/disable compression of the attachment.
email-subject	Message subject.
on-schedule	Enable/disable reporting on schedule.
period-relative	Report period relative to the time it is generated.

period-absolute-from	If period-relative is set to absolute, specify from and to timestamps for one-time reports for a specified time range.
period-absolute-to	
queryset	Specify a space-separated list of queries to include in the report attachment. There are many predefined queries, and you can configure user-defined queries with the config log report_queryset command.
schedule-hour	0-23.
schedule-type	Daily or on specified days.
schedule-weekdays	If you do not schedule the report daily, specify the days on which to run it.

Example

```
FortiADC-docs # config log report
FortiADC-docs (report) # edit my_report
Add new entry 'my_report' for node 1962

FortiADC-docs (my_report) # get
on-schedule : enable
queryset :
email-format :
period-relative : yesterday
schedule-type : schedule-hour : 12

FortiADC-docs (my_report) # set queryset ?
<datasource> query list
SLB-Top-Policy-By-Bytes log.report_queryset
SLB-Top-Source-By-Bytes log.report_queryset
SLB-Top-Source-Country-By-Bytes log.report_queryset
SLB-History-Flow-By-Bytes log.report_queryset
LLB-Top-Link-by-Bytes log.report_queryset
LLB-History-Flow-By-Bytes log.report_queryset
DNS-Top-Policy-by-Count log.report_queryset
DNS-Top-Source-by-Count log.report_queryset
Attack-Top-Destination-For-IPReputation-By-Count log.report_queryset
Attack-Top-Source-For-IPReputation-By-Count log.report_queryset
Attack-Top-Source-Country-For-IPReputation-By-Count log.report_queryset
Attack-Top-Destination-For-GEO-By-Count log.report_queryset
Attack-Top-Source-For-GEO-By-Count log.report_queryset
Attack-Top-Source-Country-For-GEO-By-Count log.report_queryset
Attack-Top-Destination-For-WAF-By-Count log.report_queryset
Attack-Top-Source-For-WAF-By-Count log.report_queryset
Attack-Top-Source-Country-For-WAF-By-Count log.report_queryset
Attack-Top-Destination-For-Synflood-By-Count log.report_queryset
Event-Top-Admin-Login-By-Count log.report_queryset
Event-Top-Failed-Admin-Login-By-Count log.report_queryset
Event-Top-Admin-Config-By-Count log.report_queryset

FortiADC-docs (my_report) # set queryset SLB-Top-Source-Country-By-Bytes Attack-Top-
    Source-Country-For-WAF-By-Count
```

```
FortiADC-docs (my_report) # set email-format pdf

FortiADC-docs (my_report) # set schedule-type daily

FortiADC-docs (my_report) # set email-attachname "Daily_Country_Report"

FortiADC-docs (my_report) # set email-body "This report was sent by your website admin.
    Please contact admin@example.com to request changes to daily report metrics."

FortiADC-docs (my_report) # get
on-schedule : enable
queryset : SLB-Top-Source-Country-By-Bytes Attack-Top-Source-Country-For-WAF-By-Count
email-format : pdf
email-subject : "Daily Country Report" email-body : "This report was sent by your website
    admin. Please contact admin@example.com to request changes to daily report metrics."
email-attachname : Daily_Country_Report
email-compress : enable period-relative : yesterday
schedule-type : daily schedule-hour : 12

FortiADC-docs (my_report) # end
```

config log report email

Use this command to add email addresses for alert recipients.

Before you begin, make sure you have read-write permission for log settings.

Syntax

```
config log report_email
   edit <name>
      set from <string>
      set to <string>
   next
end
```

from	The sender's email address to be used in report email
to	The recipient's email address to be used in report email.

config log report_queryset

Use this command if you need to configure report queries that are different from the predefined queries.

Before you begin:

- You must have read-write permission for log settings.

After you have configured a query, you can select it in the report configuration.

Syntax

```
config log report_queryset
   edit <name>
      set module {attack|dns|event|llb|slb}
      set attack_sort_type count
      set attack_subtype {top_destip_for_geo|top_destip_for_ipreputation|top_destip_for_
          sysflood|top_destip_for_waf|top_source_country_for_geo|top_source_country_for_
          ipreputation|top_source_country_for_waf|top_source_for_geo|top_source_for_
          ipreputation|top_source_for_waf}
      set dns_sort_type count
      set dns_subtype {top_policy|top_source}
      set event_sort_type count
      set event_subtype {top_admin_config|top_admin_login|top_failed_admin_login}
      set llb_subtype {top_link|slb_history_flow}
      set slb_subtype {slb_history_flow|top_policy|top_source|top_source_country}
      set traffic_data_type {sessions|bytes}
   next
end
```

module	Set the reporting module. This setting also filters the commands so that only relevant options are available.
attack_sort_type	Results are ordered by count.
attack_subtype	Key query term.
dns_sort_type	Results are ordered by count.
dns_subtype	Key query term.
event_sort_type	Results are ordered by count.
event_subtype	Key query term.
llb_subtype	Key query term.
slb_subtype	Key query term.
traffic_data_type	Query by session count or bytes.

Example

```
FortiADC-docs # config log report_queryset
FortiADC-docs (report_queryset) # edit my_slb_query
Add new entry 'my_slb_query' for node 2514

FortiADC-docs (my_slb_query) # get
module : slb
traffic_data_type : bytes
slb_subtype : top_policy
```

```
FortiADC-docs (my_slb_query) # set slb_subtype ?
slb_history_flow slb_history_flow
top_policy top_policy
top_source top_source
top_source_country top_source_country

FortiADC-docs (my_slb_query) # set slb_subtype top_source_country

FortiADC-docs (my_slb_query) # next

FortiADC-docs (report_queryset) # edit my_attack_query
Add new entry 'my_attack_query' for node 2514

FortiADC-docs (my_attack_query) # set module attack
FortiADC-docs (my_attack_query) # set attack_subtype ?
top_destip_for_geo top_destip_for_geo
top_destip_for_ipreputation top_destip_for_ipreputation
top_destip_for_sysflood top_destip_for_sysflood
top_destip_for_waf top_destip_for_waf
top_source_country_for_geo top_source_country_for_geo
top_source_country_for_ipreputation top_source_country_for_ipreputation
top_source_country_for_waf top_source_country_for_waf
top_source_for_geo top_source_for_geo
top_source_for_ipreputation top_source_for_ipreputation
top_source_for_waf top_source_for_waf

FortiADC-docs (my_attack_query) # set attack_subtype top_source_country_for_waf

FortiADC-docs (my_attack_query) # get
module : attack
attack_sort_type : count
attack_subtype : top_source_country_for_waf

FortiADC-docs (my_attack_query) # end
FortiADC-docs #
```

config log setting fast_stats

Use this command to enable or disable real-time statistics collection for fast reports. Enabled by default. Can be disabled if you encounter issues.

Before you begin:

- You must have read-write permission for log settings.

Syntax

```
config log setting fast_stats
   set status {enable|disable}
   set traffic-log-status {enable|disable}
   set traffic-log-category slb
   set attack-log-status {enable|disable}
   set attack-log-category synflood
   ipreputation waf geo av
```

```
end
```

status	Enable/disable fast statistics. Disabled by default.
traffic-log-status	Enable/disable fast statistics for traffic logs. Disabled by default.
traffic-log-category	Enable/disable fast statistics for traffic categories. SLB is enabled by default.
attack-log-status	Enable/disable fast statistics for attack logs. Disabled by default.
attack-log-category	Enable/disable fast statistics for attack categories. Syn flood, IP reputation, WAF, GEO, and AV are enabled by default.

Example

```
docs-2 # config log setting fast_stats
docs-2 (fast_statis) # get
status : enable
traffic-log-status : enable
traffic-log-category : slb
attack-log-status : enable
attack-log-category : synflood ipreputation waf geo
```

config log setting highspeed

Use this command to configure high speed logging.

The high speed log feature is intended for deployments that require a high volume of logging activity. The logs are sent in binary format so they can be sent at a high speed. If you want to use high speed logging, contact Fortinet to obtain a utility for handling the binary format.

The feature supports traffic logs. Event logs and security logs are not supported.

Before you begin:

- You must have read-write permission for log settings.

Syntax

```
config log setting highspeed
   set server <string>
   set status {enable | disable}
   set traffic-log-status {enable | disable}
   set traffic-log-category {slb|dns}
   set udpport <integer>
end
```

server	IP address of the syslog server.
status	Enable/disable the configuration.

traffic-log-status	Enable/disable logging for traffic processed by the load balancing modules.
traffic-log-category	• slb—Send server load balancing logs. • dns—Send global load balancing logs.
udpport	Listening port number of the syslog server. Usually this is UDP port 514.

config log setting local

Use this command to configure basic log settings.

The local log is a datastore hosted on the FortiADC system.

Typically, you use the local log to capture information about system health and system administration activities. We recommend that you use local logging during evaluation and verification of your initial deployment, and then configure remote logging to send logs to a log management repository where they can be stored long term and analyzed using preferred analytic tools.

Local log disk settings are configurable. You can select a subset of system events, traffic, and security logs.

Before you begin:

- You must have read-write permission for log settings.

Syntax

```
config log setting local
   set attack-log-cached-lines {0|100|500|800|1000|2000|5000|10000}
   set attack-log-category {synflood ipreputation waf geo}
   set attack-log-status {enable|disable}
   set disk-full {overwrite | nolog}
   set event-log-cached-lines {0|100|500|800|1000|2000|5000|10000}
   set event-log-category {admin configuration fw glb health-check llb slb system user}
   set event-log-status {enable|disable}
   set loglevel {alert | critical | debug | emerge | error | information | notification |
       warning}
   set rate_limit <integer>
   set rotation-size <integer>
   set status {enable|disable}
   set traffic-log-cached-lines {0|100|500|800|1000|2000|5000|10000}
   set traffic-log-category {slb dns}
   set traffic-log-status {enable|disable}
   set script-log-status {enable|disable}
   set script-log-category {slb}
end
```

attack-log-cached-lines	Limit the number of logs that are cached. The default is 0 (disabled). Valid multiples are 100, 500, 800, 1000, 2000, 5000, 10000. If 0, every generated log is written to disk immediately. If 1000, logs are written to disk in batches of 1000.

attack-log-category	• synflood— SYN flood protection logs. • ipreputation— IP Reputation logs. • waf—WAF logs. • geo—Geo logs.
attack-log-status	Enable/disable logging for the category.
disk-full	Specify log behavior when the maximum disk space for local logs (30% of total disk space) is reached: • overwrite—Continue logging. Overwrite the earliest logs. • nolog—Stop logging.
event-log-cached-lines	Limit the number of logs that are cached. The default is 0 (disabled). Valid multiples are 100, 500, 800, 1000, 2000, 5000, 10000. If 0, every generated log is written to disk immediately. If 1000, logs are written to disk in batches of 1000.
event-log-category	Select the types of events to collect in the local log: • Configuration—Configuration changes. • Admin—Administrator actions. • System—System operations, warnings, and errors. • User—Authentication results logs. • Health Check—Health check results and client certificate validation check results. • SLB—Notifications, such as connection limit reached. • LLB—Notifications, such as bandwidth thresholds reached. • GLB—Notifications, such as the status of associated local SLB and virtual servers. • Firewall—Notifications for the "firewall" module, such as SNAT source IP pool is using all of its addresses.
event-log-status	Enable/disable logging for the category.

`loglevel`	Specify the lowest severity for which alerts are sent: • Emergency—The system has become unstable. • Alert—Immediate action is required. • Critical—Functionality is affected. • Error—An error condition exists and functionality could be affected. • Warning—Functionality might be affected. • Notification—Information about normal events. • Information—General information about system operations. • Debug—Detailed information about the system that can be used to troubleshoot unexpected behavior. For example, if you select `error`, the system sends alerts with level Error, Critical, Alert, and Emergency. If you select `alert`, the system sends alerts with level Alert and Emergency.
`rate_limit`	Rate limit logging (logs/second). The default is 0 (disabled).
`rotation-size`	Maximum size for a local log file. The default is 200 MB. When the current log file reaches this size, a new file is created.
`status`	Enable/disable local logging.
`traffic-log-cached-lines`	Limit the number of logs that are cached. The default is 0 (disabled). Valid multiples are 100, 500, 800, 1000, 2000, 5000, 10000. If 0, every generated log is written to disk immediately. If 1000, logs are written to disk in batches of 1000.
`traffic-log-category`	• SLB—Server Load Balancing traffic logs related to sessions and throughput. • GLB—Global Load Balancing traffic logs related to DNS requests.
`traffic-log-status`	Enable/disable logging for the category.
`script-log-status`	Enable/disable script log.
`script-log-category`	Set script log category.

Example

```
FortiADC-VM (root) # get log setting local
status : enable
rotation-size : 199
disk-full : overwrite
loglevel : information
event-log-status : enable
event-log-category : configuration admin health_check system user slb llb glb fw
traffic-log-status : enable
traffic-log-category : slb dns
attack-log-status : enable
```

```
attack-log-category : synflood ipreputation waf geo
script-log-status : enable
script-log-category : slb
event-log-cached-lines : 0
traffic-log-cached-lines : 0
attack-log-cached-lines : 0
rate_limit : 0
```

config log setting remote

Use this command to configure logging to a remote syslog server.

A remote syslog server is a system provisioned specifically to collect logs for long term storage and analysis with preferred analytic tools.

Before you begin:

- You must have read-write permission for log settings.

Syntax

```
config log setting remote
   edit <name>
      set attack-log-status {enable|disable}
      set attack-log-category {synflood ipreputation waf geo}
      set comma-separated-value {enable|disable}
      set event-log-status {enable|disable}
      set event-log-category {admin configuration fw glb health-check llb slb system user}
      set facility {alert | audit | auth | authpriv | clock | cron | daemon | ftp | kern |
          local0, local1, local2, local3, local4, local5, local6, local7, lpr, mail, news,
          ntp}
      set loglevel {alert | critical | debug | emerge | error | information | notification
          | warning}
      set port <integer>
      set server <string>
      set status {enable|disable}
      set traffic-log-status {enable|disable}
      set traffic-log-category {slb dns}
      set script-log-status {enable|disable}
      set script-log-category {slb}
   next
end
```

`attack-log-status`	Enable/disable logging for security events.
`attack-log-category`	• synflood—SYN flood protection logs. • ipreputation—IP Reputation logs. • waf—WAF logs. • geo—Geo IP logs

`comma-separated-value`	Send logs in CSV format. Do not use with FortiAnalyzer.
`event-log-status`	Enable/disable logging for system events.
`event-log-category`	Select the types of events to collect in the local log: • Configuration—Configuration changes. • Admin—Administrator actions. • System—System operations, warnings, and errors. • User—Authentication results logs. • Health Check—Health check results and client certificate validation check results. • SLB—Notifications, such as connection limit reached. • LLB—Notifications, such as bandwidth thresholds reached. • GLB—Notifications, such as the status of associated local SLB and virtual servers. • Firewall—Notifications for the "firewall" module, such as SNAT source IP pool is using all of its addresses.
`facility`	Identifier that is not used by any other device on your network when sending logs to FortiAnalyzer/syslog.
`loglevel`	Specify the lowest severity for which alerts are sent: • Emergency—The system has become unstable. • Alert—Immediate action is required. • Critical—Functionality is affected. • Error—An error condition exists and functionality could be affected. • Warning—Functionality might be affected. • Notification—Information about normal events. • Information—General information about system operations. • Debug—Detailed information about the system that can be used to troubleshoot unexpected behavior. For example, if you select `error`, the system sends alerts with level Error, Critical, Alert, and Emergency. If you select `alert`, the system sends alerts with level Alert and Emergency.
`port`	Listening port number of the syslog server. Usually this is UDP port 514.
`server`	IP address of the syslog server.
`status`	Enable/disable the configuration.
`traffic-log-status`	Enable/disable logging for traffic processed by the load balancing modules.

traffic-log-category	• SLB—Server Load Balancing traffic logs related to sessions and throughput. • GLB—Global Load Balancing traffic logs related to DNS requests.
script-log-status	Enable/disable script log.
script-log-category	Specify the script log category.

Example

```
FortiADC-VM # config log setting remote
FortiADC-VM (remote) # edit 1
Add new entry '1' for node 547

FortiADC-VM (1) # get
status : disable
server :
port : 514
loglevel : information
comma-separated-value: disable
facility : kern
event-log-status : disable
traffic-log-status : disable
attack-log-status : disable

FortiADC-VM (1) # set status enable
FortiADC-VM (1) # set server 203.0.113.10
FortiADC-VM (1) # set loglevel notification

FortiADC-VM (1) # set event-log-status enable
FortiADC-VM (1) # set event-log-category admin app configuration system

FortiADC-VM (1) # set traffic-log-status enable
FortiADC-VM (1) # set traffic-log-category slb dns
FortiADC-VM (1) # end

FortiADC-VM # get

FortiADC-VM # get log setting remote
== [ 1 ]
status: enable
server: 203.0.113.10
port: 514
loglevel: notification
facility: kern

FortiADC-VM # show log setting remote
config log setting remote
edit 1
set server 203.0.113.10
set loglevel notification
set event-log-status enable
set event-log-category configuration admin app system
set traffic-log-status enable
set traffic-log-category slb dns
```

```
next
end

FortiADC-VM (root) # get log setting remote
== [ 1 ]
status: enable
server: 192.0.2.1
port: 514
loglevel: information
facility: kern
FortiADC-VM (root) #
```

config router

This chapter is a reference for the following commands:

- "config router isp" on page 209
- "config router md5-ospf" on page 210
- "config router ospf" on page 211
- "config router policy" on page 216
- "config router setting" on page 217
- "config router static" on page 219

config router isp

Network systems maintain route tables to determine where to forward TCP/IP packets. Use this command to configure ISP routes. ISP routes can be used for outbound traffic and link load balancing traffic.

Routes for outbound traffic are chosen according to the following priorities:

1. Link local routes—Self-traffic uses link local routes.
2. LLB policy route—Configured policy routes have priority over default routes.
3. System policy route—Configured policy routes have priority over default routes.
4. Static route / ISP route / OSPF route—Priority is based on the distance metric. By default, distance for static routes is 10, for ISP routes is 20, and for OSPF routes is 110. The distance metric is configurable for static routes and OSPF routes, but not ISP routes.
5. Default LLB route—Default routes have lower priority than configured routes.
6. Default static route / OSPF route—Default routes have lower priority than configured routes.

Before you begin:

- You must have read-write permission for system settings.

Note: Adding a new ISP route does not affect existing sessions. Deleting or editing an ISP route causes the related sessions to be re-created.

Syntax

```
config router isp
   edit <No.>
      set destination <datasource>
      set gateway <class_ip>
   next
end
```

`destination`	Specify an ISP address book configuration object. **Note**: Two ISP routes cannot reference the same ISP address book. The ISP routing feature does not support multipath routing.

gateway	IP address of the gateway router that can route packets to the destination IP address that you have specified.

Example

```
FortiADC-VM # config router isp
```

See also

- get router info routing-table

config router md5-ospf

Use this command to configure a table of MD5 keys used in OSPF cryptographic authentication. The table can include up to 256 entries. All OSPF interfaces that want to learn routes from each other must be configured with the same authentication type and password or MD5 key (one match is enough).

OSPF cryptographic authentication involves the use of a shared secret key to authenticate all router traffic on a network. The key is never sent over the network in the clear—a packet is sent and a condensed and encrypted form of the packet is appended to the end of the packet. A non-repeating sequence number is included in the OSPF packet to protect against replay attacks that could try to use already sent packets to disrupt the network. When a packet is accepted as authentic, the authentication sequence number is set to the packet sequence number. If a replay attack is attempted, the packet sent will be out of sequence and ignored.

Before you begin:

- You must have read-write permission for router settings.

After you have configured an MD5 key configuration object, you can specify it in the OSPF router configuration.

Syntax

```
config router md5-ospf
   edit <name>
      config md5-member
         edit <No.>
            set md5-key <string>
         next
      end
   next
end
```

<No.>	A number 1-255. Each member key ID must be unique to its member list.
md5-key	A string of up to 16 characters to be hashed with the cryptographic MD5 hash function.

Example

```
FortiADC-docs # config router md5-ospf
FortiADC-docs (md5-ospf) # edit md5-key-pool
Add new entry 'md5-key-pool' for node 3752
FortiADC-docs (md5-key-pool) # config md5-member
FortiADC-docs (md5-member) # edit 1
Add new entry '1' for node 3754
FortiADC-docs (1) # set key 0123456789abcdef
FortiADC-docs (1) # end
FortiADC-docs (md5-key-pool) # end
FortiADC-docs #
```

config router ospf

Use this command to configure OSPF. FortiADC supports OSPF version 2. OSPF (Open Shortest Path First) is described in RFC2328.

OSPF is a link-state interior routing protocol. Compared with RIP, OSPF can provide scalable network support and faster convergence times. OSPF is widely used in large networks such as ISP backbone and enterprise networks.

Before you begin:

- You must have read-write permission for router settings.

Syntax

```
config router ospf
   set router-id <integer>
   set default-metric <integer>
   set distance <integer>
   set default-information-originate {always|enable|disable}
   set default-information-metric-type {1|2}
   set default-information-metric <integer>
   set redistribute-connected {enable|disable}
   set redistribute-connected-metric-type {1|2}
   set redistribute-connected-metric <integer>
   set redistribute-static {enable|disable}
   set redistribute-static-metric-type {1|2}
   set redistribute-static-metric <integer>
   config area
      edit <class_ip>
         set authentication {md5|none|text}
      next
   end
   config network
      edit <No.>
         set area <datasource>
         set prefix <ip&netmask>
      next
   end
```

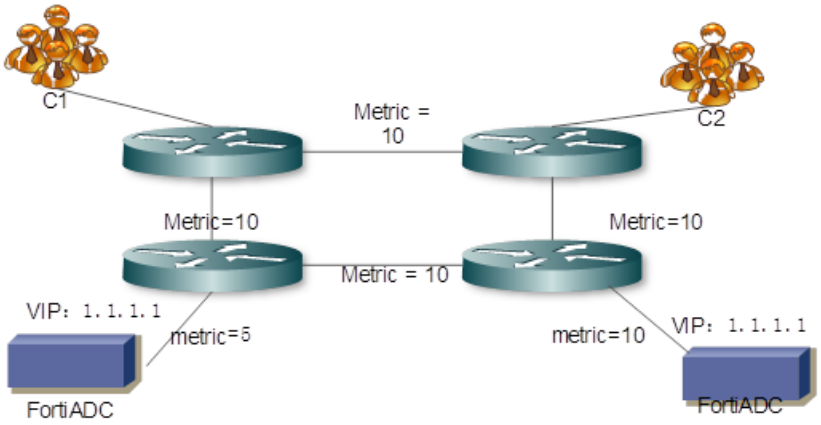
```
    config ospf-interface
       edit <name>
          set authentication {md5|none|text}
          set authentication-md5 <datasource>
          set authentication <text>
          set cost <integer>
          set dead-interval <integer>
          set hello-interval <integer>
          set interface <datasource>
          set mtu-ignore {enable|disable}
          set network-type {broadcast | point-to-multipoint | point-to-point}
          set priority <integer>
          set retransmit-interval <integer>
          set transmit-delay <integer>
       next
    end
  end
```

router-id	32-bit number that identifies the router. The router ID uses dotted decimal notation. sets the router-ID of the OSPF process. The router-ID must be an IP address of the router, and it must be unique within the entire OSPF domain to the OSPF speaker.
default-metric	The default is 10.
distance	The default is 110.
default-information-originate	• enable—Originate an AS-External (type-5) LSA describing a default route into all external routing capable areas of the specified metric and metric type. • always—The default is always advertised, even when there is no default present in the routing table. • disable
default-information-metric-type	• 1 • 2
default-information-metric	The default is -1.
redistribute-connected	Enable/disable to redistribute connected routes into OSPF, with the metric type and metric set if specified. Redistributed routes are distributed into OSPF as Type-5 External LSAs into links to areas.
redistribute-connected-metric-type	• 1 • 2
redistribute-connected-metric	Specify a metric.

redistribute-static	Enable/disable to redistribute static routes into OSPF, with the metric type and metric set if specified. Redistributed routes are distributed into OSPF as Type-5 External LSAs into links to areas.
redistribute-static-metric-type	• 1 • 2
redistribute-static-metric	Specify a metric.
config area	
<class_id>	32-bit number that identifies the OSPF area. An OSPF area is a smaller part of the larger OSPF AS. Areas are used to limit the link-state updates that are sent out. The flooding used for these updates would overwhelm a large network, so it is divided into these smaller areas for manageability.
authentication	Specify an authentication type: • none—Also called null authentication. No authentication is used. In this case the 16-byte Authentication field is not checked, and can be any value. However checksumming is still used to locate errors. • text—A simple password is used. The password is a plain text string of characters. The same password is used for all transactions on a network. The main use of this type of authentication is to prevent routers from accidently joining the network. Simple password authentication is vulnerable to many forms of attack, and is not recommended as a secure form of authentication. • md5—Use OSPF cryptographic authentication. A shared secret key is used to authenticate all router traffic on a network. The key is never sent over the network in the clear—a packet is sent and a condensed and encrypted form of the packet is appended to the end of the packet. A non-repeating sequence number is included in the OSPF packet to protect against replay attacks that could try to use already sent packets to disrupt the network. When a packet is accepted as authentic, the authentication sequence number is set to the packet sequence number. If a replay attack is attempted, the packet sent will be out of sequence and ignored.
config network	
area	Specify an area configuration name.
prefix	Address/mask notation to specify the subnet.
config ospf-interface	

authentication	Specify an authentication type. All OSPF interfaces that want to learn routes from each other must be configured with the same authentication type and password or MD5 key (one match is enough). Options are: • none—Use the authentication type referenced by the area included in the network configuration. • md5—Override the authentication type referenced by the area included in the network configuration with the MD5 configuration specified here. • text—Override the authentication type referenced by the area included in the network configuration with the text configuration specified here.
authentication-md5	Specify an MD5 configuration name.
authentication-text	Specify a password string. Passwords are limited to 8 characters.
cost	Set link cost for the specified interface. The cost value is set to router-LSA's metric field and used for SPF calculation. The default is 0.
dead-interval	Number of seconds for RouterDeadInterval timer value used for Wait Timer and Inactivity Timer. This value must be the same for all routers attached to a common network. The default is 40 seconds.
hello-interval	Number of seconds between hello packets sent on the configured interface. This value must be the same for all routers attached to a common network. The default is 10 seconds.
interface	Specify the interface to enable OSPF for it.
mtu-ignore	Enable/disable to ignore the interface MTU. Disabled by default.
network-type	• broadcast • point-to-point • point-to-multipoint
priority	The router with the highest priority will be more eligible to become Designated Router. Setting the value to 0 makes the router ineligible to become Designated Router. The default is 1.
retransmit-interval	Interval for retransmitting Database Description and Link State Request packets. The default is 5 seconds.
transmit-delay	Increment LSA age by this value when transmitting. The default is 1 second.

Example



FortiADC1

```
FortiADC-VM # config router ospf
FortiADC-VM (ospf) # set router-id 1.1.1.2
FortiADC-VM (ospf) # set default-metric 5
FortiADC-VM (ospf) # config network
FortiADC-VM (network) # edit 1
Add new entry '1' for node 2090
FortiADC-VM (1) # set prefix 1.1.1.1/32
FortiADC-VM (1) # set area 0.0.0.0
FortiADC-VM (1) # end

FortiADC-VM (ospf) # get
router-id : 1.1.1.2
default-information-originate: disable
default-information-metric: -1
default-information-metric-type: 2
default-metric : 5
distance : 110
redistribute-connected: disable
redistribute-connected-metric: -1
redistribute-connected-metric-type: 2
redistribute-static : disable
redistribute-static-metric: -1
redistribute-static-metric-type: 2
== [ 1 ]

FortiADC-VM (ospf) # show
config router ospf
set router-id 1.1.1.2
set default-metric 5
config network
edit 1
set prefix 1.1.1.1/32
next
end
config ospf-interface
end
```

```
end
```

FortiADC2

```
FortiADC-VM # config router ospf
FortiADC-VM (ospf) # set router-id 1.1.1.3
FortiADC-VM (ospf) # config network
FortiADC-VM (network) # edit 1
Add new entry '1' for node 2090
FortiADC-VM (1) # set prefix 1.1.1.1/32
FortiADC-VM (1) # set area 0.0.0.0
FortiADC-VM (1) # end

FortiADC-VM (ospf) # get
router-id : 1.1.1.2
default-information-originate: disable
default-information-metric: -1
default-information-metric-type: 2
default-metric : 10
distance : 110
redistribute-connected: disable
redistribute-connected-metric: -1
redistribute-connected-metric-type: 2
redistribute-static : disable
redistribute-static-metric: -1
redistribute-static-metric-type: 2
== [ 1 ]

FortiADC-VM (ospf) # show
config router ospf
set router-id 1.1.1.2
config network
edit 1
set prefix 1.1.1.1/32
next
end
config ospf-interface
end
end
```

See Also

- config router md5-ospf
- get router info ospf

config router policy

Network systems maintain route tables to determine where to forward TCP/IP packets. Use this command to configure system policy routes. Policy routes are based on IP layer values, specifically the source and/or destination fields.

Routes for outbound traffic are chosen according to the following priorities:

1. Link local routes—Self-traffic uses link local routes.
2. LLB policy route—Configured policy routes have priority over default routes.
3. System policy route—Configured policy routes have priority over default routes.
4. Static route / ISP route / OSPF route—Priority is based on the distance metric. By default, distance for static routes is 10, for ISP routes is 20, and for OSPF routes is 110. The distance metric is configurable for static routes and OSPF routes, but not ISP routes.
5. Default LLB route—Default routes have lower priority than configured routes.
6. Default static route / OSPF route—Default routes have lower priority than configured routes.

The system evaluates policy routes, then static routes. The packets are routed to the first route that matches. The policy route table, therefore, need not include a “default route” for packets that do not match your policy because those packets can be forwarded to the default route set in the static route table.

Most policy route settings are optional, so a matching route might not provide enough information to forward the packet. In that case, the FortiADC appliance may refer to the routing table in an attempt to match the information in the packet header with a route in the routing table. For example, if the destination address is the only match criteria in the policy route, the FortiADC appliance looks up the IP address of the next-hop router in its routing table. This situation could occur when interfaces are dynamic (such as DHCP or PPPoE) and you do not want or are unable to specify a static IP address of the next-hop router.

Before you begin:

- You must have read-write permission for system settings.

Syntax

```
config router policy
   edit <No.>
      set destination <ip&netmask>
      set gateway <class_ip>
      set source <ip&netmask>
   next
end
```

`destination`	Address/mask notation to match the destination IP in the packet header. To match any value, leave it blank or enter 0.0.0.0/32.
`gateway`	IP address of the gateway router that can route packets to the destination IP address that you have specified.
`source`	Address/mask notation to match the source IP in the packet header. To match any value, either leave it blank or enter 0.0.0.0/32.

config router setting

Use this command to change basic routing settings. However, the default settings are recommended for most deployments.

Before you begin:

- You must have read-write permission for system settings.

Syntax

```
config router setting
   set ip-forward {enable | disable}
   set ip6-forward {enable | disable}
   set rt-cache-reverse {enable | disable}
   set rt-cache-strict {enable | disable}
   config rt-cache-reverse-exception
      edit <No.>
         set ip-netmask <ip&netmask>
      next
   end
end
```

ip-forward	Enabled by default. Do not disable under normal circumstances. If disabled, functions related to routing, like link loadbalancing, static routing, policy routing, and OSPF routing cannot function.
ip6-forward	Enabled by default. Do not disable under normal circumstances. If disabled, functions related to routing, like link loadbalancing, static routing, policy routing, and OSPF routing cannot function.
rt-cache-reverse	When enabled, forwards reply packets to the ISP link that forwarded the corresponding request packet. When not enabled, forwards all packets based on the results of routing lookup. The rt-cache-reverse function is useful when your site gets traffic routed to it from multiple ISP links. Enabled by default.
rt-cache-strict	Enable it when you want to send reply packets only via the same interface that received the request packets. When enabled, source interface becomes part of the matching tuple FortiADC uses to identify sessions, so reply traffic is forwarded from the same interface that received the traffic. Normally each session is identified by a 5-tuple: source IP, destination IP, protocol, source port, and destination port. Disabled by default.
config rt-cache-reverse-exception	
ip-netmask	If rt-cache-reverse is enabled, you can specify source IP addresses that should be handled differently. Specify a subnet IP address and netmask for each exception. For example, if you configure an exception for 192.168.1.0/24, FortiADC will not maintain a pointer to the ISP for traffic from source 192.168.1.18. Reply packets will be forwarded based on the results of routing lookup.

Example

```
FortiADC-VM # config route setting
FortiADC-VM (setting) # get
rt-cache-strict : disable
rt-cache-reverse : enable
ip-forward : enable
ip6-forward : enable

FortiADC-VM (setting) # config rt-cache-reverse-exception
FortiADC-VM (rt-cache-rever~e) # edit 1
Add new entry '1' for node 3740
FortiADC-VM (1) # set ip-netmask 192.168.0.1/24
FortiADC-VM (1) # end
FortiADC-VM (setting) # end
```

config router static

Network systems maintain route tables to determine where to forward TCP/IP packets. Use this command to configure static routes. Static routes are based on destination IP addresses.

Routes for outbound traffic are chosen according to the following priorities:

1. Link local routes—Self-traffic uses link local routes.
2. LLB Link Policy route—Configured policy routes have priority over default routes.
3. Policy route—Configured policy routes have priority over default routes.
4. Static route / ISP route / OSPF route—Priority is based on the distance metric. By default, distance for static routes is 10, for ISP routes is 20, and for OSPF routes is 110. The distance metric is configurable for static routes and OSPF routes, but not ISP routes.
5. Default LLB Link Policy route—Default routes have lower priority than configured routes.
6. Default static route / OSPF route—Default routes have lower priority than configured routes.

The system evaluates policy routes, then static routes. The packets are routed to the first route that matches. The static route table, therefore, is the one that must include a “default route” to be used when no more specific route has been determined.

Static routes specify the IP address of a next-hop router that is reachable from that network interface. Routers are aware of which IP addresses are reachable through various network pathways, and can forward those packets along pathways capable of reaching the packets’ ultimate destinations. The FortiADC system itself does not need to know the full route, as long as the routers can pass along the packet.

You must configure at least one static route that points to a router, often a router that is the gateway to the Internet. You might need to configure multiple static routes if you have multiple gateway routers, redundant ISP links, or other special routing cases.

Before you begin:

- You must have read-write permission for system settings.

Syntax

```
config router static
   edit <No.>
```

```
        set destination <ip&netmask>
        set distance <integer>
        set gateway <class_ip>
    next
end
```

destination	Address/mask notation to match the destination IP in the packet header. Specify 0.0.0.0/0 or ::/0 to set a default route for all packets. It is a best practice to include a default route. If there is no other, more specific static route defined for a packet's destination IP address, a default route will match the packet, and pass it to a gateway router so that any packet can reach its destination. If you do not define a default route, and if there is a gap in your routes where no route matches a packet's destination IP address, packets passing through the FortiADC towards those IP addresses will, in effect, be null routed. While this can help to ensure that unintentional traffic cannot leave your FortiADC and therefore can be a type of security measure, the result is that you must modify your routes every time that a new valid destination is added to your network. Otherwise, it will be unreachable. A default route ensures that this kind of locally-caused "destination unreachable" problem does not occur.
distance	The default administrative distance is 10, which makes it preferred to OSPF routes that have a default of 110. We recommend you do not change these settings unless your deployment has exceptional requirements.
gateway	Specify the IP address of the gateway router that can route packets to the destination IP address that you have specified.

Example

```
FortiADC-VM # config router static

FortiADC-VM (static) # edit 1
FortiADC-VM (1) # set gateway 192.168.1.1
FortiADC-VM (1) # end

FortiADC-VM # get router static 1
destination : 0.0.0.0/0
gateway : 192.168.1.1
distance : 10
```

config router bgp

Use these commands to configure BGP-related options, such as AS ID, router ID, distance of routes, redistribute route , etc., including BGP network, neighbor, and ha-router-id-list configurations.

Syntax

```
config router bgp
   set as <id>
   set router-id <ipv4 address>
   set distance-external <1-255>
   set distance-external6 <1-255>
   set distance-internal <1-255>
   set distance-internal6 <1-255>
   set distance-local <1-255>
   set distance-local6 <1-255>
   set redistribute-ospf <enable/disable>
   set redistribute-connected <enable/disable>
   set redistribute-static <enable/disable>
   set redistribute-connected6 <enable/disable>
   set redistribute-static6 <enable/disable>
   set always-compare-med <enable/disable>
   set deterministic-med <enable/disable>
   set bestpath-as-path-ignore <enable/disable>
   set bestpath-cmp-routerid <enable/disable>
   set bestpath-med-missing-as-worst <enable/disable>
   config network
      edit <id>
         set type <ipv4/ipv6>
         set prefix <ipv4-netmask>
         set prefix6 <ipv6-netmask>
      next
   end
   config neighbor
      edit <id>
         set remote-as <id>
         set addr-type <ipv4/ipv6>
         set ip <ipv4 address>
         set ip6 <ipv6 address>
         set interface <interface name>
         set port <0-65535>
         set keepalive-timer <0-65535>
         set holdtime-timer <0-65535>
         set default-originate <enable/disable>
         set distribute-list-in <access list name>
         set distribute-list-out <access list name>
         set prefix-list-in <prefix list name>
         set prefix-list-out <prefix list name>
         set ebgp-multihop <1-255 >
         set next-hop-self <enable/disable >
         set passive <enable/disable >
         set password <password>
         set shutdown <enable/disable >
         set ttl-security <1-254>
         set update-source-type <interface/address>
         set update-source-interface <interface name>
         set update-source-ip <ipv4 address>
         set update-source-ip6 <ipv6 address>
         set weight <0-65535>
      next
   end
```

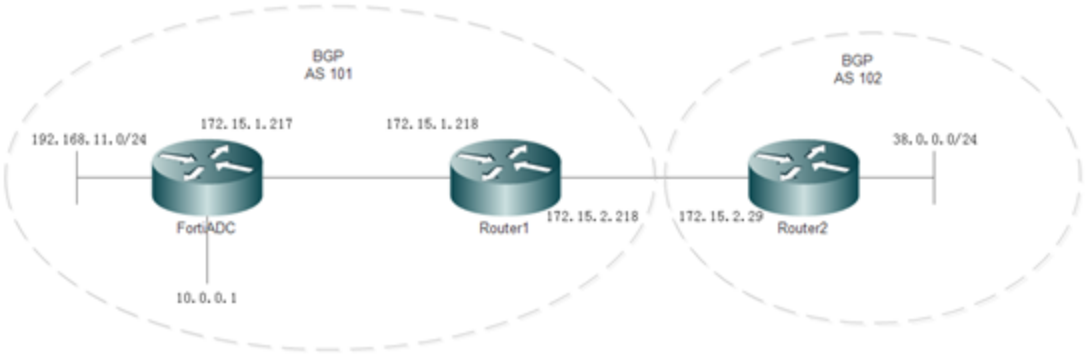
```
      config ha-router-id-list
         edit <id>
            set router-id <ipv4 address>
            set node <index>
         next
      end
   end

config router bgp
   config network
      edit <id>
         set type <ipv4/ipv6>
         set prefix <ipv4-netmask>
         set prefix6 <ipv6-netmask>
      next
   end
end

config router bgp
   config neighbor
      edit <id>
         set remote-as <id>
         set addr-type <ipv4/ipv6>
         set ip <ipv4 address>
         set ip6 <ipv6 address>
         set interface <interface name>
         set port <0-65535>
         set keepalive-timer <0-65535>
         set holdtime-timer <0-65535>
         set default-originate <enable/disable>
         set distribute-list-in <access list name>
         set distribute-list-out <access list name>
         set prefix-list-in <prefix list name>
         set prefix-list-out <prefix list name>
         set ebgp-multihop <1-255 >
         set next-hop-self <enable/disable >
         set passive <enable/disable >
         set password <password>
         set shutdown <enable/disable >
         set ttl-security <1-254>
         set update-source-type <interface/address>
         set update-source-interface <interface name>
         set update-source-ip <ipv4 address>
         set update-source-ip6 <ipv6 address>
         set weight <0-65535>
      next
   end
end

config router bgp
   config ha-router-id-list
      edit <id>
         set router-id <ipv4 address>
         set node <index>
      next
   end
end
```

as <id>	Specify the AS (Autonomous System) number.
router-id	Specify a unique value to identify the router, using an IPv4 address.
distance-external	Specify the distance for routes external to the AS.
distance-external6	Specify the distance for IPv6 routes external to the AS.
distance-internal	Specify the distance for routes internal to the AS.
distance-internal6	Specify the distance for IPv6 routes internal to the AS.
distance-local	Specify the distance for routes local to the AS.
distance-local6	Specify the distance for IPv6 routes local to the AS.
redistribute-ospf	Enable or disable the redistribute OSPF route to the BGP server.
redistribute-connected	Enable or disable the redistribute connected route to the BGP server.
redistribute-static	Enable or disable the redistribute static route to the BGP server.
redistribute-connected6	Enable or disable the redistribute connected IPv6 route to the BGP server.
redistribute-static6	Enable or disable the redistribute static IPv6 route to the BGP server.
always-compare-med	Enable or disable always compare MED (Multi-Exit Discriminator) for BGP decision.
deterministic-med	Enable or disable enforce deterministic comparison of MED for BGP decision.
bestpath-as-path-ignore	Enable or disable ignore AS path for BGP decision.
bestpath-cmp-routerid	Enable or disable compare router ID for identical EBGP paths for BGP decision.
bestpath-med-missing-as-worst	Enable or disable treat missing MED as least preferred for BGP decision.
Network	
type	Specify the address type: IPv4 or IPv6.
prefix	Specify the network prefix when (address) type is IPv4, using the IP/mask format.
prefix6	Specify the network prefix when (address) type is IPv6, using the IPv6/mask format.

Neighbor	
remote-as	The AS number of the neighbor.
addr-type	address type used to configure neighbor
ip	IP address of neighbor.
ip6	IPv6 address of neighbor.
interface	Interface that connected to neighbor
port	Port number that communicate with neighbor.
keepalive-timer	Frequency to send keep alive requests.
holdtime-timer	Number of seconds to mark peer as dead.
default-originate	Enable/disable originate default route to this neighbor.
distribute-list-in	Filter for IP updates from this neighbor.
distribute-list-out	Filter for IP updates to this neighbor.
prefix-list-in	IP Inbound filter for updates from this neighbor.
prefix-list-out	IP Outbound filter for updates to this neighbor.
ebgp-multihop	Specify the maximum multi-hops allowed for EBGP neighbors. Only need for ebgp neighbor, can't set with ttl-security
next-hop-self	Enable or disable IP next-hop calculation for this neighbor.
passive	Enable/disable sending of open messages to this neighbor.
password	Set Password
shutdown	Enable/disable shutdown this neighbor.
ttl-security	Specify the maximum number of hops to the BGP neighbor.Only need for ebgp neighbor
update-source-type	Type of source for routing updates.
update-source-interface	Interface Source for routing updates.
update-source-ip	IP address Source for routing updates.
update-source-ip6	IPv6 address Source for routing updates.

weight	Default weight for routes from this neighbor. range is <0-65535>
HA router ID list	
router-id	Specify Router-id, using IPv4 address.
node <index>	Specify Node ID of HA Node

Examples for IPv4 BGP configuration



Configure BGP router

```
FortiADC-VM (root) # config router bgp
FortiADC-VM (bgp) # set as 101
FortiADC-VM (bgp) # set router-id 10.0.6.217
FortiADC-VM (bgp) # set distance-internal 300
FortiADC-VM (bgp) # set redistribute-static enable
```

Configure BGP network

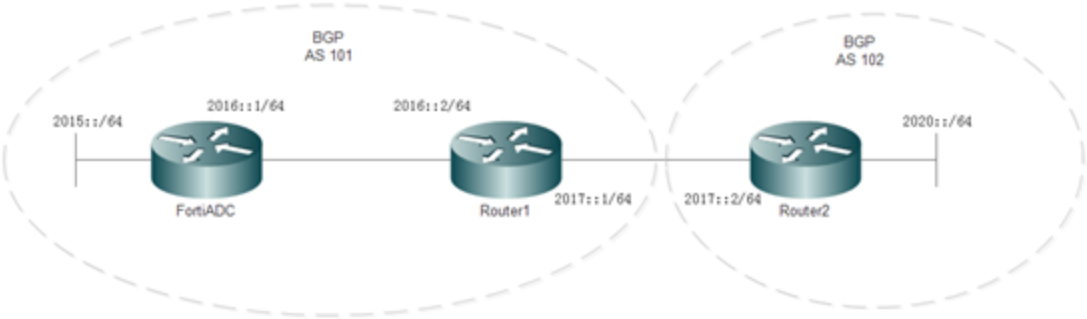
```
FortiADC-VM (bgp) # config network
FortiADC-VM (network) # edit 1
FortiADC-VM (1) # set type ipv4
FortiADC-VM (1) # set prefix 172.15.1.0/24
FortiADC-VM (1) # next
FortiADC-VM (network) # edit 2
FortiADC-VM (1) # set type ipv4
FortiADC-VM (1) # set prefix 192.168.11.0/24
FortiADC-VM (1) # next
FortiADC-VM (network) # end
```

Configure BGP neighbor

```
FortiADC-VM (bgp) # config neighbor
FortiADC-VM (neighbor) # edit 1
FortiADC-VM (1) # set remote-as 101
FortiADC-VM (1) # set ip 172.15.11.218
FortiADC-VM (1) # set interface port2
FortiADC-VM (1) # next
FortiADC-VM (neighbor) # end
FortiADC-VM (bgp) # get
```

```
as : 101
router-id : 10.0.6.217
distance-external : 20
distance-internal : 250
distance-local : 200
redistribute-ospf : disable
redistribute-connected : disable
redistribute-static : enable
redistribute-connected6 : disable
redistribute-static6 : disable
always-compare-med : disable
deterministic-med : disable
bestpath-as-path-ignore : disable
bestpath-cmp-routerid : disable
bestpath-med-missing-as-worst : disable
== [ 1 ]
== [ 2 ]
== [ 1 ]
FortiADC-VM (bgp) # end
```

Examples for IPv6 BGP configuration



Configure BGP router (IPv6)

```
FortiADC-VM (root) # config router bgp
FortiADC-VM (bgp) # set as 101
FortiADC-VM (bgp) # set router-id 10.0.6.217
FortiADC-VM (bgp) # config network #configure BGP network
FortiADC-VM (network) # edit 1
FortiADC-VM (1) # set type ipv6
FortiADC-VM (1) # set prefix6 2015::/64
FortiADC-VM (1) # next
FortiADC-VM (network) # edit 2
FortiADC-VM (1) # set type ipv4
FortiADC-VM (1) # set prefix6 2016::/64
FortiADC-VM (1) # next
FortiADC-VM (network) # end
```

Configure BGP network (IPv6)

```
FortiADC-VM (bgp) # config network
FortiADC-VM (network) # edit 1
FortiADC-VM (1) # set type ipv6
```

```
FortiADC-VM (1) # set prefix6 2015::/64
FortiADC-VM (1) # next
FortiADC-VM (network) # edit 2
FortiADC-VM (1) # set type ipv4
FortiADC-VM (1) # set prefix6 2016::/64
FortiADC-VM (1) # next
FortiADC-VM (network) # end
```

Configure BGP neighbor (IPv6)

```
FortiADC-VM (bgp) # config neighbor #configure BGP neighbor
FortiADC-VM (neighbor) # edit 1
FortiADC-VM (1) # set remote-as 101
FortiADC-VM (1) # set addr-type ipv6
FortiADC-VM (1) # set ip6 2016::2
FortiADC-VM (1) # set interface port2
FortiADC-VM (1) # next
FortiADC-VM (neighbor) # end
FortiADC-VM (bgp) # end
```

config security

The `config security` commands configure web application firewall (WAF) settings.

This chapter is a reference for the following commands:

- "config security waf bot-detection" on page 228
- "config security waf exception" on page 230
- "config security waf heuristic-sql-xss-injection-detection" on page 231
- "config security waf http-protocol-constraint" on page 234
- "config security waf profile" on page 241
- "config security waf url-protection" on page 244
- "config security waf web-attack-signature" on page 245
- "config security waf json-validation-detection" on page 248
- "config security waf xml-schema file" on page 251
- "config security waf xml-validation-detection" on page 251
- "config security antivirus profile" on page 256
- "config security antivirus quarantine" on page 257
- "config security antivirus settings" on page 259
- "config system fortisandbox" on page 259

config security waf bot-detection

Use this command to configure bot detection policies. Bot detection policies use heuristics to detect client traffic likely to be generated by robots instead of genuine clients. You can use predefined blacklists and whitelists to get started. You can use the user-specified whitelist table to fine-tune detection.

Before you begin:

- You must have read-write permission for security settings.

After you have created a bot detection policy, you can specify it in a WAF profile configuration.

Syntax

```
config security waf bot-detection
   edit <name>
      set status {enable|disable}
      set bad-robot {enable|disable}
      set search-engine-crawler {enable|disable}
      set action {alert| deny | period-block}
      set block-period <integer>
      set http-request-rate <integer>
      set severity {high | low | medium}
      config whitelist
         edit <No.>
            set cookie-name-pattern <string>
            set ip <subnet>
```

```
            set url-pattern <string>
            set url-parameter-name-pattern <string>
            set user-agent-pattern <string>
          next
        end
      next
    end
```

status	Enable/disable bot detection.
bad-robot	Enable/disable the predefined bad robot blacklist.
search-engine-crawler	Enable/disable the predefined search engine spider whitelist.
action	• alert • deny • period-block
block-period	The default is 3600 seconds. The valid range is 1-3600.
http-request-rate	The default is 0 (off). The valid range is 0-100,000,000 requests per second.
severity	• high • medium • low
config whitelist	
cookie-name-pattern	Matching string. Regular expressions are supported.
ip	Matching subnet (CIDR format).
url-pattern	Matching string. Regular expressions are supported.
url-parameter-name-pattern	Matching string. Regular expressions are supported.
user-agent-pattern	Matching string. Regular expressions are supported.

Example

```
FortiADC-VM # config security waf bot-detection
FortiADC-VM (bot-detection) # edit waf-bot-detection-policy
Add new entry 'waf-bot-detection-policy' for node 3220
FortiADC-VM (waf-bot-detect~o) # get
status : disable
FortiADC-VM (waf-bot-detect~o) # set status enable
FortiADC-VM (waf-bot-detect~o) # get
status : enable
search-engine-crawler : enable
bad-robot : enable
http-request-rate : 0
```

```
action : alert
severity : low
block-period : 3600
FortiADC-VM (waf-bot-detect~o) # config whitelist
FortiADC-VM (whitelist) # edit 1
Add new entry '1' for node 3228
FortiADC-VM (1) # get
ip : 0.0.0.0/0
url-pattern :
url-parameter-name-pattern :
user-agent-pattern :
cookie-name-pattern :
FortiADC-VM (1) # set ip 10.1.1.0/24
FortiADC-VM (1) # end
FortiADC-VM (waf-bot-detect~o) # end
FortiADC-VM #
```

config security waf exception

Use this command to create exception configuration objects. An exception configuration object defines hosts or URLs that should not be processed by the WAF rule.

Before you begin:

- You must have read-write permission for security settings.

After you have created exception objects, you can specify them in the WAF profile configuration or the WAF feature configurations. You can specify an exception per signature rule, per method rule, per response rule, per URL access rule, per file extension rule, per SQL injection rule, and per XSS injection rule.

Syntax

```
config security waf exception
   edit <name>
      config exception-rule
         edit <No.>
            set host-status {enable|disable}
            set host-pattern <host-pattern>
            set url-pattern <url-pattern>
         next
      end
   next
end
```

`host-status`	Enable/disable setting exceptions by host pattern.
`host-pattern`	Matching string. Regular expressions are supported. For example, you can specify `www.example.com`, `*.example.com`, or `www.example.*` to match a literal host pattern or a wildcard host pattern.

`url-pattern`	Matching string. Must begin with a URL path separator (/). Regular expressions are supported. For example, you can specify pathnames and files with expressions like `\/admin`, `.*\/data\/1.html`, or `\/data.*`.

Example

```
FortiADC-docs # config security waf exception
FortiADC-docs (exception) # edit exception-group
Add new entry 'exception-group' for node 3200
FortiADC-docs (exception-group) # config exception-rule
FortiADC-docs (exception-rule) # edit 1
Add new entry '1' for node 3202
FortiADC-docs (1) # set host-status enable
FortiADC-docs (1) # set host-pattern example.com
FortiADC-docs (1) # set url-pattern /1.index
FortiADC-docs (1) # end
FortiADC-docs (exception-group) # end
```

config security waf heuristic-sql-xss-injection-detection

Use this command to configure SQL injection and cross-site scripting (XSS) detection policies.

In many cases, you can use predefined policies, and you do not need to create them. Table 14 describes the predefined policies.

Table 14: Predefined SQL injection and XSS detection policies

	SQL Injection			XSS		
Predefined Rules	**Detection**	**Action**	**Severity**	**Detection**	**Action**	**Severity**
High-Level-Security	All except Body SQL Injection Detection	Deny	High	All except Body XSS Injection Detection	Deny	High
Medium-Level-Security	Only SQL URI SQL Injection Detection	Deny	High	None	Alert	Low
Alert-Only	Only SQL URI SQL Injection Detection	Alert	High	None	Alert	Low

The configurations for these policies are shown in the examples that follow. If desired, you can create user-defined policies.

Before you begin:

- You must have read-write permission for security settings.

After you have created an SQL injection/XSS policy, you can specify it in a WAF profile configuration.

Syntax

```
config security waf heuristic-sql-xss-injection-detection
   edit <name>
   set exception <datasource>
   set sql-injection-detection {enable|disable}
   set sql-injection-detection-exception <datasource>
   set sql-injection-action {alert|deny}
   set sql-injection-severity {high|medium|low}
   set uri-sql-injection-detection {enable|disable}
   set referer-sql-injection-detection {enable|disable}
   set cookie-sql-injection-detection {enable|disable}
   set body-sql-injection-detection {enable|disable}
   set xss-detection {enable|disable}
   set xss-exception <datasource>
   set xss-action {alert|deny}
   set xss-severity {high|medium|low}
   set uri-xss-detection {enable|disable}
   set referer-xss-detection {enable|disable}
   set cookie-xss-detection {enable|disable}
   set body-xss-detection {enable|disable}
   next
end
```

`exception`	Specify an exception configuration object for all modules.
`sql-injection-detection`	Enable/disable SQL injection detection.
`sql-injection-detection-exception`	Specify an exception configuration object for the SQL module.
`sql-injection-action`	• alert • deny
`sql-injection-severity`	• high • medium • low
`uri-sql-injection-detection`	Enable/disable detection in the HTTP request.
`referer-sql-injection-detection`	Enable/disable detection in the Referer header.
`cookie-sql-injection-detection`	Enable/disable detection in the Cookie header.

body-sql-injection-detection	Enable/disable detection in the HTTP Body message.
xss-detection	Enable/disable XSS detection.
xss-exception	Specify an exception configuration object for the XSS module.
xss-action	• alert • deny
xss-severity	• high • medium • low
uri-xss-injection-detection	Enable/disable detection in the HTTP request.
referer-xss-injection-detection	Enable/disable detection in the Referer header.
cookie-xss-injection-detection	Enable/disable detection in the Cookie header.
body-xss-injection-detection	Enable/disable detection in the HTTP Body message.

Example

```
FortiADC-docs # get security waf heuristic-sql-xss-injection-detection High-Level-Security

sql-injection-detection : enable
sql-injection-action : deny
sql-injection-severity : high
uri-sql-injection-detection : enable
referer-sql-injection-detection: enable
cookie-sql-injection-detection: enable
body-sql-injection-detection : disable
xss-detection : enable
xss-action : deny
xss-severity : high
uri-xss-detection : enable
referer-xss-detection : enable
cookie-xss-detection : enable
body-xss-detection : disable
sql-injection-detection-exception:
xss-exception :
exception :

FortiADC-docs # get security waf heuristic-sql-xss-injection-detection Medium-Level-
    Security
sql-injection-detection : enable
sql-injection-action : deny
sql-injection-severity : high
uri-sql-injection-detection : enable
referer-sql-injection-detection: disable
cookie-sql-injection-detection: disable
body-sql-injection-detection : disable
```

```
xss-detection : disable
xss-action : alert
xss-severity : low
sql-injection-detection-exception:
exception :

FortiADC-docs # get security waf heuristic-sql-xss-injection-detection Alert-Only
sql-injection-detection : enable
sql-injection-action : alert
sql-injection-severity : high
uri-sql-injection-detection : enable
referer-sql-injection-detection: disable
cookie-sql-injection-detection: disable
body-sql-injection-detection : disable
xss-detection : disable
xss-action : alert
xss-severity : low
sql-injection-detection-exception:
exception :
```

config security waf http-protocol-constraint

Use this command to configure HTTP protocol checks: HTTP request parameter lengths, HTTP request method, and HTTP response code.

Table 15 describes the three predefined policies.

Table 15: Predefined HTTP protocol constraint policies

Predefined Rules	Description
High-Level-Security	Maximum URI length is 2048 characters. Action is set to deny. Severity is set to high.
Medium-Level-Security	Maximum URI length is 2048 characters. Action is set to alert. Severity is set to medium.
Alert-Only	Maximum URI length is 2048 characters. Action is set to alert. Severity is set to low.

The configurations for these rules are shown in the examples that follow. If desired, you can create user-defined rules to filter traffic with invalid HTTP request methods or drop packets with the specified server response codes.

Before you begin:

- You must have read-write permission for security settings.

After you have created an HTTP protocol constraint policy, you can specify it in a WAF profile configuration.

Syntax

```
config security waf http-protocol-constraint
   edit <name>
      set exception <datasource>
```

```
        set illegal-host-name-check {enable|disable}
        set illegal-host-name-check-action {alert|deny}
        set illegal-host-name-check-severity {high|medium|low}
        set illegal-http-version-check {enable|disable}
        set illegal-http-version-check-action {alert|deny}
        set illegal-http-version-check-severity {high|medium|low}
        set max-cookie-number-in-request <integer>
        set max-cookie-number-in-request-action {alert|deny}
        set max-cookie-number-in-request-severity {high|medium|low}
        set max-header-number-in-request <integer>
        set max-header-number-in-request-action {alert|deny}
        set max-header-number-in-request-severity {high|medium|low}
        set max-request-body-length <integer>
        set max-request-body-length-action {alert|deny}
        set max-request-body-length-severity {high|medium|low}
        set max-request-header-length <integer>
        set max-request-header-length-action {alert|deny}
        set max-request-header-length-severity {high|medium|low}
        set max-request-header-name-length <integer>
        set max-request-header-name-length-action {alert|deny}
        set max-request-header-name-length-severity {high|medium|low}
        set max-request-header-value-length <integer>
        set max-request-header-value-length-action {alert|deny}
        set max-request-header-value-length-severity {high|medium|low}
        set max-uri-length <integer>
        set max-uri-length-action {alert|deny}
        set max-uri-length-severity {high|medium|low}
        set max-url-parameter-name-length <integer>
        set max-url-parameter-name-length-action {alert|deny}
        set max-url-parameter-name-length-severity {high|medium|low}
        set max-url-parameter-value-length <integer>
        set max-url-parameter-value-length-action {alert|deny}
        set max-url-parameter-value-length-severity {high|medium|low}
        config request-method-rule
           edit <No.>
              set exception <datasource>
              set action {alert|deny}
              set severity {high|medium|low}
              set method {CONNECT DELETE GET HEAD OPTIONS OTHERS POST PUT TRACE }
           next
        end
        config response-code-rule
           edit <No.>
              set exception <datasource>
              set action {alert|deny}
              set severity {high|medium|low}
              set code-min <400-599>
              set code-max <400-599>
           next
        end
     next
  end
```

`exception`	Specify an exception configuration object.

`illegal-host-name-check`	Enable/disable hostname checks. A domain name must consist of only the ASCII alphabetic and numeric characters, plus the hyphen. The hostname is checked against the set of characters allowed by the RFC 2616. Disallowed characters, such as non-printable ASCII characters or other special characters (for example, '<', '>', and the like), are a symptom of an attack.
`illegal-host-name-check-action`	• alert • deny
`illegal-host-name-check-severity`	• high • medium • low
`illegal-http-version-check`	Enable/disable the HTTP version check. Well-formed requests include the version of the protocol used by the client, in the form of HTTP/v where v is replaced by the actual version number (one of 0.9, 1.0, 1.1). Malformed requests are a sign of traffic that was not sent from a normal browser and are a symptom of an attack.
`illegal-http-version-check-action`	• alert • deny
`illegal-http-version-check-severity`	• high • medium • low
`max-cookie-number-in-request`	Maximum number of cookie headers in an HTTP request. The default is 16. The valid range is 1-32.
`max-cookie-number-in-request-action`	• alert • deny
`max-cookie-number-in-request-severity`	• high • medium • low
`max-header-number-in-request`	Maximum number of headers in an HTTP request. The default is 50. Requests with more headers are a symptom of a buffer overflow attack or an attempt to evade detection mechanisms. The valid configuration range is 1-100.
`max-header-number-in-request-action`	• alert • deny

`max-header-number-in-request-severity`	• high • medium • low
`max-request-body-length`	Maximum length of the HTTP body. The default is 67108864. The valid range is 1-67108864.
`max-request-body-length-action`	• alert • deny
`max-request-body-length-severity`	• high • medium • low
`max-request-header-length`	Maximum length of the HTTP request header. The default is 8192. The valid range is 1-16384.
`max-request-header-action`	• alert • deny
`max-request-header-severity`	• high • medium • low
`max-request-header-name-length`	Maximum characters in an HTTP request header name. The default is 1024. The valid range is 1-8192.
`max-request-header-name-length-action`	• alert • deny
`max-request-header-name-length-severity`	• high • medium • low
`max-request-header-value-length`	Maximum characters in an HTTP request header value. The default is 4096. Longer headers might be a symptom of a buffer overflow attack. The valid configuration range is 1-8192.
`max-request-header-value-length-action`	• alert • deny
`max-request-header-value-length-severity`	• high • medium • low

max-uri-length	Maximum characters in an HTTP request URI. The default is 2048. The valid range is 1-8192.
max-uri-length-action	• alert • deny
max-uri-length-severity	• high • medium • low
max-url-parameter-name-length	Maximum characters in a URL parameter name. The default is 1024. The valid range is 1-2048.
max-url-parameter-name-length-action	• alert • deny
max-url-parameter-name-length-severity	• high • medium • low
max-url-parameter-value-length	Maximum characters in a URL parameter value. The default is 4096. The valid range is 1-8192.
max-url-parameter-value-length-action	• alert • deny
max-url-parameter-value-length-severity	• high • medium • low
config request-method-rule	
exception	Specify an exception configuration object.
action	• alert • deny
severity	• high • medium • low

method	Specify a space-separated list of methods to match in the HTTP request line: • CONNECT • DELETE • GET • HEAD • OPTIONS • POST • PUT • TRACE • Others **Note**: The first 8 methods are described in RFC 2616. Others contains not commonly used HTTP methods defined by Web Distributed Authoring and Version (WebDAV) extensions.
config response-code-rule	
exception	Specify an exception configuration object.
action	• alert • deny
severity	• high • medium • low
code-min	Start of the range.
code-max	End of the range.

Example

```
FortiADC-docs # get security waf http-protocol-constraint High-Level-Security
max-uri-length : 2048
max-uri-length-action : deny
max-uri-length-severity : high
max-request-header-name-length: 1024
max-request-header-name-length-action: deny
max-request-header-name-length-severity: high
max-request-header-value-length: 4096
max-request-header-value-length-action: deny
max-request-header-value-length-severity: high
max-url-parameter-name-length : 1024
max-url-parameter-name-length-action: deny
max-url-parameter-name-length-severity: high
max-url-parameter-value-length: 4096
max-url-parameter-value-length-action: deny
max-url-parameter-value-length-severity: high
```

```
illegal-http-version-check : enable
illegal-http-version-check-action: deny
illegal-http-version-check-severity: high
illegal-host-name-check : enable
illegal-host-name-check-action: deny
illegal-host-name-check-severity: high
max-cookie-number-in-request : 16
max-cookie-number-in-request-action: deny
max-cookie-number-in-request-severity: high
max-header-number-in-request : 50
max-header-number-in-request-action: deny
max-header-number-in-request-severity: high
max-request-header-length : 8192
max-request-header-length-action: deny
max-request-header-length-severity: high
max-request-body-length : 67108864
max-request-body-length-action: deny
max-request-body-length-severity: high
exception :

FortiADC-docs # get security waf http-protocol-constraint Medium-Level-Security
max-uri-length : 2048
max-uri-length-action : alert
max-uri-length-severity : medium
max-request-header-name-length: 1024
max-request-header-name-length-action: alert
max-request-header-name-length-severity: medium
max-request-header-value-length: 4096
max-request-header-value-length-action: alert
max-request-header-value-length-severity: medium
max-url-parameter-name-length : 1024
max-url-parameter-name-length-action: alert
max-url-parameter-name-length-severity: medium
max-url-parameter-value-length: 4096
max-url-parameter-value-length-action: alert
max-url-parameter-value-length-severity: medium
illegal-http-version-check : enable
illegal-http-version-check-action: alert
illegal-http-version-check-severity: medium
illegal-host-name-check : enable
illegal-host-name-check-action: alert
illegal-host-name-check-severity: medium
max-cookie-number-in-request : 16
max-cookie-number-in-request-action: alert
max-cookie-number-in-request-severity: medium
max-header-number-in-request : 50
max-header-number-in-request-action: alert
max-header-number-in-request-severity: medium
max-request-header-length : 8192
max-request-header-length-action: alert
max-request-header-length-severity: medium
max-request-body-length : 67108864
max-request-body-length-action: alert
max-request-body-length-severity: medium
exception :

FortiADC-docs # get security waf http-protocol-constraint Alert-Only
```

```
max-uri-length : 2048
max-uri-length-action : alert
max-uri-length-severity : low
max-request-header-name-length: 1024
max-request-header-name-length-action: alert
max-request-header-name-length-severity: low
max-request-header-value-length: 4096
max-request-header-value-length-action: alert
max-request-header-value-length-severity: low
max-url-parameter-name-length : 1024
max-url-parameter-name-length-action: alert
max-url-parameter-name-length-severity: low
max-url-parameter-value-length: 4096
max-url-parameter-value-length-action: alert
max-url-parameter-value-length-severity: low
illegal-http-version-check : enable
illegal-http-version-check-action: alert
illegal-http-version-check-severity: low
illegal-host-name-check : enable
illegal-host-name-check-action: alert
illegal-host-name-check-severity: low
max-cookie-number-in-request : 16
max-cookie-number-in-request-action: alert
max-cookie-number-in-request-severity: low
max-header-number-in-request : 50
max-header-number-in-request-action: alert
max-header-number-in-request-severity: low
max-request-header-length : 8192
max-request-header-length-action: alert
max-request-header-length-severity: low
max-request-body-length : 67108864
max-request-body-length-action: alert
max-request-body-length-severity: low
exception :
```

config security waf profile

Use this command to configure web application firewall (WAF) profiles. A WAF profile references the WAF policies that are to be enforced.

In many cases, you can use predefined profiles to get started. Table 16 describes the three predefined policies.

Table 16: Predefined WAF profiles

Predefined Rules	Description
High-Level-Security	HTTP protocol constraints policy: High-Level-Security SQL injection and XSS detection policy: High-Level-Security

Predefined Rules	Description
Medium-Level-Security	HTTP protocol constraints policy: Medium-Level-Security SQL injection and XSS detection policy: Medium-Level-Security
Alert-Only	HTTP protocol constraints policy: Alert-Only SQL injection and XSS detection policy: Alert-Only

The configurations for these profiles are shown in the examples that follow. If desired, you can create user-defined profiles.

Before you begin:

- You can use predefined WAF profiles, create profiles based on predefined feature options, or create profiles based on user-defined configuration objects. If you want to add user-defined configuration objects, you must create them before using this command to add them to a WAF profile.
- You must have read-write permission for security settings.

After you have created a WAF profile, you can specify it in a virtual server configuration.

Syntax

```
config security waf profile
   edit <name>
      set exception <datasource>
      set bot-detection <datasource>
      set description <string>
      set heuristic-sql-xss-injection-detection <datasource>
      set http-protocol-constraint <datasource>
      set url-protection <datasource>
      set web-attack-signature <datasource>
      set http-header-cache {enable|disable}
      set xml-validation <datasource>
      set json-validation <datasource>
   next
end
```

`exception`	Specify an exception configuration object.
`bot-detection`	Specify a user-defined configuration object.
`description`	A string to describe the purpose of the configuration, to help you and other administrators more easily identify its use.
`heuristic-sql-xss-injection-detection`	Specify a predefined or user-defined configuration object.
`http-protocol-constraint`	Specify a predefined or user-defined configuration object.
`url-protection`	Specify a predefined or user-defined configuration object.

web-attack-signature	Specify a predefined or user-defined configuration object.
http-header-cache	Enable/disable caching HTTP headers. Enabled by default. If you experience performance issues, you can disable. However, the cached HTTP headers are used to populate fields in logs resulting from HTTP body scanning. Can only be set with the CLI.
xml-validation	Specify a predefined or user-defined configuration object.
json-validation	Specify a predefined or user-defined configuration object.

Example

```
FortiADC-docs # get security waf profile High-Level-Security
web-attack-signature : High-Level-Security
url-protection :
http-protocol-constraint : High-Level-Security
heuristic-sql-xss-injection-detect: High-Level-Security
description :
http-header-cache : enable
exception :

FortiADC-docs # get security waf profile Medium-Level-Security
web-attack-signature : Medium-Level-Security
url-protection :
http-protocol-constraint : Medium-Level-Security
heuristic-sql-xss-injection-detect: Medium-Level-Security
description :
http-header-cache : enable
exception :


FortiADC-docs # get security waf profile Alert-Only
web-attack-signature : Alert-Only
url-protection :
http-protocol-constraint : Alert-Only
heuristic-sql-xss-injection-detect: Alert-Only
description :
http-header-cache : enable
exception :

FortiADC-docs # config security waf profile
FortiADC-docs (profile) # edit eval
Add new entry 'eval' for node 3000
FortiADC-docs (eval) # get
web-attack-signature :
url-protection :
http-protocol-constraint :
heuristic-sql-xss-injection-detect:
bot-detection:
description :
http-header-cache : enable
```

```
exception :

FortiADC-docs (eval) # set web-attack-signature Alert-Only
FortiADC-docs (eval) # set http-protocol-constraint Alert-Only
FortiADC-docs (eval) # set heuristic-sql-xss-injection-detect Alert-Only
FortiADC-docs (eval) # set exception exception-group
FortiADC-docs (eval) # set description "evaluate alert-only and exception list"
FortiADC-docs (eval-alert-onl~-) # end
```

config security waf url-protection

Use this command to configure URL protection policies. URL protection policies can filter HTTP requests that match specific character strings and file extensions.

Before you begin:

- You must have read-write permission for security settings.

After you have created a URL protection policy, you can specify it in a WAF profile configuration.

Syntax

```
config security waf url-protection
   edit <name>
      set exception <datasource>
      config url-access-rule
         edit <No.>
            set exception <datasource>
            set action {alert|deny}
            set severity {high|medium|low}
            set url-pattern <url-pattern>
         next
      end
      config file-extension-rule
         edit <No.>
            set exception <datasource>
            set action {alert|deny}
            set severity {high|medium|low}
            set file-extension-pattern <file-extension-pattern>
         next
      end
   next
end
```

exception	Specify an exception configuration object.
action	• alert • deny

severity	• high • medium • low
url-pattern	Matching string. Regular expressions are supported.
file-extension-pattern	Matching string. Regular expressions are supported.

Example

```
FortiADC-docs # config security waf url-protection
FortiADC-docs (url-protection) # edit url-policy
Add new entry 'url-policy' for node 3050
FortiADC-docs (url-policy) # config url-access-rule
FortiADC-docs (url-access-rule) # edit 1
Add new entry '1' for node 3052
FortiADC-docs (1) # get
url-pattern :
action : alert
severity : low
exception :
FortiADC-docs (1) # set url-pattern tmp
FortiADC-docs (1) # end
FortiADC-docs (url-policy) # config file-extension-rule
FortiADC-docs (file-extension~r) # edit 1
Add new entry '1' for node 3057
FortiADC-docs (1) # get
file-extension-pattern :
action : alert
severity : low
exception :
FortiADC-docs (1) # set file-extension-pattern tmp
FortiADC-docs (1) # end
FortiADC-docs (url-policy) # end
```

config security waf web-attack-signature

Use this command to configure web attack signature policies. The attack signature policy includes rules to enable scanning of HTTP headers and HTTP body content in HTTP requests, HTTP responses, or both.

Table 17 describes the predefined policies. You can select the predefined policies in your WAF profiles, or you can create policies that enable a different set of scan classes or a different action. In this release, you cannot exclude individual signatures or create custom signatures. You can enable or disable the scan classes.

Table 17: Web Attack Signature predefined policies

Policy	Status	Action
High-Level-Security	• Scan HTTP header—Enabled. • Scan HTTP Request Body—Enabled. • Scan HTTP Response Body—Disabled.	• High Severity Action—Deny. • Medium Severity Action—Deny. • Low Severity Action—Alert.
Medium-Level-Security	• Scan HTTP header—Enabled. • Scan HTTP Request Body—Enabled. • Scan HTTP Response Body—Disabled.	• High Severity Action—Deny. • Medium Severity Action—Alert. • Low Severity Action—Alert.
Alert-Only	• Scan HTTP header—Enabled. • Scan HTTP Request Body—Disabled. • Scan HTTP Response Body—Disabled.	• High Severity Action—Alert. • Medium Severity Action—Alert. • Low Severity Action—Alert.

Before you begin:

- You must have read-write permission for security settings.

After you have created a web attack signature policy, you can specify it in a WAF profile configuration.

Syntax

```
config security waf web-attack-signature
   edit <name>
      set exception <datasource>
      set scan-enable {enable|disable}
      set scan-request-body {enable|disable}
      set scan-response-body {enable|disable}
      set high-severity-action {alert|deny}
      set medium-severity-action {alert|deny}
      set low-severity-action {alert|deny}
      config signature
         edit <datasource>
            set status
            set exception
            set description <string>
         next
      end
   next
end
```

`exception`	Specify an exception configuration object.
`scan-enable`	Enable/disable scanning against the signature database. This includes HTTP header scanning but not HTTP body scanning.
`scan-request-body`	Enable/disable scanning against HTTP request body signatures.
`scan-response-body`	Enable/disable against HTTP response body signatures.

high-severity-action	• alert • deny
medium-severity-action	• alert • deny
low-severity-action	• alert • deny
config signature	
status	Enable/disable the signature.
exception	Specify an exception configuration object.
description	A string to describe the purpose of the configuration, to help you and other administrators more easily identify its use.

Example

```
FortiADC-VM # get security waf web-attack-signature High-Level-Security
status : enable
request-body-detection : enable
response-body-detection : disable
high-severity-action : deny
medium-severity-action : deny
low-severity-action : alert
exception:

FortiADC-VM # get security waf web-attack-signature Medium-Level-Security
status : enable
request-body-detection : enable
response-body-detection : disable
high-severity-action : deny
medium-severity-action : alert
low-severity-action : alert
exception:

FortiADC-VM # get security waf web-attack-signature Alert-Only
status : enable
request-body-detection : disable
response-body-detection : disable
high-severity-action : alert
medium-severity-action : alert
low-severity-action : alert
exception:

FortiADC-docs # config security waf web-attack-signature
FortiADC-docs (web-attack-sig~a) # edit eval
FortiADC-docs (eval) # config signature
FortiADC-docs (signature) # edit 1002010728
FortiADC-docs (1002010728) # get
status : enable
```

```
description :
exception :
FortiADC-docs (1002010728) # set status disable
FortiADC-docs (1002010728) # set description "investigate false positive"
FortiADC-docs (1002010728) # end
```

config security waf json-validation-detection

Use this command to set JSON validation detection.

Note: This command only checks HTTP requests with content-type being application/json.

Table 18: Predefined WAF profiles

Predefined Rules	Required settings
High-Level-Security	format-checks — enable set xss-checks — enable set sql-injection-checks — enable severity —high action — deny
Medium-Level-Security	format-checks — enable set xss-checks — enable set sql-injection-checks — enable severity — medium action — alert
Alert-Only	format-checks — enable set xss-checks — disable set sql-injection-checks — disable severity — low action — alert

Syntax

```
config security waf json-validation-detection
   edit <name>
      set format-checks enable/disable
      set limit-checks enable/disable
      set limit-max-array-value-num <0-4096>
      set limit-max-depth-num <0-4096>
      set limit-max-object-num <0-4096>
```

```
        set limit-max-string-len <0-4096>
        set xss-checks enable/disable
        set sql-injection-checks enable/disable
        set exception <datasource>
        set severity low/medium/high
        set action alert/deny
    next
  end
```

`name`	Specify the name of the JSON detection profile.
`format-checks`	Enable or disable JSON format checks, which are security checks for incoming HTTP requests to determine whether they are well-formed. **Note:** If enabled, you must specify FortiADC response actions to malformed HTTP requests, as discussed below.
`limit-checks`	Enable or disable parsing limits to protect web servers from attacks, such as DDOS attacks. **Note**: If enabled, you must change the configuration for the following parameters: • Limit max array value • Limit max depth • Limit max object member • Limit max string
`limit-max-array-value-num`	Specify the maximum value within a single array. The default value is 256. Valid values range from 0 to 4,096. **Note:** This option is available only when JSON limit-checks is enabled.
`limit-max-depth-num`	Specify the maximum depth in a JSON value. The default value is 16. Valid values range from 0 to 4,096. **Note:** This option is available only when JSON limit-checks is enabled.
`limit-max-object-num`	Specify the maximum number of members in a JSON object. The default value is 64. Valid values range from 0 fro 4,096. **Note:** This option is available only when JSON limit-checks is enabled.
`limit-max-string-len`	Specify the maximum length of a string in a JSON request for a name or a value. The default value is 64. Valid values range from 0 to 4,096. **Note:** This option is available only when JSON limit-checks is enabled.

xss-checks	Enable to examine the bodies of incoming JSON requests that might indicate possible cross-site scripting attacks. **Note:** If the request contains a positive match, FortiADC will respond with the specified action, as discussed at the end of this table.
sql-injection-checks	Enable to examine the bodies of incoming requests for inappropriate SQL characters and keywords, which may indicate an SQL injection attack. **Note:** If the request contains a positive match, FortiADC will respond with the specified action, as discussed at the beginning of this table.
exception	*Optional.* Select the exception profile to be applied to the JSON detection profile.
severity	Set the severity level in WAF logs for potential attacks detected by the JSON detection profile by selecting one of the following: • High • Medium • Low
action	Specify the action that FortiADC will take upon detecting a potential attack: • Alert — Sends an alert. • Deny — Blocks the incoming request.

Example

```
config security waf json-validation-detection
   edit "all"
      set format-checks enable
      set meta-os-checks disable
      set limit-checks enable
      set limit-max-array-value-num 1
      set limit-max-depth-num 0
      set limit-max-object-num 0
      set limit-max-string-len 0
      set xss-checks enable
      set sql-injection-checks enable
      unset exception
      set severity high
      set action alert
   next
end
```

config security waf xml-schema file

Use this command to create an XML-schema file which defines an XML schema format for XML validation detection.

Note: For this 4.8.0 release, this feature is supported on the GUI only.

Syntax

```
config security waf xml-validation-detection
   edit <name>
```

config security waf_soap-wsdl-file

Use this command to create a SOAP-WSDL file which defines the message format and protocol details for a web service. WSDL is written in XML.

Note: For this 5.0.0 release, this feature is supported on the GUI only.

Syntax

```
config security waf soap-wsdl-file
   edit <name>
```

config security waf xml-validation-detection

Use this command to configure XML validation detection.

Note: This command only checks HTTP requests with content type being application/xml and text/xml.

Table 19: Predefined WAF profiles

Predefined Rules	Required settings
High-Level-Security	format-checks — enable
	set soap-format-checks— disable
	set schema-checks — disable
	set xss-checks — enable
	set sql-injection-checks — enable
	severity —high
	action — deny

Predefined Rules	Required settings
Medium-Level-Security	format-checks — enable set soap-format-checks— disable set schema-checks — disable set xss-checks — enable set sql-injection-checks — enable severity — mdeium action — alert
Alert-Only	format-checks — enable set soap-format-checks— disable set schema-checks — disable set xss-checks — disable set sql-injection-checks — disable severity — low action — alert

Syntax

```
config security waf xml-validation-detection
   edit <name>
      set format-checks enable/disable
      set soap-format-checks enable/disable
      set wsdl-checks enable/disable
      set soap_wsdl_id <datasource>
      set schema-checks enable/disable
      set xml-schema-id <datasource>
      set limit-checks enable/disable
      set limit-max-attr-num <1-256>
      set limit-max-attr-name-len <1-2048>
      set limit-max-attr-value-len <1-2048>
      set limit-max-cdata-len <1-65535>
      set limit-max-elem-child-num <1-65535>
      set limit-max-elem-depth-num <1-65535>
      set limit-max-elem-name-len <1-65535>
      set limit-max-namespace-num <0-256>
      set limit-max-namespace-url-len <0-1024>
      set xss-checks enable/disable
      set sql-injection-checks enable/disable
      set exception <datasource>
      set severity low/medium/high
      set action alert/deny
   next
end
```

name	Specify the name of the XML detection profile.
format-checks	Enable or disable XML format detection.
schema-checks	Enable or disable XML schema validation detection. **Note:**Before enabling XML schema checks, you must upload an XML schema file to check whether XML content is well-formed.
xml-schema-id	Select the XML schema file that you want to use.
soap-format-checks	Enable or disable soap-format-checks.
wsdl-checks	Enable or disable WSDL validation detection. **Note:** Before enabling WSDL checks, you must upload an WSDL file to check whether SOAP content is well-formed.
soap_wsdl_id	Select the desired WSDL file.
limit-checks	Enable or disable XML limit checks. **Note**: If enabled, you must can configure the following parameters: • limit-max-attr-num • limit-max-attr-name-len • limit-max-attr-value-len • limit-max-cdata-len • limit-max-elem-child-num • limit-max-elem-depth-num • limit-max-elem-name-len • limit-max-namespace-num • limit-max-namespace-url-len
limit-max-attr-num	Specify the maximum number of attributes each individual element is allowed to have. The default value is 256. Valid values range from 1 to 256. **Note:** This option is available only when XML limit-checks is enabled.
limit-max-attr-name-len	Specify the maximum length of each attribute name. The default value is 128. Valid values range from 1 to 2,048. **Note:** This option is available only when XML limit-checks is enabled.

`limit-max-attr-value-len`	Specify the maximum length of each attribute value. The default value is 128. Valid values range from 1 to 2,048. **Note:** This option is available only when XML limit-checks is enabled.
`limit-max-cdata-len`	Specify the length of the Cdata for each element. The default value is 65,535. Valid values range from 1 to 65,535. **Note:** This option is available only when XML limit-checks is enabled.
`limit-max-elem-child-num`	Specify the maximum number of children each element is allowed, including other elements and character information. The default value is 65,535. Valid values range from 1 to 65,535. **Note:** This option is available only when XML limit-checks is enabled.
`limit-max-elem-depth-num`	Specify the maximum number of nested levels in each element. The default value is 256. Valid values range from 1 to 65,535. **Note:** This option is available only when XML limit-checks is enabled.
`limit-max-elem-name-len`	Specify the maximum length of the name of each element. The default value is 128. Valid values range from 1 to 65,535. **Note:** This option is available only when XML limit-checks is enabled.
`limit-max-namespace-num`	Specify the number of namespace declarations in the XML document. The default value is 16. Valid values range from 0 to 256. **Note:** This option is available only when XML limit-checks is enabled.
`limit-max-namespace-url-len`	Specify the URL length for each namespace declaration. The default value is 256. Valid values range from 0 to 1,024. **Note:** This option is available only when XML limit-checks is enabled.
`xss-checks`	Enable to examine the bodies of incoming XML requests that might indicate possible cross-site scripting attacks. **Note:** If the request contains a positive match, FortiADC will respond with the specified action, as discussed at the beginning of this table.

sql-injection-checks	Enable to examine the bodies of incoming requests for inappropriate SQL characters and keywords, which may indicate an SQL injection attack. **Note:** If the request contains a positive match, FortiADC will respond with the specified action, as discussed at the end of this table.
exception	*Optional.* Select the exception profile to be applied to the XML detection profile.
severity	Set the severity level in WAF logs for potential attacks detected by the XML detection profile by selecting one of the following: • High • Medium • Low
action	Specify the action that FortiADC will take upon detecting a potential attack: • Alert — Sends an alert. • Deny — Blocks the incoming request.

Example

```
config security waf xml-validation-detection
   edit "all"
      set format-checks enable
      set soap-format-checks enable
      set wsdl-checks enable
      unset soap_wsdl_id
      set schema-checks enable
      unset xml-schema-id
      set limit-checks enable
      set limit-max-attr-num 100
      set limit-max-attr-name-len 100
      set limit-max-attr-value-len 100
      set limit-max-cdata-len 1
      set limit-max-elem-child-num 100
      set limit-max-elem-depth-num 100
      set limit-max-elem-name-len 100
      set limit-max-namespace-num 1
      set limit-max-namespace-url-len 1
      set xss-checks enable
      set sql-injection-checks enable
      unset exception
      set severity medium
      set action alert
   next
end
```

config security antivirus profile

Use this command to configure an anti-virus profile.

In many cases, you can use a predefined AV profile, and you are not required to create a new AV profile of your own.

Before you begin, make sure that you have read-write permission to configure the system's security settings.

After you have created an anti-virus profile, you can include it in HTTP or HTTPS virtual service profiles.

Syntax

```
config security antivirus profile
   edit <name>
      set comments <string>
      set uncomp-size-limit <integer>
      set uncomp-nest-limit <integer>
      set scan-bzip2 {enable | disable}
      set streaming-content-bypass {enable | disable}
      set oversize-limit <integer>
      set oversize {bypass | log | block}
      set options {avmonitor | quarantine}
      set emulator {enable | disable}
      set fsa-analytics {disable | suspicious | all}
      set analytics-max-upload <integer>
      set analytics-db {disable | enable}
      set av-virus-log {disable | enable}
   next
end
```

uncomp-size-limit	The maximum size in MB of the memory buffer used to temporarily decompress files.
uncomp-nest-limit	The maximum number of levels of nesting (compression) allowed to decompress.
scan-bzip2	Enable or disable bzip2 scanning algorithm.
streaming-content-bypass	Enable or disable bypass streaming content (rather than buffering it).
oversize-limit	The maximum in-memory file size in KB to be scanned.
options	Select an option for the system to handle infected files.
emulator	Enable or disable Win32 Emulator.
fsa-analytics	Select an option to submit files to FortiSandbox.
analytics-max-upload	The maximum file size in KB allowed to upload to FortiSandbox.
analytics-db	Enable or disable FortiSandbox signature database.
av-virus-log	The maximum file size in KB allowed to upload to FortiSandbox.

Example

```
FortiADC-docs # config security antivirus profile
FortiADC-docs (profile) # edit av_profile_01
FortiADC-docs (av_profile_01) # set comments test_for_doc
FortiADC-docs (av_profile_01) # set uncomp-size-limit 10
FortiADC-docs (av_profile_01) # set uncomp-nest-limit 5
FortiADC-docs (av_profile_01) # set scan-bzip2 enable
FortiADC-docs (av_profile_01) # set streaming-content-bypass enable
FortiADC-docs (av_profile_01) # set oversize-limit 1024
FortiADC-docs (av_profile_01) # set oversize log
FortiADC-docs (av_profile_01) # set options quarantine
FortiADC-docs (av_profile_01) # set emulator enable
FortiADC-docs (av_profile_01) # set fsa-analytics suspicious
FortiADC-docs (av_profile_01) # set analytics-max-upload 1024
FortiADC-docs (av_profile_01) # set analytics-db enable
FortiADC-docs (av_profile_01) # set av-virus-log enable
FortiADC-docs (av_profile_01) # next
FortiADC-docs (profile) # end
```

Reference to an AV profile

Use the following commands to reference an AV profile to a HTTP or HTTPs virtual service.

Syntax

```
config load-balance virtual-server
   edit <name>
      set av-profile <profile-name>
   end
end
```

Example

```
FortiADC-docs # config load-balance virtual-server
FortiADC-docs (virtual-server) # edit vs1
FortiADC-docs (vs1) # set load-balance-profile LB_PROF_HTTP
FortiADC-docs (vs1) # set av-profile av_profile_01
FortiADC-docs (vs1) # end
```

config security antivirus quarantine

Use this command to configure anti-virus quarantine.

Syntax

```
config security antivirus quarantine
   set destination {NULL | disk}
   set agelimit <integer>
   set maxfilesize <integer>
   set quarantine-quota <integer>
   set drop-infected {http | https}
```

```
   set lowspace {drop-new | ovrw-old|
end
```

destination	The destination for quarantined files, which could be either of the following: • NULL—Disable quarantine. • Disk—Send quarantined files to the hard disk.
age-limit	The number of hours that quarantined files are kept on the hard disk. The default is 1 hour. Valid values range form 0 to 336 hours. **Note:** If the age limit is set to 0 (zero), it means that there is no age limit and quarantined files will remain on the hard disk forever.
maxfilesize	The maximum size (in KB) of a single file that can be quarantined. The default is 1024 (KB). Valid values range from 1 to 2048 KB. **Note:** Files larger than the set Max File Size will not be quarantined. In reality, this value is subject the available quarantine quota that remains on the hard disk. For example, when there is less than 1024 KB of quarantine quota (disk space reserved for quarantined files) remaining, a file of 1024 KB in size still will not be quarantined even though you've set Max File Size to 1024.
quarantine-quota	The amount of disk space reserved for quarantining files. The default is 512 MB. Valid values range from 0 to 1024 MB. If the value is set to 0, no files are quarantined
drop-infected	Select either or both of the following: • HTTP • HTTPS **Note:** By default neither option is selected, which means that both types of files are quarantined. If selected, files involving the specified protocol or protocols will be dropped (not quarantined).
lowspace	Specify the way in which new files are handled when the system disk space is running low, which could be either of the following: • Override Old—Override old quarantine files with new ones. • Drop New—Drop new quarantine files to retain old ones.

Example

```
FortiADC-docs # config security antivirus quarantine
FortiADC-docs (quarantine) # set destination disk
FortiADC-docs (quarantine) # set agelimit 1
FortiADC-docs (quarantine) # set maxfilesize 1
FortiADC-docs (quarantine) # set quarantine-quota 256
FortiADC-docs (quarantine) # set drop-infected http
FortiADC-docs (quarantine) # set lowspace drop-new
```

```
FortiADC-docs (quarantine) # end
```

config security antivirus settings

Use this command to configure anti-virus service level.

Syntax

```
config security antivirus settings
   set default-db {normal | extended | extreme}
end
```

default-db	Select one of the following: • normal—The regular virus database, which includes “In the Wild” viruses and most commonly seen viruses on the network. It provides regular protection. • extended—The extended virus database, which includes both “In the Wild” viruses and a large collection of zoo viruses that are no longer seen in recent virus studies. It provides enhanced security protection. • extreme—The extreme virus database, which includes both “In the Wild” viruses and all known zoo viruses that are no longer seen in recent virus studies. It provides the highest level of security protection.

Example

```
FortiADC-docs # config security antivirus settings
FortiADC-docs (settings) # set default-db extended
FortiADC-docs (settings) # end
```

config system fortisandbox

Use this command to configure FortiSandbox settings.

Syntax

```
config system fortisandbox
   set type {fsa}
   set status {enable | disable}
   set server <server_ip>
   set email <email_address>
   set source-ip <ip_address>
end
```

type	FSA—FortiSandbox appliance.

`status`	Click the button to enable or disable FortiSandbox service. **Note:** FortiSandbox is disabled by default.
`server`	Enter the IP address of the FortiSandbox appliance. **Note:** This option applies if you want to use a on-premise FortiSandbox appliance for service.
`email`	The email address of the party to be notified.
`source-ip`	The IP address of the source interface on the FortiADC appliance.

config system

The `config system` commands configure system settings.

This chapter is a reference for the following commands:

- "config system accprofile" on page 263
- "config system address" on page 266
- "config system address6" on page 267
- "config system addrgrp" on page 268
- "config system addrgrp6" on page 269
- "config system admin" on page 270
- "config system auto backup" on page 273
- "config system certificate ca" on page 275
- "config system certificate ca_group" on page 276
- "config system certificate certificate_verify" on page 277
- "config system certificate crl" on page 279
- "config system certificate intermediate_ca" on page 280
- "config system certificate intermediate_ca_group" on page 281
- "config system certificate local" on page 281
- "config system certificate local_cert_group" on page 285
- "config system certificate ocsp" on page 287
- "config system certificate ocsp_stapling" on page 289
- "config system certificate remote" on page 285
- "config system dns" on page 292
- "config system dos-prevention" on page 293
- "config system fortiguard" on page 293
- "config system global" on page 295
- "config system ha" on page 297
- "config system health-check" on page 304
- "config system interface" on page 314
- "config system isp-addr" on page 321
- "config system mailserver" on page 326
- "config system overlay-tunnel" on page 327
- "config system password-policy" on page 329
- "config system schedule-group" on page 330
- "config system scripting" on page 331
- "config system service" on page 331
- "config system servicegrp" on page 333
- "config system setting" on page 335
- "config system snmp community" on page 336
- "config system snmp sysinfo" on page 338

- "config system snmp user" on page 339
- "config system tcpdump" on page 341
- "config system time manual" on page 342
- "config system time ntp" on page 343
- "config system web-filter" on page 345
- "config system tunneling" on page 346
- "config system alert" on page 350
- "config system alert-policy" on page 354
- "config system alert-action" on page 349
- "config system alert-syslog" on page 347
- "config system alert-email" on page 348
- "config system alert-snmp-trap" on page 348

config system accprofile

Use this command to manage access profiles.

Access profiles provision permissions to roles. The following permissions can be assigned:

- Read (view access)
- Read-Write (view, change, and execute access)
- No access

When an administrator has only read access to a feature, the administrator can access the web UI page for that feature, and can use the `get` and `show` CLI command for that feature, but cannot make changes to the configuration.

In larger companies where multiple administrators divide the share of work, access profiles often reflect the specific job that each administrator does (“role”), such as account creation or log auditing. Access profiles can limit each administrator account to their assigned role. This is sometimes called role-based access control (RBAC).

Table 20 lists the administrative areas that can be provisioned. If you provision read access, the role can view the web UI menu (or issue a CLI get command). If you provision read-write access, the role can save configuration changes (or issue a CLI set command).

For complete access to *all* commands and abilities, you must log in with the administrator account named **admin**.

Table 20: Areas of control in access profiles

Web UI Menus	CLI Commands

System	`config system`
	`diagnose hardware`
	`diagnose netlink`
	`diagnose sniffer`
	`diagnose system`
	`execute date`
	`execute ping`
	`execute ping-options`
	`execute traceroute`

Networking	`config router`
Server Load Balance	`config load-balance`
Link Load Balance	`config link-load-balance`
Global Load Balance	`config global-dns-server`
Security	`config firewall`

Web UI Menus	CLI Commands
Log & Report	`config log` `execute formatlogdisk`

* For each `config` command, there is an equivalent `get`/`show` command. The `config` commands require write permission. The `get`/`show` commands require read permission.

Before you begin:

- You must have read-write permission for system settings.

Syntax

```
config system accprofile
   edit <name>
      set firewall {none|read|read-write}
      set global-load-balance {none|read|read-write}
      set link-load-balance {none|read|read-write}
      set load-balance {none|read|read-write}
      set log {none|read|read-write}
      set router {none|read|read-write}
      set security {none|read|read-write}
      set system {none|read|read-write}
   next
end
```

`firewall`	Set the permission: • none—Do not provision access for the menu. • read—Provision ready-only access. • read-write—Enable the role to make changes to the configuration.
`global-load-balance`	Set the permission: • none—Do not provision access for the menu. • read—Provision ready-only access. • read-write—Enable the role to make changes to the configuration.
`link-load-balance`	Set the permission: • none—Do not provision access for the menu. • read—Provision ready-only access. • read-write—Enable the role to make changes to the configuration.

load-balance	Set the permission: • none—Do not provision access for the menu. • read—Provision ready-only access. • read-write—Enable the role to make changes to the configuration.
log	Set the permission: • none—Do not provision access for the menu. • read—Provision ready-only access. • read-write—Enable the role to make changes to the configuration.
router	Set the permission: • none—Do not provision access for the menu. • read—Provision ready-only access. • read-write—Enable the role to make changes to the configuration.
security	Set the permission: • none—Do not provision access for the menu. • read—Provision ready-only access. • read-write—Enable the role to make changes to the configuration.
system	Set the permission: • none—Do not provision access for the menu. • read—Provision ready-only access. • read-write—Enable the role to make changes to the configuration.

Example

```
FortiADC-docs # config system accprofile
FortiADC-docs (accprofile) # edit doc-user
Add new entry 'doc-user' for node 772

FortiADC-docs (doc-user) # get
system : none
router : none
firewall : none
load-balance : none
log : none
link-load-balance : none
global-load-balance : none
security : none

FortiADC-docs (doc-user) # set system read-write
FortiADC-docs (doc-user) # end
```

config system address

Use this command to create the IPv4 address objects that you use to specify matching source and destination addresses in policies.

The following policies use address objects:

- Connection limit policies
- Firewall policies
- Link Load Balance policies
- QoS policies

Basic Steps

1. Create address objects.
2. Specify them when you configure your policies.

Before you begin:

- You must have read-write permission for system settings.

Syntax

```
config system address
   edit <name>
      set type {ip-netmask | ip-range}
      set ip-netmask <ip&netmask>
      set ip-min <class_ip>
      set ip-max <class_ip>
   next
end
```

type	• ip-netmask: address block • ip-range: address range
ip-netmask	Specify a subnet using the address/mask notation.
ip-min	Specify the start of an address range.
ip-max	Specify the end of an address range.

Example

```
FortiADC-docs # config system address
FortiADC-docs (address) # edit TEST-NET-1
Add new entry 'TEST-NET-1' for node 3800
FortiADC-docs (TEST-NET-1) # get
type : ip-netmask
ip-netmask : 0.0.0.0/0
```

```
FortiADC-docs (TEST-NET-1) # set ip-netmask 192.0.2.0/24
FortiADC-docs (TEST-NET-1) # next
FortiADC-docs (address) # edit TEST-NET-2
Add new entry 'TEST-NET-2' for node 3800
FortiADC-docs (TEST-NET-2) # set ip-netmask 198.51.100.0/24
FortiADC-docs (TEST-NET-2) # next
FortiADC-docs (address) # edit TEST-NET-3
Add new entry 'TEST-NET-3' for node 3800
FortiADC-docs (TEST-NET-3) # set ip-netmask 203.0.113.0/24
FortiADC-docs (TEST-NET-3) # end
FortiADC-docs #
```

config system address6

Use this command to create the IPv6 address objects that you use in firewall rules.

You create address objects to specify matching source and destination addresses in policies.

The following policies use address objects:

- Connection limit policies
- Firewall policies
- Link Load Balance policies
- QoS policies

Basic Steps

1. Create address objects.
2. Specify them when you configure your policies.

Before you begin:

- You must have read-write permission for system settings.

Syntax

```
config system address6
   edit <No.>
      set type {ip6-network | ip6-range}
      set ip6-network <ip&netmask>
      set ip6-min <class_ip>
      set ip6-max <class_ip>
   next
end
```

type	• ip6-network: address block • ip6-range: address range
ip6-network	Specify a subnet using the address/mask notation.
ip6-min	Specify the start of an address range.
ip6-max	Specify the end of an address range.

Example

```
FortiADC-docs # config system address6
FortiADC-docs (address6) # edit WAN
Add new entry 'WAN' for node 3811
FortiADC-docs (WAN) # set ip6-network 2001:DB8::/32
FortiADC-docs (WAN) # end
```

config system addrgrp

Use this command to create the IPv4 address groups that you use to specify matching source and destination addresses in policies.

The following policies use address groups:

- Link Load Balance policies

Basic Steps

1. Create address objects.
2. Configure address group objects.
3. Select the address groups when you configure your policies.

Before you begin:

- You must have read-write permission for system settings.
- You must have created IPv4 address objects.

Syntax

```
config system addrgrp
   edit <name>
      config member
         edit <name>
            set address <datasource>
         next
      end
   next
end
```

address	Specify an IPv4 address object.

Example

```
FortiADC-docs # config system addrgrp
FortiADC-docs (addrgrp) # edit WAN
Add new entry 'WAN' for node 3806
FortiADC-docs (WAN) # config member
FortiADC-docs (member) # edit 1
Add new entry '1' for node 3808
FortiADC-docs (1) # set address TEST-NET-3
FortiADC-docs (1) # end
```

```
FortiADC-docs (WAN) # next
FortiADC-docs (addrgrp) # edit LAN
Add new entry 'LAN' for node 3806
FortiADC-docs (LAN) # config member
FortiADC-docs (member) # edit 1
Add new entry '1' for node 3808
FortiADC-docs (1) # set address TEST-NET-1
FortiADC-docs (1) # next

FortiADC-docs (member) # edit 2
Add new entry '2' for node 3808
FortiADC-docs (2) # set address TEST-NET-2
FortiADC-docs (2) # end
FortiADC-docs (LAN) # end
```

config system addrgrp6

Use this command to create the IPv6 address groups that you use to specify matching source and destination addresses in policies.

The following policies use address groups:

- Link Load Balance policies

Basic Steps

1. Create address objects.
2. Configure address group objects.
3. Select the address groups when you configure your policies.

Before you begin:

- You must have read-write permission for system settings.
- You must have created IPv4 address objects.

Syntax

```
config system addrgrp6
   edit <name>
      config member
         edit <name>
            set address <datasource>
         next
      end
   next
end
```

address	Specify an IPv6 address object.

Example

```
FortiADC-docs # config system addrgrp6
FortiADC-docs (addrgrp6) # edit WAN-6
```

```
Add new entry 'WAN-6' for node 3817
FortiADC-docs (WAN-6) # config member
FortiADC-docs (member) # edit 1
Add new entry '1' for node 3819
FortiADC-docs (1) # set address WAN
FortiADC-docs (1) # end
FortiADC-docs (WAN-6) # end
```

config system admin

Use this command to manage administrator accounts.

We recommend that only network administrators—and if possible, only a single person—use the **admin** account. You can configure accounts that provision different scopes of access. For example, you can create an account for a security auditor who must only be able to view the configuration and logs, but *not* change them.

Before you begin:

- If you want to use RADIUS or LDAP authentication, you must have already have created the RADIUS server or LDAP server configuration.
- You must have read-write permission for system settings.

Syntax

```
config system admin
   edit <name>
      set access-profile <datasource>
      set auth-strategy {local | ldap | radius}
      set ldap-server <datasource>
      set radius-server <datasource>
      set is-system-admin {no|yes}
      set password <passwd>
      set trusted-hosts <ip&netmask>
      set vdom <datasource>
      set wildcard {disable|enable}
   next
end
```

`<name>`	Name of the administrator account, such as `admin1` or `admin@example.com`. Do not use spaces or special characters except the 'at' symbol (`@`) or dot (`.`). The maximum length is 35 characters. **Note:** This is the user name that the administrator must provide when logging in to the CLI or web UI. After you initially save the configuration, you cannot edit the name.

access-profile	Specify a user-defined or predefined profile. The predefined profile named **super_admin_prof** is a special access profile used by the **admin** account. However, specifying this access profile will *not* confer all permissions of the **admin** account. For example, the new administrator would not be able to reset lost administrator passwords. *Note*: This option does not appear for the **admin** administrator account, which by definition always uses the **super_admin_prof** access profile.
auth-strategy	• local—Use the local authentication server. • ldap—Use an LDAP authentication server. Select the LDAP server configuration. • radius—Use a RADIUS authentication server.
ldap-server	If using LDAP, specify the LDAP server configuration.
radius-server	If using RADIUS, specify the RADIUS server configuration.
is-system-admin	• yes—Can access all virtual domains. • no—Can access only the virtual domain specified in this configuration. **Note**: The system admin privileges enabled by this setting give the user permission to change any non-global-admin password without its current password and to change any global-admin password with the current password.
password	Set a strong password for all administrator accounts. The password should be at least eight characters long, be sufficiently complex, and be changed regularly.
wildcard	Enable/disable user wildcard for remote server authentication.

`trusted-hosts`	Source IP address and netmask from which the administrator is allowed to log in. For multiple addresses, separate each entry with a space. You can specify up to three trusted areas. They can be single hosts, subnets, or a mixture.
	
	Configuring trusted hosts hardens the security of the system. In addition to knowing the password, an administrator must connect only from the computer or subnets you specify.
	
	Trusted host definitions apply both to the web UI and to the CLI when accessed through Telnet, SSH, or the CLI console widget. Local console access is *not* affected by trusted hosts, as the local console is by definition not remote, and does not occur through the network.
	
	If ping is enabled, the address you specify here is also a source IP address to which the system will respond when it receives a ping or traceroute signal.
	
	To allow logins only from *one* computer, enter only its IP address and 32- or 128-bit netmask:
	
	`192.0.2.2/32`
	
	`2001:0db8:85a3::8a2e:0370:7334/128`
	
	To allow login attempts from any IP address (not recommended), enter:
	
	`0.0.0.0/0.`
	
	Caution: If you restrict trusted hosts, do so for *all* administrator accounts. Failure to do so means that all accounts are still exposed to the risk of brute force login attacks. This is because if you leave even *one* administrator account unrestricted (i.e. `0.0.0.0/0`), the system must allow login attempts on all network interfaces where remote administrative protocols are enabled, and wait until *after* a login attempt has been received in order to check that user name's trusted hosts list.
	
	Tip: If you allow login from the Internet, set a longer and more complex New Password, and enable only secure administrative access protocols. We also recommend that you restrict trusted hosts to IPs in your administrator's geographical area.
	
	Tip: For improved security, restrict all trusted host addresses to single IP addresses of computer(s) from which *only* this administrator will log in.

`vdom`	If you have enabled the virtual domain feature, specify the virtual domain that this administrator can view and manage. **Note:** You can create multiple VDOMs separated by space.

Example

```
FortiADC-VM # config system admin
FortiADC-VM (admin) # edit doc-admin
Add new entry 'doc-admin' for node 78
FortiADC-VM (doc-admin) # set access-profile doc-admin
FortiADC-VM (doc-admin) # end
```

```
FortiADC-VM # get system admin doc-admin
is-system-admin : no
vdom : root
password : *
trusted-hosts : 0.0.0.0/0 ::/0
auth-strategy : local
access-profile : doc-admin
theme :
role-list :
privilege-map :
access-token : 3p6RgrzT21ciDMdwgowh9Lwd303SoSsrhygy0Or0PDhrnuXBQrRZdnagne
    6K6y9o5qU5el31WkqiMmRANIy04IfpWl91SjnXHh0TA1SukjM6DCFoidnmVCKQVRRN8cIP
```

config system auto backup

Use this command to configure scheduled system backup.

Syntax

```
config system auto-backup
   set address <ip>
   set folder <string>
   set overwrite-config {enable|disable}
   set password <string>
   set port <integer>
   set scheduled-backup-day {Sunday|Monday|Tuesday|Wednesday|Thursday|Friday|Saturday}
   set scheduled-backup-frequency {daily|weekly|every}
   set scheduled-backup-status {enable|disable}
   set scheduled-backup-time <hh:mm>
   set storage {disk|sftp}
   set username <string>
end
```

`address`	The IP address of the SFTP server.
`folder`	Specify the folder path on the SFTP server.
`overwrite-config`	Enable or disable "overwrite-config" when "storage" is "disk". If overwrite-config is disabled, FortiADC will stop backing up configurations when the maximum size or files is met. By default, this setting is disabled.
`port`	Specify the listening port on the SFTP server.
`scheduled-backup-day`	Specify one day of the week (i.e., Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday.)

scheduled-backup-frequency	Specify a scheduled backup frequency: • Daily—Specify the time of day for daily backup. • Weekly—Specify the day and time for weekly backup. • Every—Specify the time for periodic backup.
scheduled-backup-status	Enable or disable scheduled backup.
scheduled-backup-time	Specify the backup time in the format of <hh:mm> hour and minute, hh: 0-23, mm: {00|15|30|45}.
storage	Specify where to save the backup configuration files: • disk—Hard disk. • sftp—SFTP server.
username	The user name used to log into the SFTP server.
password	The password used to log into the SFTP server.

Example

The following example for a scenario where the storage is on a local disk:

```
FortiADC-VM # config system auto-backup
FortiADC-VM (auto-backup) # get
scheduled-backup-status : disable
FortiADC-VM (auto-backup) # set scheduled-backup-status enable
FortiADC-VM (auto-backup) # set scheduled-backup-day Monday
FortiADC-VM (auto-backup) # set scheduled-backup-time 03:30
FortiADC-VM (auto-backup) # set overwrite-config enable
FortiADC-VM (auto-backup) # show full

config system auto-backup
   set scheduled-backup-status enable
   set scheduled-backup-frequency weekly
   set scheduled-backup-day Monday
   set scheduled-backup-time 03:30
   set storage disk
   set overwrite-config enable
end

FortiADC-VM (auto-backup) # get
scheduled-backup-status : enable
scheduled-backup-frequency : weekly
scheduled-backup-day : Monday
scheduled-backup-time : 03:30
storage : disk
overwrite-config : enable
```

The following example is for a scenario where the storage is on an SFTP server:

```
FortiADC-VM # config sys auto-backup
```

```
FortiADC-VM (auto-backup) # set scheduled-backup-status enable
FortiADC-VM (auto-backup) # set storage sftp
FortiADC-VM (auto-backup) # set scheduled-backup-frequency daily
FortiADC-VM (auto-backup) # set scheduled-backup-time 12:00
FortiADC-VM (auto-backup) # set address 10.0.100.2
FortiADC-VM (auto-backup) # set username test
FortiADC-VM (auto-backup) # set password test
FortiADC-VM (auto-backup) # set folder /backup
FortiADC-VM (auto-backup) # show full

config system auto-backup
   set scheduled-backup-status enable
   set scheduled-backup-frequency daily
   set scheduled-backup-time 12:00
   set storage sftp
   set address 10.0.100.2
   set port 22
   set username test
   set password ENC
       FQ21TuLJKNMzW3AD3GkVQX2yUyeMiC8251rM6XFbNuZkE80xcV+miFjCymkvA+LS8211ZJ8trQFF7RI1NnA
       NdFOlyiABjZ2ZB/YqsbOETL/Ckywe
   set folder /backup
end

FortiADC-VM (auto-backup) # get
scheduled-backup-status : enable
scheduled-backup-frequency : daily
scheduled-backup-time : 12:00
storage : sftp
address : 10.0.100.2
port : 22
username : test
password : *
folder : /backup
```

config system certificate ca

Use this command to configure CA certificates. An alternative to execute certificate ca.

Before you begin:

- You must have read-write permission for system settings.

Syntax

```
config system certificate ca
   edit <name>
      set certificate <certificate>
   next
end
```

certificate	Paste the contents of a CA certificate file between quotation marks as shown in the example.

Example

```
FortiADC-VM # config system certificate ca

FortiADC-VM (ca) # get
== [ Fortinet_CA ]
== [ OracleSSLCA ]
== [ ca ]
FortiADC-VM # config system certificate ca
FortiADC-VM (ca) # edit ca-new

FortiADC-VM (ca-new) # set certificate "-----BEGIN CERTIFICATE-----
> MIID0TCCArmgAwIBAgIJAKr1/WtE48FeMA0GCSqGSIb3DQEBCwUAMGgxEzARBgoJ
> kiaJk/IsZAEZFgNvcmcxFzAVBgoJkiaJk/IsZAEZFgdjaWxvZ29uMQswCQYDVQQG
> EwJVUzEQMA4GA1UEChMHQ0lMb2dvbjEZMBcGA1UEAxMQQ0lMb2dvbiBPU0cgQ0Eg
> MTAeFw0xNDA0MzAxNDE4MDhaFw0zNDA0MzAxNDE4MDhaMGgxEzARBgoJkiaJk/Is
> ZAEZFgNvcmcxFzAVBgoJkiaJk/IsZAEZFgdjaWxvZ29uMQswCQYDVQQGEwJVUzEQ
> MA4GA1UEChMHQ0lMb2dvbjEZMBcGA1UEAxMQQ0lMb2dvbiBPU0cgQ0EgMTCCASIw
> DQYJKoZIhvcNAQEBBQADggEPADCCAQoCggEBAMQQzsB9Uc37VuIyt5xJxcYYkc6K
> XpYihHgskTQp6YYB4XHVimouHafMYyoFsnenrcgf2NGFDvi9l9x9mnL77920JqGr
> LijieMiFEyP1nhGW8C6nJjkSsXLbgZNh9u6U+0oAbspsFRwdHDZOI7gIHSJ2zuiY
> CkMAvjw9TN44Q4IFCvSIf7mfzZgBH7AW1sbgznqnAJsWQhQGTpxZAxubItesyduD
> vj8tz9eb5u8JO3iQ/LYhMspNnxcpTFdaLn2v82NAFTtCrZdCd7aLj1DM0DPEX7Nw
> V/rt/l+tlscglYyEoUnlPYuSQN0Q6Aj5i1GcKPvnFS0Oy9lGY1lT1vZJ4F0CAwEA
> AaN+MHwwDwYDVR0TAQH/BAUwAwEB/zAOBgNVHQ8BAf8EBAMCAQYwHQYDVR0OBBYE
> FP7bnvI4TIqtrM+KGgCvedJiQpuHMB8GA1UdIwQYMBaAFP7bnvI4TIqtrM+KGgCv
FP7bnvI4TIqtrM+KGgCvedJiQpuHMB8GA1UdIwQYMBaAFP7bnvI4TIqtrM+KGgCv
> edJiQpuHMBkGA1UdEQQSMBCBDmNhQGNpbG9nb24ub3JnMA0GCSqGSIb3DQEBCwUA
> A4IBAQCq5KUHQNg51uh1pxKMXQ98ADj2bNzQbswdAFslPow8tTZIBMwhdrq02ZHC
> XPyp2IHxfv+G+pMV1JFtdR0fy8ivilMNyjObEGh1Ss3kvvU7d1z3XwPxqpNcwDqs
> 1K6RRg4zpNWCFPcliAkPDsDbaN1B6A6zJXqOpGgzwocU3dZbPe5sYLgkWZO2/8MI
> eAEk7zoU1ZPSZiu5HghPafKuE1HYshvsak090tRgC6VLvaSLoNZlwR0GuFVGdewH
> 4jR1HpENH7QiLCB1NGCoJgDi3qiFosw3M2+0ExevE1afj2Usm4oZir+Uty0rvR8D
> 03RHH8yYbZ9rw0kuwTkJEo3bYDxH
> -----END CERTIFICATE-----"

FortiADC-VM (ca-new) # end
```

config system certificate ca_group

Use this command to manage CA groups.

Create CA groups to facilitate the configuration of the certificate validator that is associated with a virtual server.

Include in the CA group all of the CAs for the pool of backend servers to be associated with a single virtual server.

Before you begin:

- You must have already added the CAs to the CA certificate store.
- You must have read-write permission for system settings.

Syntax

```
config system certificate ca_group
   edit <name>
      config group_member
         edit <No.>
            set ca <datasource>
         next
      end
   next
end
```

ca	Specify the CA to add to the group.

config system certificate certificate_verify

Use this command to manage certificate validation rules.

To be valid, a client certificate must meet the following criteria:

- Must not be expired or not yet valid
- Must not be revoked by either certificate revocation list (CRL) or, if enabled, online certificate status protocol (OCSP)
- Must be signed by a certificate authority (CA) whose certificate you have imported into the FortiADC appliance
- Must contain a CA field whose value matches a CA's certificate
- Must contain an Issuer field whose value matches the Subject field in a CA's certificate

Certificate validation rules specify the CA certificates to use when validating client certificates, and they specify a CRL and/or OCSP server, if any, to use for certificate revocation checking.

You select a certificate validation configuration object in the profile configuration for a virtual server. If the client presents an invalid certificate during the authentication phase of a SSL/TLS session initiation, the FortiADC system will not allow the connection.

Before you begin:

- You must have already created a CA group and OCSP or CRL configuration.
- You must have read-write permission for system settings.

Syntax

```
config system certificate certificate_verify
   edit "verify"
      set verify-depth <integer>
      set customize-error-ignore <enable/disable>
      set ca-ignore-errors <ca_errors>
      set cert-ignore-errors <cert_errors>
      config group_member
         edit 1
            set ca-certificate <ca>
            set ocsp <ocsp rule>
            set crl <crl rule>
```

```
        next
      end
    next
  end
```

verify-depth	Specify the depth from the last intermediate CA to the root CA.
customize-error-ignore	Enable or disable "ignore errors".
ca-ignore-errors	Specify the errors on the CA to be ignored. Applicable only when "customize-error-ignore" is enabled.
cert-ignore-errors	Specify the errors on the certificate to be ignored. Applicable only when "customize-error-ignore" is enabled.

Example

```
FortiADC-VM # config system certificate certificate_verify
FortiADC-VM (certificate_ve~i) # edit "verify"
FortiADC-VM (verify) # set verify-depth
<integer> Verify depth
FortiADC-VM (verify) # set customize-error-ignore
enable enable option
disable disable option
FortiADC-VM (verify) # set ca-ignore-errors
UNABLE_TO_GET_ISSUER_CERT OPENSSL 2
UNABLE_TO_GET_CRL OPENSSL 3
CERT_NOT_YET_VALID OPENSSL 9
CERT_HAS_EXPIRED OPENSSL 10
CRL_NOT_YET_VALID OPENSSL 11
CRL_HAS_EXPIRED OPENSSL 12
DEPTH_ZERO_SELF_SIGNED_CERT OPENSSL 18
SELF_SIGNED_CERT_IN_CHAIN OPENSSL 19
UNABLE_TO_GET_ISSUER_CERT_LOCALLY OPENSSL 20
UNABLE_TO_VERIFY_LEAF_SIGNATURE OPENSSL 21
CERT_CHAIN_TOO_LONG OPENSSL 22
INVALID_CA OPENSSL 24
INVALID_PURPOSE OPENSSL 26
CERT_UNTRUSTED OPENSSL 27
CERT_REJECTED OPENSSL 28
FortiADC-VM (verify) # set cert-ignore-errors
UNABLE_TO_GET_ISSUER_CERT OPENSSL 2
UNABLE_TO_GET_CRL OPENSSL 3
CERT_NOT_YET_VALID OPENSSL 9
CERT_HAS_EXPIRED OPENSSL 10
CRL_NOT_YET_VALID OPENSSL 11
CRL_HAS_EXPIRED OPENSSL 12
DEPTH_ZERO_SELF_SIGNED_CERT OPENSSL 18
SELF_SIGNED_CERT_IN_CHAIN OPENSSL 19
UNABLE_TO_GET_ISSUER_CERT_LOCALLY OPENSSL 20
UNABLE_TO_VERIFY_LEAF_SIGNATURE OPENSSL 21
CERT_CHAIN_TOO_LONG OPENSSL 22
INVALID_CA OPENSSL 24
INVALID_PURPOSE OPENSSL 26
CERT_UNTRUSTED OPENSSL 27
```

```
CERT_REJECTED OPENSSL 28
FortiADC-VM (verify) #
```

config system certificate crl

Use this command to manage certificate revocation lists (CRL). You can enable CRL by importing a CRL file or specifying a CRL URL.

A CRL is a file that contains a list of revoked certificates, their serial numbers, and their revocation dates. The file also contains the name of the issuer of the CRL, the effective date, and the next update date. By default, the shortest validity period of a CRL is one hour.

Some potential reasons for certificates to be revoked include:

- A CA server was hacked and its certificates are no longer trustworthy.
- A single certificate was compromised and is no longer trustworthy.
- A certificates has expired and is not supposed to be used past its lifetime.

You can upload a CRL file or specify a URL for the CRL file.

Online certificate status protocol (OCSP) is an alternative to CRL. OCSP is useful when you do not want to deploy CRL files, for example, or want to avoid the public exposure of your PKI structure even if it is only invalid certificates.

Before you begin:

- You must know the URL of a CRL server or have downloaded the CRL file and be able to browse to it so that you can upload it.
- You must have read-write permission for system settings.

Syntax

```
config system certificate crl
   edit <name>
      set crl <certificate>
      set http-url <string>
      set scep-url <string>
      set host-header <string>
   next
end
```

`crl`	Paste the contents of a CRL certificate file between quotation marks as shown in the example.
`http-url`	Specify an HTTP URL.
`scep-url`	Specify a SCEP URL.
`host-header`	Specify a hostname in the HTTP request header.

Example

```
FortiADC-VM # config system certificate crl

FortiADC-VM (new-crl) # set crl "-----BEGIN X509 CRL-----
> MIIBxTCBrgIBATANBgkqhkiG9w0BAQsFADBrMRMwEQYKCZImiZPyLGQBGRYDb3Jn
> MRcwFQYKCZImiZPyLGQBGRYHY2lsb2dvbjELMAkGA1UEBhMCVVMxEDAOBgNVBAoT
> B0NJTG9nb24xHDAaBgNVBAMTE0NJTG9nb24gU2lsdmVyIENBIDEXDTE1MDMxNzA4
> NDIwM1oXDTE1MDQxNjA4NDIwM1qgDzANMAsGA1UdFAQEAgIR8DANBgkqhkiG9w0B
> AQsFAAOCAQEAxTbPy5RGtqyE9VLAzNReCBlIcq3PxiLyuBkyniSZdwAkE8znwXLh
> CYBRCLhkY87sGBqRB1lU4v31RIVsy4AMuJrL2B2ClOa2aEry+PcMMehKnIZcTtMi
> YBvCDsbZSGM1JsxCGMakDaMCMqIpVwcnwzoY7rYtlvzlDfUJVMs+hTyRcqq326/l
> smNcUkLhy4U5ydqFqMT2SaLXDw7hsxEARU7AHhWssgDgAPk/UdH4IxNNtmNb4mcK
> j+D87pdYeXLcHqqv+OhCS70e/dmTJPwXrn9ZmG6gjBxPb2MUbUNw252JnFaRpj58
> aVuuSGcqLs2fVs1rGLRW4Pw8aHF3cafbew==
> -----END X509 CRL-----"

FortiADC-VM (new-crl) # end
```

See also

- execute certificate crl

config system certificate intermediate_ca

Use this command to configure intermediate CAs.

Before you begin:

- You must have read-write permission for system settings.

Syntax

```
config system certificate intermediate_ca
   edit <name>
      set certificate <certificate>
   next
end
```

certificate	Paste the contents of an intermediate CA file between quotation marks as shown in the example.

Example

```
FortiADC-VM # config system certificate intermediate_ca
FortiADC-VM (intermediate_ca) # edit new-intermediate-ca
Add new entry 'new-intermediate-ca' for node 1605

FortiADC-VM (new-intermedia~e) # set certificate "-----BEGIN CERTIFICATE-----
> MIID0TCCArmgAwIBAgIJAKr1/WtE48FeMA0GCSqGSIb3DQEBCwUAMGgxEzARBgoJ
> kiaJk/IsZAEZFgNvcmcxFzAVBgoJkiaJk/IsZAEZFgdjaWxvZ29uMQswCQYDVQQG
```

```
> EwJVUzEQMA4GA1UEChMHQ0lMb2dvbjEZMBcGA1UEAxMQQ0lMb2dvbiBPU0cgQ0Eg
> MTAeFw0xNDA0MzAxNDE4MDhaFw0zNDA0MzAxNDE4MDhaMGgxEzARBgoJkiaJk/Is
> ZAEZFgNvcmcxFzAVBgoJkiaJk/IsZAEZFgdjaWxvZ29uMQswCQYDVQQGEwJVUzEQ
> MA4GA1UEChMHQ0lMb2dvbjEZMBcGA1UEAxMQQ0lMb2dvbiBPU0cgQ0EgMTCCASIw
> DQYJKoZIhvcNAQEBBQADggEPADCCAQoCggEBAMQQzsB9Uc37VuIyt5xJxcYYkc6K
> XpYihHgskTQp6YYB4XHVimouHafMYyoFsnenrcgf2NGFDvi9l9x9mnL77920JqGr
> LijieMiFEyP1nhGW8C6nJjkSsXLbgZNh9u6U+0oAbspsFRwdHDZOI7gIHSJ2zuiY
> CkMAvjw9TN44Q4IFCvSIf7mfzZgBH7AW1sbgznqnAJsWQhQGTpxZAxubItesyduD
> vj8tz9eb5u8JO3iQ/LYhMspNnxcpTFdaLn2v82NAFTtCrZdCd7aLj1DM0DPEX7Nw
> V/rt/l+tlscglYyEoUnlPYuSQN0Q6Aj5i1GcKPvnFS0Oy9lGY1lT1vZJ4F0CAwEA
> AaN+MHwwDwYDVR0TAQH/BAUwAwEB/zAOBgNVHQ8BAf8EBAMCAQYwHQYDVR0OBBYE
> eAEk7zoU1ZPSZiu5HghPafKuE1HYshvsak090tRgC6VLvaSLoNZlwR0GuFVGdewH
FP7bnvI4TIqtrM+KGgCvedJiQpuHMB8GA1UdIwQYMBaAFP7bnvI4TIqtrM+KGgCv
> -----END CERTIFICATE-----
    edJiQpuHMBkGA1UdEQQSMBCBDmNhQGNpbG9nb24ub3JnMA0GCSqGSIb3DQEBCwUA
> A4IBAQCq5KUHQNg51uh1pxKMXQ98ADj2bNzQbswdAFslPow8tTZIBMwhdrq02ZHC
> XPyp2IHxfv+G+pMV1JFtdR0fy8ivilMNyjObEGh1Ss3kvvU7d1z3XwPxqpNcwDqs
> 1K6RRg4zpNWCFPcliAkPDsDbaN1B6A6zJXqOpGgzwocU3dZbPe5sYLgkWZO2/8MI
> eAEk7zoU1ZPSZiu5HghPafKuE1HYshvsak090tRgC6VLvaSLoNZlwR0GuFVGdewH
> 4jR1HpENH7QiLCB1NGCoJgDi3qiFosw3M2+0ExevE1afj2Usm4oZir+Uty0rvR8D
> 03RHH8yYbZ9rw0kuwTkJEo3bYDxH
> -----END CERTIFICATE-----"

FortiADC-VM (new-intermedia~e) # end
```

config system certificate intermediate_ca_group

Use this command to manage intermediate CA groups.

Before you begin:

- You must have read-write permission for system settings.

Syntax

```
config system certificate intermediate_ca_group
   edit <name>
      config group_member
         edit <No.>
            set ca <datasource>
         next
      end
   next
end
```

ca	Specify a CA configuration object.

config system certificate local

Use this command to manage local certificates.

Before you begin:

- You must have read-write permission for system settings.

Syntax

```
config system certificate local
   edit <name>
      set certificate <certificate>
      set comments <string>
      set csr <csr>
      set password <passwd>
      set private-key <key>
   next
end
```

certificate	Paste the contents of a certficate file between quotation marks as shown in the example.
comments	Optional administrator note.
csr	Paste the contents of a CSR file between quotation marks as shown in the example.
password	Password that was used to encrypt the file. The FortiADC system uses the password to decrypt and install the certificate.
private-key	Paste the contents of a key file between quotation marks as shown in the example.

Example

```
FortiADC-VM # config system certificate local

FortiADC-VM (local) # get
== [ Factory ]
== [ csr_name_test ]

FortiADC-VM (local) # show
config system certificate local
edit "csr_name_test"
set password ENC
    t7e4fiX6Sd6T5426Gg/HQXRH41mBwGmjKdBSHUbVUZTka2FtD1oLMWE2mTq1c9GMUz0DokPfoqxkjkmja5mWv4
    /wA5XdQ00lQmTeMZK/X5OSFmSS
set private-key "-----BEGIN ENCRYPTED PRIVATE KEY-----
MIIBnjBABgkqhkiG9w0BBQ0wMzAbBgkqhkiG9w0BBQwwDgQI5/vf1VQB/28CAggA
MBQGCCqGSIb3DQMHBAgZorM0zlnPNASCAViZk4wTZYYMPl0e7NwyxqvLND3LxUaV
UG1XpUSPfnUP4YgrV2d0Uijclj5M7MS341cMVKZ7G1pS/6jvxUr0NamQv4j7JsJ0
t3G7LMkzcTiep26GUCy55Qt+iob7lh0iiKa+4uPOq/Mzy+84AWnRNLfIhevHPsYb
rk4UbwNOFb0ZD9i06+UrFLsRGmtp/vlDyBgAoBojKxB/4j0G299QamnzPz4qneBc
HtPqTMPELyqtT6w4cmnwp6Ti2OOAr9c44mKdyyAVZKie+Iu/4pSVBNSfuC+jjtmC
k8OrCrG14NwrhbTY9zEnGxBRR1NMTEBBTqAQNYWtjUEQVjmY1GAJA3/oBQe7l8C/
G/IUVvc/aaqMvsKSNfDpgZaudTDe1Wxi1792ADGh7zslls+ykH9nmqh7BPfm30Nv
f8O1hXgq01Lvo4v1xdC0w5oAeCyGlbTY5ZnXJFm0HCp0kA==
```

```
-----END ENCRYPTED PRIVATE KEY-----
"
set csr "-----BEGIN CERTIFICATE REQUEST-----
MIIBNzCB4gIBADBqMQswCQYDVQQIEwJjYTESMBAGA1UEBxMJc3Vubnl2YWxlMREw
DwYDVQQKEwhmb3J0aW5ldDENMAsGA1UECxMEZmFkYzEQMA4GA1UEAxMHZXhhbXBs
ZTETMBEGCSqGSIb3DQEJARYEcm9vdDBcMA0GCSqGSIb3DQEBAQUAA0sAMEgCQQDK
XH/MC1KTkkZJiQDFb6IXHLYsSVbJzF0K30s3CVmKZvJQSBnmV8aq3fJjN281rrFT
iUovVdBzwCF5jKbxsrPLAgMBAAGgEzARBgNVHRMxChMIQ0E6RkFMU0UwDQYJKoZI
hvcNAQEFBQADQQB96NU+xjds83/6VRSzsyxeVxAGVD7F9Npuji8r/MpxPiMT0PQM
G8Wg//26ZqpwjuPq2V1+7QU4MDk3B5VUJSEF
-----END CERTIFICATE REQUEST-----
"
next
end

FortiADC-VM (local) # edit new-local
Add new entry 'new-local' for node 849

FortiADC-VM (new-local) # set private-key "-----BEGIN RSA PRIVATE KEY-----
> MIIJKQIBAAKCAgEA3W29+ID6194bH6ejLrIC4hb2Ugo8v6ZC+Mrck2dNYMNPjcOK
> ABvxxEtBamnSaeU/IY7FC/giN622LEtV/3oDcrua0+yWuVafyxmZyTKUb4/GUgaf
> RQPf/eiX9urWurtIK7XgNGFNUjYPq4dSJQPPhwCHE/LKAykWnZBXRrX0Dq4XyApN
> ku0IpjIjEXH+8ixE12wH8wt7DEvdO7T3N3CfUbaITl1qBX+Nm2Z6q4Ag/u5rl8NJ
> fXg71ZmXA3XOj7zFvpyapRIZcPmkvZYn7SMCp8dXyXHPdpSiIWL2uB3KiO4JrUYv
> t2GzLBUThp+lNSZaZ/Q3yOaAAUkOx+1h08285Pi+P8lO+H2Xic4SvMq1xtLg2bNo
> PC5KnbRfuFPuUD2/3dSiiragJ6uYDLOyWJDivKGt/72OVTEPAL9o6T2pGZrwbQui
> FGrGTMZOvWMSpQtNl+tCCXlT4mWqJDRwuMGrI4DnnGzt3IKqNwS4Qyo9KqjMIPwn
> XZAmWPm3FOKe4sFwc5fpawKO01JZewDsYTDxVj+cwXwFxbE2yBiFz2FAHwfopwaH
> 35p3C6lkcgP2k/zgAlnBluzACUI+MKJ/G0gv/uAhj1OHJQ3L6kn1SpvQ41/ueBjl
> unExqQSYD7GtZ1Kg8uOcq2r+WISE3Qc9MpQFFkUVllmgWGwYDuN3Zsez95kCAwEA
> AQKCAgBymEHxouau4z6MUlisaOn/Ej0mVi/8S1JrqakgDB1Kj6nTRzhbOBsWKJBR
> EbRidI61mtGNikIF+PAAN+YgFJbXYK5I5jjIDs5JJohIkKaP9c5AJbxnpGslvLg/
IDrFXBc22YY9QTa4YldCi/eOrP0eLIANs95u3zXAqwPBnh1kgG9pYsbuGy5Fh4kp
PzTrIv5aIqYtvJwQzrDyGYcHMaEpNpg5Rz716jPGi5hAPRH+7pyHhO/Watv4bvB+
> RoplFQKCAQEA6i+DcoCL5A+N3tlvkuuQBUw/xzhn2uu5BP/kwd2A+b7gfp6Uv9lf
lCjO+O+v12+SDC1U96+CaQUFLQSw7H/7vfH4UsJmhvX0HWSSWFzsZRCiklOgl1/4
> vlNgB7MU/c7bZLyor3ZuWQh8Q6fgRSQj0kp1T/78RrwDl8r7xG4gW6vj6F6m+9bg
> ro5Zayu3qxqJhWVvR3OPvm8pVa4hIJR5J5Jj3yZNOwdOX/Saiv6tEx7MvB5bGQlC
> 6co5SIEPPZ/FNC1Y/PNOWrb/Q4GW1AScdICZu7wIkKzWAJCo59A8Luv5FV8vm4R2
> wRsQuawQVLCUEP3To6kYOwTzJq7jhiUK6FnjLjeTrNQSVdoqwoJrlTAHgXVV3q7q
4JkyB6kXcVfowrjYXqDF/UX0ddDLLGF96ZStte3PXX8PQWY89FZuBkGw6NRZInHi
> xinN2V8cm7Cw85d9Ez2zEGB4KC7LI+JgLQtdg3XvbdfhOi06eGjgK2mwfOqT8Sq+
> v9POIJXTNEI3fi3dB86af/8OXRtOrAa1mik2msDI1Goi7cKQbC3fz/p1ISQCptvs
> YvNwstDDutkA9o9araQy5b0LC6w5k+CSdVNbd8O2EUd0OBOUjblHKvdZ3Voz8EDF
> ywYimmNGje1lK8nh2ndpja5q3ipDs1hKg5UujoGfei2gn0ch5QKCAQEA8O+IHOOu
> T/lUgWspophE0Y1aUJQPqgK3EiKB84apwLfz2eAPSBff2dCN7Xp6s//u0fo41LE5
> P0ds/5eu9PDlNF6HH5H3OYpV/57v5O2OSBQdB/+3TmNmQGYJCSzouIS3YNOUPQ1z
> FFvRateN91BW7wKFHr0+M4zG6ezfutAQywWNoce7oGaYTT8z/yWXqmFidDqng5w5
> 6d8t40ScozIVacGug+lRi8lbTC+3Tp0r+la66h49upged3hFOvGXIOybvYcE98K2
> GpNl9cc4q6O1WLdR7QC91ZNflKOKE8fALLZ/stEXL0p2bixbSnbIdxOEUch/iQhM
> chxlsRFLjxV1dwKCAQEA60X6LyefIlXzU3PA+gIRYV0g8FOxzxXfvqvYeyOGwDaa
> p/Ex50z76jIJK8wlW5Ei7U6xsxxw3E9DLH7Sf3H4KiGouBVIdcv9+IR0LcdYPR9V
> oCQ1Mm5a7fjnm/FJwTokdgWGSwmFTH7/jGcNHZ8lumlRFCj6VcLT/nRxM6dgIXSo
> w1D9QGC9V+e6KOZ6VR5xK0h8pOtkqoGrbFLu26GPBSuguPJXt0fwJt9PAG+6VvxJ
> 89NLML/n+g2/jVKXhfTT1Mbb3Fx4lnbLnkP+JrvYIaoQ1PZNggILYCUGJJTLtqOT
> gkg1S41/X8EFg671kAB6ZYPbd5WnL14Xp0a9MOB/bwKCAQEA6WVAl6u/al1/jTdA
> R+/1ioHB4Zjsa6bhrUGcXUowGy6XnJG+e/oUsS2kr04cm03sDaC1eOSNLk2Euzw3
```

```
> EbRidI61mtGNikIF+PAAN+YgFJbXYK5I5jjIDs5JJohIkKaP9c5AJbxnpGslvLg/
> IDrFXBc22YY9QTa4YldCi/eOrP0eLIANs95u3zXAqwPBnh1kgG9pYsbuGy5Fh4kp
> q7WSpLYo1kQo6J8QQAdhLVh4B7QIsU7GQYGm0djCR81Mt2o9nCW1nEUUnz32YVay
> ASM/Q0eip1I2kzSGPLkHww2XjjjkD1cZfIhHnYZ+kO3sV92iKo9tbFOLqmbz48l7
> RoplFQKCAQEA6i+DcoCL5A+N3tlvkuuQBUw/xzhn2uu5BP/kwd2A+b7gfp6Uv9lf
> P6SCgHf6D4UOMQyN0O1UYdb71ESAnp8BGF7cpC97KtXcfQzK3+53JJAWGQsxcHts
> Q0foss6gTZfkRx4EqJhXeOdI06aX5Y5ObZj7PYf0dn0xqyyYqYPHKkYG3jO1gelJ
> T0C3ipKv3h4pI55Jg5dTYm0kBvUeELxlsg3VM4L2UNdocikBaDvOTVte+Taut12u
> OLaKns9BR/OFD1zJ6DSbS5n/4A9p4YBFCG1Rx8lLKUeDrzXrQWpiw+9amunpMsUr
> rlJhfMwgXjA7pOR1BjmOapXMEZNWKlqsPQKCAQByVDxIwMQczUFwQMXcu2IbA3Z8
> Czhf66+vQWh+hLRzQOY4hPBNceUiekpHRLwdHaxSlDTqB7VPq+2gSkVrCX8/XTFb
> SeVHTYE7iy0Ckyme+2xcmsl/DiUHfEy+XNcDgOutS5MnWXANqMQEoaLW+NPLI3Lu
> V1sCMYTd7HN9tw7whqLg18wB1zomSMVGT4DkkmAzq4zSKI1FNYp8KA3OE1Emwq+0
> wRsQuawQVLCUEP3To6kYOwTzJq7jhiUK6FnjLjeTrNQSVdoqwoJrlTAHgXVV3q7q
> v3TGd3xXD9yQIjmugNgxNiwAZzhJs/ZJy++fPSJ1XQxbd9qPghgGoe/ff6G7
> -----END RSA PRIVATE KEY-----"

FortiADC-VM (new-local) # set certificate "-----BEGIN CERTIFICATE-----
> MIIGJzCCBA+gAwIBAgIBATANBgkqhkiG9w0BAQUFADCBsjELMAkGA1UEBhMCRlIx
> DzANBgNVBAgMBkFsc2FjZTETMBEGA1UEBwwKU3RyYXNib3VyZzEYMBYGA1UECgwP
> d3d3LmZyZWVsYW4ub3JnMRAwDgYDVQQLDAdmcmVlbGFuMS0wKwYDVQQDDCRGcmVl
> bGFuIFNhbXBsZSBDZXJ0aWZpY2F0ZSBBdXRob3JpdHkxIjAgBgkqhkiG9w0BCQEW
> E2NvbnRhY3RAZnJlZWxhbi5vcmcwHhcNMTIwNDI3MTAzMTE4WhcNMjIwNDI1MTAz
> MTE4WjB+MQswCQYDVQQGEwJGUjEPMA0GA1UECAwGQWxzYWNlMRgwFgYDVQQKDA93
> d3cuZnJlZWxhbi5vcmcxEDAOBgNVBAsMB2ZyZWVsYW4xDjAMBgNVBAMMBWFsaWNl
> MSIwIAYJKoZIhvcNAQkBFhNjb250YWN0QGZyZWVsYW4ub3JnMIICIjANBgkqhkiG
> 9w0BAQEFAAOCAg8AMIICCgKCAgEA3W29+ID6194bH6ejLrIC4hb2Ugo8v6ZC+Mrc
> k2dNYMNPjcOKABvxxEtBamnSaeU/IY7FC/giN622LEtV/3oDcrua0+yWuVafyxmZ
> yTKUb4/GUgafRQPf/eiX9urWurtIK7XgNGFNUjYPq4dSJQPPhwCHE/LKAykWnZBX
> RrX0Dq4XyApNku0IpjIjEXH+8ixE12wH8wt7DEvdO7T3N3CfUbaITl1qBX+Nm2Z6
> q4Ag/u5rl8NJfXg71ZmXA3XOj7zFvpyapRIZcPmkvZYn7SMCp8dXyXHPdpSiIWL2
> uB3KiO4JrUYvt2GzLBUThp+lNSZaZ/Q3yOaAAUkOx+1h08285Pi+P8lO+H2Xic4S
> vMq1xtLg2bNoPC5KnbRfuFPuUD2/3dSiiragJ6uYDLOyWJDivKGt/72OVTEPAL9o
> 6T2pGZrwbQuiFGrGTMZOvWMSpQtNl+tCCXlT4mWqJDRwuMGrI4DnnGzt3IKqNwS4
> Qyo9KqjMIPwnXZAmWPm3FOKe4sFwc5fpawKO01JZewDsYTDxVj+cwXwFxbE2yBiF
> z2FAHwfopwaH35p3C6lkcgP2k/zgAlnBluzACUI+MKJ/G0gv/uAhj1OHJQ3L6kn1
> SpvQ41/ueBjlunExqQSYD7GtZ1Kg8uOcq2r+WISE3Qc9MpQFFkUVllmgWGwYDuN3
> Zsez95kCAwEAAaN7MHkwCQYDVR0TBAIwADAsBglghkgBhvhCAQ0EHxYdT3BlblNT
> TCBHZW5lcmF0ZWQgQ2VydGlmaWNhdGUwHQYDVR0OBBYEFFlfyRO6G8y5qEFKikl5
> ajb2fT7XMB8GA1UdIwQYMBaAFCNsLT0+KV14uGw+quK7Lh5sh/JTMA0GCSqGSIb3
> DQEBBQUAA4ICAQAT5wJFPqervbja5+90iKxi1d0QVtVGB+z6aoAMuWK+qgi0vgvr
> mu9ot2lvTSCSnRhjeiP0SIdqFMORmBtOCFk/kYDp9M/91b+vS+S9eAlxrNCB5VOf
> PqxEPp/wv1rBcE4GBO/c6HcFon3F+oBYCsUQbZDKSSZxhDm3mj7pb67FNbZbJIzJ
> 70HDsRe2O04oiTx+h6g6pW3cOQMgIAvFgKN5Ex727K4230B0NIdGkzuj4KSML0NM
> slSAcXZ41OoSKNjy44BVEZv0ZdxTDrRM4EwJtNyggFzmtTuV02nkUj1bYYYC5f0L
> ADr6s0XMyaNk8twlWYlYDZ5uKDpVRVBfiGcq0uJIzIvemhuTrofh8pBQQNkPRDFT
> Rq1iTo1Ihhl3/Fl1kXk1WR3jTjNb4jHX7lIoXwpwp767HAPKGhjQ9cFbnHMEtkro
> RlJYdtRq5mccDtwT0GFyoJLLBZdHHMHJz0F9H7FNk2tTQQMhK5MVYwg+LIaee586
> CQVqfbscp7evlgjLW98H+5zylRHAgoH2G79aHljNKMp9BOuq6SnEglEsiWGVtu2l
> hnx8SB3sVJZHeer8f/UQQwqbAO+Kdy70NmbSaqaVtp8jOxLiidWkwSyRTsuU6D8i
> DiH5uEqBXExjrj0FslxcVKdVj5glVcSmkLwZKbEU1OKwleT/iXFhvooWhQ==
> -----END CERTIFICATE-----"

FortiADC-VM (new-local) # end
```

See also

- execute certificate local

config system certificate local_cert_group

Use this command to manage local certificate groups.

Create local groups to facilitate the configuration of profiles that are associated with a virtual server.

Include in the local certificate group all of the server certificates and intermediate CAs for the pool of backend servers to be associated with a single virtual server.

Before you begin:

- You must have already added the certificates to the local certificate store and Intermediate CA certificate store.
- You must have read-write permission for system settings.

Syntax

```
config system certificate local_cert_group
   edit <name>
      config group_member
         edit <No.>
            set default {enable|disable}
            set intermediate-ca-group <datasource>
            set local-cert <datasource>
         next
      end
   next
end
```

default	Specify one certificate to be the default for the group.
intermediate-ca-group	Specify an Intermediate CA group configuration.
local-cert	Specify a local certificate configuration.

config system certificate remote

Use this command to configure a remote certificate. You can enable OCSP by importing an OCSP CA or specifying an OSCP URL. If you want to use the configuration in a certificate verify configuration, you must add both an OCSP CA and URL.

OCSP enables you to validate or revoke certificates by query, rather than by importing certificate revocation list (CRL) files. Since distributing and installing CRL files can be a considerable burden in large organizations, and because delay between the release and install of the CRL represents a vulnerability window, this can often be preferable.

To use OCSP queries, you must first install the certificates of trusted OCSP/CRL servers.

Before you begin:

- You must know the URL of an OCSP server or have downloaded the certificate and key files and be able to browse to them so that you can upload them.
- You must have read-write permission for system settings.

Syntax

```
config system certificate remote
   edit "cert"
   next
end
```

cert	Paste the contents of a CA file between the quotation marks (" "), as shown in the example below.

Example

```
FortiADC-VM # config system certificate remote

FortiADC-VM (remote) # get
== [ ca ]

FortiADC-VM (remote) # edit new-remote-ca
Add new entry 'new-remote-ca' for node 930

FortiADC-VM (new-remote-ca) # set certificate "-----BEGIN CERTIFICATE-----
> MIID0TCCArmgAwIBAgIJAKr1/WtE48FeMA0GCSqGSIb3DQEBCwUAMGgxEzARBgoJ
> kiaJk/IsZAEZFgNvcmcxFzAVBgoJkiaJk/IsZAEZFgdjaWxvZ29uMQswCQYDVQQG
> EwJVUzEQMA4GA1UEChMHQ0lMb2dvbjEZMBcGA1UEAxMQQ0lMb2dvbiBPU0cgQ0Eg
> MTAeFw0xNDA0MzAxNDE4MDhaFw0zNDA0MzAxNDE4MDhaMGgxEzARBgoJkiaJk/Is
> ZAEZFgNvcmcxFzAVBgoJkiaJk/IsZAEZFgdjaWxvZ29uMQswCQYDVQQGEwJVUzEQ
> MA4GA1UEChMHQ0lMb2dvbjEZMBcGA1UEAxMQQ0lMb2dvbiBPU0cgQ0EgMTCCASIw
> DQYJKoZIhvcNAQEBBQADggEPADCCAQoCggEBAMQQzsB9Uc37VuIyt5xJxcYYkc6K
> XpYihHgskTQp6YYB4XHVimouHafMYyoFsnenrcgf2NGFDvi9l9x9mnL77920JqGr
> LijieMiFEyP1nhGW8C6nJjkSsXLbgZNh9u6U+0oAbspsFRwdHDZOI7gIHSJ2zuiY
> CkMAvjw9TN44Q4IFCvSIf7mfzZgBH7AW1sbgznqnAJsWQhQGTpxZAxubItesyduD
> vj8tz9eb5u8JO3iQ/LYhMspNnxcpTFdaLn2v82NAFTtCrZdCd7aLj1DM0DPEX7Nw
> V/rt/l+tlscglYyEoUnlPYuSQN0Q6Aj5i1GcKPvnFS0Oy9lGY1lT1vZJ4F0CAwEA
> AaN+MHwwDwYDVR0TAQH/BAUwAwEB/zAOBgNVHQ8BAf8EBAMCAQYwHQYDVR0OBBYE
> FP7bnvI4TIqtrM+KGgCvedJiQpuHMB8GA1UdIwQYMBaAFP7bnvI4TIqtrM+KGgCv
> edJiQpuHMBkGA1UdEQQSMBCBDmNhQGNpbG9nb24ub3JnMA0GCSqGSIb3DQEBCwUA
> A4IBAQCq5KUHQNg51uh1pxKMXQ98ADj2bNzQbswdAFslPow8tTZIBMwhdrq02ZHC
> XPyp2IHxfv+G+pMV1JFtdR0fy8ivilMNyjObEGh1Ss3kvvU7d1z3XwPxqpNcwDqs
> 1K6RRg4zpNWCFPcliAkPDsDbaN1B6A6zJXqOpGgzwocU3dZbPe5sYLgkWZO2/8MI
> eAEk7zoU1ZPSZiu5HghPafKuE1HYshvsak090tRgC6VLvaSLoNZlwR0GuFVGdewH
> 4jR1HpENH7QiLCB1NGCoJgDi3qiFosw3M2+0ExevE1afj2Usm4oZir+Uty0rvR8D
> 03RHH8yYbZ9rw0kuwTkJEo3bYDxH
> -----END CERTIFICATE-----"

FortiADC-VM (new-remote-ca) #
```

See also

- execute certificate remote

config system certificate ocsp

Use this command to configure Online Certificate Status Protocol (OCSP). You can enable OCSP by importing an OCSP CA or specifying an OSCP URL. If you want to use the configuration in a certificate verify configuration, you must add both an OCSP CA and URL.

OCSP enables you to validate or revoke certificates by query rather than by importing certificate revocation list (CRL) files. Because distributing and installing CRL files can be a considerable burden for large organizations, and because delay between the release and install of the CRL represents a vulnerability window, OCSP can often be the preferred option.

Typically, upon receiving certificates, FortiADC sends validity check requests to the OCSP server, which then returns the result signed by its certificate. A URL is required to identify the OCSP service location.

To use OCSP queries, you must first install the certificates of trusted OCSP/CRL servers.

Before you begin:

- You must know the URL of an OCSP server or have downloaded the certificate and key files and be able to browse to them so that you can upload them.
- You must have read-write permission for system settings.

Syntax

```
config system certificate ocsp
   edit "ocsp"
      set verify-others <enable/disable>
      set remote-certificates <remote_ca>
      set ca-chain <ca_group>
      set issuer-criteria-check <enable/disable>
      set accept-trusted-root-ca <enable/disable>
      set reject-ocsp-response-with-missing-nextupdate <enable/disable>
      set url <ocsp server location>
      set host-header <string>
      set timeout <integer>
      set leeway <integer>
      set maxage <integer>
      set caching enable
      set caching-thisupd-extra-maxage -1
      set caching-nextupd-ahead-time -1
end
```

`remote-certificates`	Specify the remote-certificates used to sign the OCSP result. **Note:** This option becomes available only when `verify-others` is enabled.

ca-chain	Specify the CA chain (i.e., CA group) used to sign the OCSP result. **Note:** This option becomes available only when verify-others is disabled.
issuer-criteria-check	Enable or disable to issuer-criteria-check. **Note:** This option comes in hand in hand with CA Chain, and is available only when verify-others is disabled). The function is enabled by default, but you can disable it if you do not want to validate the certificate issuer's identity.
accept-trusted-root-ca	Enable or disable accept-trusted-root-ca. **Note:** This option becomes available only when issuer-criteria-check is enabled.
reject-ocsp-response-with-missing-nextupdate	Enable or disable reject-ocsp-response-with-missing-nextupdate. The default is disable. **Note:** When disabled, FortiADC will accept OCSP responses without the next-update time. When enabled, it will drop OCSP responses without the next-update time.
url	The URL of the OCSP server.
host-header	The hostname in the HTTP request header.
timeout	The number of seconds (200 ms by default) that FortiADC waits for a response from the OCSP responder. FortiADC will block the link once it times out.
leeway	Specify the time that when the OCSP responder clock and a client clock are not synchronized, which could cause a certificate status check to fail. (default 300s)
maxage	Specify a time in seconds to compare to the notBefore field of a status response. Used when the status response does not include the notAfter field.(default 0s)
caching	Enable or disable OCSP caching. Enable this option to make OCSP response restored as cache in FortiADC.
caching-thisupd-extra-maxage	Specify the time gap between the current time and the this-updated-time in OCSP response that is acceptable by FortiADC. **Note:** The default is -1, meaning this option does not take effect.
caching-nex-tupd-ahead-time	Specify how long before the next-updated-time FortiADC will flush the OCSP response. **Note:** The default is -1, meaning this option does not take effect.

Example

```
FortiADC-VM # config system certificate ocsp

FortiADC-VM (ocsp) # edit ocsp

FortiADC-VM (ocsp) # set url
```

```
<string> URL of OCSP server

FortiADC-VM (ocsp) # set verify-others
enable enable option
disable disable option

FortiADC-VM (ocsp) # set remote-certificates
<datasource> remote certificates reference

FortiADC-VM (ocsp) # set accept-trusted-root-ca
enable enable option
disable disable option

FortiADC-VM (ocsp) # set issuer-criteria-check
enable enable option
disable disable option

FortiADC-VM (ocsp) # set timeout
<integer> OCSP inquery timeout (in millisecond)

FortiADC-VM (ocsp) # set leeway
<integer> OCSP response thisupd and nextupd leeway (in second)

FortiADC-VM (ocsp) # set maxage
<integer> OCSP response thisupd max-age (in second, set to negative number to disable max-
    age check)

FortiADC-VM (ocsp) # set caching
enable enable option
disable disable option
FortiADC-VM (ocsp) # set caching-thisupd-extra-maxage
<integer> OCSP caching thisupd extra max-age check (in second, set to -1 to disable it)
FortiADC-VM (ocsp) # set caching-nextupd-ahead-time
<integer> OCSP caching nextupd ahead time (in second, set to -1 to disable it)
```

config system certificate ocsp_stapling

Use this command to configure Online Certificate Status Protocol Stapling. You can enable OCSP stapling by importing an OCSP response or quote an OCSP profile.

In a stapling scenario, the certificate holder queries the OCSP server themselves at regular intervals, obtaining a signed time-stamped OCSP response. When the site's visitors attempt to connect to the site, this response is included ("stapled") with the TLS/SSL Handshake via the Certificate Status Request extension response. Note that the TLS client must explicitly include a Certificate Status Request extension in its Client Hello TLS/SSL handshake message.

OCSP_staping could be used in a `local_certificate_group`, and the local certificate in OCSP stapling must be the local certificate in the local certificate group.

Syntax

```
config system certificate OCSP_stapling
edit <name>
   set OCSP <datasource>
```

```
    set OCSP-response <datasource>
    set issuer-certificate <datasource>
    set local-certificate <datasource>
    set response-update-ahead-time <integrate>
    set response-update-interval <integrate>
  end
```

ocsp	Quote from system certificate OCSP.
ocsp-response	A certificate containing the OCSP response from the OCSP server.
issuer-certificate	The issuer CA of the local certificate.
local-certificate	The certificate used by FortiADC.
response-update-ahead-time	The default is 1h (1 hour). Valid values are Xh (hour), Xm (minute), and Xs (second). For example, 5m, 30s (=5 minute and 30 seconds).
response-update-interval	The number of seconds (200 ms by default) that FortiADC waits for a response from the OCSP responder. FortiADC will block the link once it times out.

Example

```
config system certificate OCSP_stapling
   edit "ocsp_stapling"
      set local-certificate cert
      set issuer-certificate cacert
      set OCSP-response
          "MIIKeQoBAKCCCnIwggpuBgkrBgEFBQcwAQEEggpfMIIKWzCCASChgYEwfzEUMBIGA1UEAwwLNDA5Ni1
          yb290Y2ExCzAJBgNVBAgMAmJqMQswCQYDVQQGEwJjbjEnMCUGCSqGSIb3DQEJARYYNDA5Ni1yb290Y2F
          AZm9ydGluZXQuY29tMREwDwYDVQQKDAhmb3J0aW5ldDERMA8GA1UECwwIZm9ydGlhZGMYDzIwMTcwMzE
          zMTA0MDQ1WjBkMGIwOjAJBgUrDgMCGgUABBQuq3cKCtmzEbCY3c2GIzKUbADU6wQUjLv9DNomYUiws+I
          kpFUi+FUQW5sCAQKAABgPMjAxNzAzMTMxMDQwNDVaoBEYDzIwMTcwMzIzMTA0MDQ1WqEjMCEwHwYJKwY
          BBQUHMAECBBIEEHqSQEn+xI8mdXVoJL7aLXwwDQYJKoZIhvcNAQEFBQADggIBABLRfWAxeSzUucrTkkc
          INb8EPGgJvYP6tHcHmh/iqguHgfdY6YdWDS2ZMiUgJSEiIX9y00qKBARH0fERnEjwQtE9WlWjSCr+BSz
          icN+MrSfcT7tihRbpBfSTX6yCL8ox/281q7BpjGtm3mz2NpebFG/c8Ziz5wSVOkKo161t3DZu2mL3nH6
          dWl6b+dAf8hh1uJNHUsB+Ppidjzt2a0WzUxTe1lsm8vpxDsIMM3gAz052tnLx86wiPEbk3EEu9OPJqJz
          r+x222HL8kJwLEvrDmUDkXQCoFigPQ5F+DiM0Bx1dDReucN7bXeQvfdVV7XMsaK4pPiOnsooRtRqY8YX
          /GjZM3TD3CH+6XCuGb9NlSZBL6Ad8sHVprNskcPiS7dYAwm5cBI8M8gyK/q2wHB6XK2siYTEXAmXTdQg
          Vh7U8Nt0uBPx9rPVvdGtmIPYjWKwy3bqlK+pB92YZyWcZTM6yhJWUiTxNneiCkV4m/OX31fafZ27qHDB
          jdlCFJ9w/KX1uttDviW7x6VZ92D5/meSo+vE3+Lbx85pakwtFDNfg/7ULk+3v/1beFAE1pNkGWyuarZa
          jkkAMNuD1ADZIZjqeX3Ayy6tFC6tbigD0YYMfvlrEXIFcu4E74KD+X4CKMnq10ndJAIuWCVL0ZRbiFGf
          B/Eb72I7zP3zGkPsmsoK26x74oIIHHzCCBxswggcXMIIE/6ADAgECAgEBMA0GCSqGSIb3DQEBBQUAMH8
          xFDASBgNVBAMMCzQwOTYtcm9vdGNhMQswCQYDVQQIDAJiajELMAkGA1UEBhMCY24xJzAlBgkqhkiG9w0
          BCQEWGDQwOTYtcm9vdGNhQGZvcnRpbmV0LmNvbTERMA8GA1UECgwIZm9ydGluZXQxETAPBgNVBAsMCGZ
          vcnRpYWRjMB4XDTE2MDcwNDAxNDE1NloXDTI2MDcwMjAxNDE1NlowfzEUMBIGA1UEAwwLNDA5Ni1yb29
          0Y2ExCzAJBgNVBAgMAmJqMQswCQYDVQQGEwJjbjEnMCUGCSqGSIb3DQEJARYYNDA5Ni1yb290Y2FAZm9
          ydGluZXQuY29tMREwDwYDVQQKDAhmb3J0aW5ldDERMA8GA1UECwwIZm9ydGlhZGMwggIiMA0GCSqGSIb
          3DQEBAQUAA4ICDwAwggIKAoICAQCoNbg+KrJkqxkV1ynD5JDPVcqHGSaunh2tP+kTESyww3p1wZrzNvr
          MljtlK3fKzWtymykJTWGJjtELxxcXdvVF6+vgaSysv8RfRo0mpJGRdAnpjYMlQM2Q71/+FRhhVI9eDrM
          A0ib8MwWlSBzFS0aNplxtqs85UR2ItlX00EuHSvsAM+u0LvfhbVjlBnVupLiHCgY9fsyJW+hhPW3QeB7
```

```
            Px+r9DPZ2CmKPAOmdYBEN57LY7q6oYJbRoMvlN87JxveQGvRVOt1Cvk0NuDpDOWsZYdGju/NDcMikgCN
            rcBioRZV2fpFLb3T6v7L017tISZ1wZjjgv19/bq+5ZtTqjhk3WD+MlgMFFaIomK1toINWVpLRtKv4fLu
            CR8j1kWRzMR3WqdHXNgiNpTOoI2XqVxOyCxgNfftQWBYf3dY8ojcLS0W39DNVqUMJmg3C6xaH+wBE/L2
            dIu67sCWnHt/EIn8Wcwd7yJr5qhDhO4Imte9CDBu7trRzM8sMgnh1GlQ1Sc+lloy05eGwDds5vlx7KqI
            0Mz6/zjyxvbjNNga9uqDOOQRttV5LNckDKzrQVrze+k8gscBBvN2JKfpoDzdgV/4gzDVi2pLUgBawv3V
            X+RbJYw8kn2GKgpAIK+rQ8NRvtqaV+icIWULqQl1i72XHkUYVs1sbK9FOdkcUxxw6DdF7QwIDAQABo4I
            BnDCCAZgwDwYDVR0TAQH/BAUwAwEB/zAdBgNVHQ4EFgQUjLv9DNomYUiws+IkpFUi+FUQW5swHwYDVR0
            jBBgwFoAUjLv9DNomYUiws+IkpFUi+FUQW5swbAYDVR0fBGUwYzAyoDCgLoYsaHR0cDovL3BraS5zcGF
            ya2xpbmdjYS5jb20vU3BhcmtsaW5nUm9vdC5jcmwwLaAroCmGJ2h0dHA6Ly9wa2kuYmFja3VwLmNvbS9
            TcGFya2xpbmdSb290LmNybDCB1gYIKwYBBQUHAQEEgckwgcYwOAYIKwYBBQUHMAKGLGh0dHA6Ly9wa2k
            uc3BhcmtsaW5nY2EuY29tL1NwYXJrbGluZ1Jvb3QuY3J0MDMGCCsGAQUFBzAChidodHRwOi8vcGtpLmJ
            hY2t1cC5jb20vU3BhcmtsaW5nUm9vdC5jcnQwLAYIKwYBBQUHMAGGIGh0dHA6Ly9wa2kuc3BhcmtsaW5
            nY2EuY29tL29jc3AvMCcGCCsGAQUFBzABhhtodHRwOi8vcGtpLmJhY2t1cC5jb20vb2NzcC8wDQYJKoZ
            IhvcNAQEFBQADggIBADVwfB4VB9g2YNtXFqNTf/RmcXGOrv1ffcTpvGJibV0AJteznvVgVTZPPHjcPsp
            RocIeo8wotgaNovOqrjgUQr7xEidZ8egMeuissPMp49ntMU5801AZ6iC3EM5FkfBcFXS4L78VmRbpXm2
            LObSogmJHu6XanY7FtSJu/mjV9R0uYc8q5NymIMZZlBVAfMdTnbghBjqdD3O3im3h2Or87vUPRk5E83y
            BBUggmS5LtAYbcel7nG4Erjp+u2bvl+Vj8Bj+rBxRg4HnZNcEDPbEqORrDBzVYI0f5QlXpWKM6hOJt3H
            ZcyTk74MVUbYDNnuec99qNKg6DYN1GlRM1fRUF9ZMfzibbIptiPAahJcyXlf3QsUsoH6qJ1JV+o2RQY5
            w3BD0oF91KMU3nyyrNYAhUkmKFTHibG4jXo6cvfw+U5yRRSv5F7f7c8qANGmQ+15WUvklUZ8b5f0N3Lr
            mcWmSDcCq0zmHKtwmaqOQoUiCCLxSfzC4sbE6WnX4m7omh08v/+JPJ7YFTFMk39QCfbvF0u5Rbsh4ktv
            wkL1izfWFTcs61/DWjkcwfTNF5c453JiW3p0Yg8rFYEH7R876s1VqflGvSCfdJYgAXEPJ0FfYjzjKjXs
            mjkNA0cqgEuJKXUHW7dPMgWHCzCwsnYc/ovVRf8Fg+V0TkiIF7qeEbGGSotSx"
   next
end
```

Or

```
config system certificate OCSP_stapling
   edit "ocsp_stapling"
      set local-certificate cert
      set issuer-certificate cacert
      set OCSP ocsp
      set response-update-ahead-time 1h
      set response-update-interval 5m
   next
end
```

config system console

Use this command to configure console display options.

Before you begin:

- You must have read-write permission for system settings.

Syntax

```
config system console
   set output {standard|more}
end
```

output	Specify whether to use "more" paging.

Example

```
docs-1 # config system console
docs-1 (console) # get
output                          : more
docs-1 (console) # set output ?
 standard    standard
 more        more
docs-1 (console) #
```

config system dns

Use this command to configure DNS.

Before you begin:

- You must have read-write permission for system settings.

Syntax

```
config system dns
   set primary <class_ip>
   set secondary <class_ip>
end
```

primary	Specify the IP address for the primary DNS server.
secondary	Specify the IP address for the secondary DNS server.

Example

```
FortiADC-VM # get system dns
primary : 8.8.8.8
secondary : 0.0.0.0

FortiADC-VM # config system dns
FortiADC-VM (dns) # set secondary 8.8.4.4
FortiADC-VM (dns) # end

FortiADC-VM # get system dns
primary : 8.8.8.8
secondary : 8.8.4.4
```

config system dos-prevention

Use this command to enable basic denial of service (DoS) prevention to combat SYN floods.

When enabled, FortiADC uses the SYN cookie method to track half-open connections. The system maintains a DoS mitigation table for each configured IPv4 virtual server. It times out half-open connections so that they do not deplete system resources.

Note: The DoS feature is not supported for IPv6 traffic or for Layer 4 virtual servers with the Direct Routing packet forwarding mode.

Before you begin:

- You must have read-write permission for system settings.

Syntax

```
config system dos-prevention
   set syncookie <enable|disable>
   set max_half_open <integer>
end
```

`syncookie`	Enable/disable denial-of-service prevention.
`max_half_open`	Specify a maximum number of half open sockets. The default is 1 (10 connections). The valid range is 1 to 80,000.

Example

```
FortiADC-VM # get system dos-prevention
syncookie : disable
max_half_open : 1

FortiADC-VM # config system dos-prevention
FortiADC-VM (dos-prevention) # set syncookie enable
FortiADC-VM (dos-prevention) # set max_half_open 100
FortiADC-VM (dos-prevention) # end

FortiADC-VM # get system dos-prevention
syncookie : enable
max_half_open : 100
```

config system fortiguard

Use this command to configure how the FortiADC system receives scheduled updates from FortiGuard services.

FortiGuard periodically updates the WAF Signature Database, IP Reputation Database, and Geo IP Database.

Before you begin:

- You must have read-write permission for system settings.

Syntax

```
config system fortiguard
   set override-server-status {enable|disable}
   set override-server-address <string>
   set scheduled-update-day {Sunday | Monday | Tuesday | Wednesday | Thursday | Friday |
       Saturday}
   set scheduled-update-frequency {daily|weekly|every}
   set scheduled-update-status {enable|disable}
   set scheduled-update-time <hh:mm>
end
```

override-server-status	Enable/disable connection to the override server address.
override-server-address	Override server IP address.
scheduled-update-day	Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday.
scheduled-update-frequency	• Every—Schedule periodic updates. Specify the time to perform the update. • Daily—Schedule daily updates. Specify the time of day to perform the update. • Weekly—Schedule weekly updates. Specify the day and time to perform the update.
scheduled-update-status	Enable/disable scheduled updates.
scheduled-update-time	<hh:mm> hour and minute, hh: 0-23, mm: {00|15|30|45}.

Example

```
FortiADC-VM # get system fortiguard
scheduled-update-status: enable
scheduled-update-frequency: weekly
scheduled-update-day: Sunday
scheduled-update-time: 04:00
override-server-status: disable
push-update-status : enable
push-update-override-status: disable
tunneling-status : disable

FortiADC-VM # config system fortiguard
FortiADC-VM (fortiguard) # set scheduled-update-time 23:45
FortiADC-VM (fortiguard) # end

FortiADC-VM # get system fortiguard
scheduled-update-status: enable
scheduled-update-frequency: weekly
scheduled-update-day: Sunday
scheduled-update-time: 23:45
```

```
override-server-status: disable
push-update-status : enable
push-update-override-status: disable
tunneling-status : disable
```

See also

- config system web-filter

config system global

Use this command to manage system settings.

Before you begin:

- You must have read-write permission for system settings.

Syntax

```
config system global
   set admin-idle-timeout <integer>
   set config-sync {enable|disable}
   set default-certificate <certname>
   set hardware-ssl {enable|disable}
   set hostname <string>
   set language {english|chinese-simplified}
   set port-http <integer>
   set port-https <integer>
   set port-ssh <integer>
   set port-telnet <integer>
   set ssh-cbc-cipher {enable|disable|
   set ssh-hmac-md5 {enable|disable}
   set vdom-admin {enable|disable>
end
```

admin-idle-timeout	Log out an idle administrator session. The default is 30 minutes.
config-sync	Enable/disable the configuration synchronization feature. This feature is related to the execute config-sync command, not HA synchronization. Disabled by default.
default-certificate	The default is Factory.
hardware-ssl	Enable/disable hardware SSL acceleration. The setting has no effect on FortiADC-VM.

hostname	You can configure a hostname to facilitate system management. If you use SNMP, for example, the SNMP system name is derived from the configured hostname. The hostname can be up to 35 characters in length. It can include US-ASCII letters, numbers, hyphens, and underscores, but not spaces and special characters. The System Information widget and the `get system status` CLI command display the full hostname. If the hostname is longer than 16 characters, the name is truncated and ends with a tilde (~) to indicate that additional characters exist, but are not displayed.
language	English or Simplified Chinese.
port-http	Specify the port for the HTTP service. Usually, HTTP uses port 80.
port-https	Specify the port for the HTTPS service. Usually, HTTPS uses port 443.
port-ssh	Specify the port for the SSH service. Usually, SSH uses port 22.
port-telnet	Specify the port for the Telnet service. Usually, Telnet uses port 25.
ssh-cbc-cipher	Disabled by default. Enable if you want to use this cipher.
ssh-hmac-md5	Disabled by default. Enable if you want to use this cipher.
vdom-admin	Enables the virtual domain feature.

Example

```
FortiADC-VM # get system global
default-certificate           : Factory
hostname                      : FortiADC-VM
vdom-admin                    : disable
admin-idle-timeout            : 480
port-http                     : 80
port-https                    : 443
port-ssh                      : 22
port-telnet                   : 23
language                      : english
hardware-ssl                  : enable
gui-system                    : enable
gui-router                    : enable
gui-log                       : enable
ssh-cbc-cipher                : disable
ssh-hmac-md5                  : disable
config-sync-enable            : disable
```

config system ha

Use this command to configure high availability (HA) settings.

Before you begin:

- You must have read-write permission for system settings.

Syntax

```
config system ha
   set mode {active-active | active-passive | standalone}
   set arps <integer>
   set arps-interval <integer>
   set auto-config-sync {enable|disable}
   set datadev <datasource>
   set group-id <integer>
   set group-name <string>
   set ha-eth-type <4 digit hex>
   set hatrans-eth-type <4 digit hex>
   set hb-interval <integer>
   set hb-lost-threshold <integer>
   set hb-type { multicast|broadcast}
   set hbdev <datasource>
   set l2ep-eth-type (4 digit hex)
   set http-persistence-pickup {enable|disable}
   set local-node-id <integer>
   set l4-persistence-pickup {enable|disable}
   set l4-session-pickup {enable|disable}
   set mgmt-status {enable | disable}
   set mgmt-interface <interface>
   set mgmt-ip <ip address>
   set mgmt-ip-allowaccess {https ping ssh snmp http telnet}
   set mgmt-mac-addr <mac address>
   set monitor <datasource>
   set node-list {0 1 2 3 4 5 6 7}
   set override {enable|disable}
   set priority <integer>
   set remote-ip-monitor {enable|disable}
   set remote-ip-failover-hold-time <integer>
   set remote-ip-failover-threshold <integer>
      config remote-ip-monitor-list
         edit <name>
            set health-check-interval <integer>
            set health-check-retry <integer>
            set health-check-timeout <integer>
            set interface <datasource>
            set remote-address <class_ip>
         next
   end
end
```

mode	• active-active • active-passive • standalone **Note**: If you change this setting, you are logged out of the CLI, and you can log in again if permitted by the new configuration.
arps	Number of times that the cluster member broadcasts extra address resolution protocol (ARP) packets when it takes on the primary role. (Even though a new NIC has not actually been connected to the network, the member does this to notify the network that a new physical port has become associated with the IP address and virtual MAC of the HA cluster.) This is sometimes called “using gratuitous ARP packets to train the network,” and can occur when the primary node is starting up, or during a failover. Also configure ARP Packet Interval. Normally, you do not need to change this setting. Exceptions include: Increase the number of times the primary node sends gratuitous ARP packets if an active-passive cluster takes a long time to fail over or to train the network. Sending more gratuitous ARP packets may help the failover to happen faster. Decrease the number of times the primary node sends gratuitous ARP packets if the cluster has a large number of VLAN interfaces and virtual domains. Because gratuitous ARP packets are broadcast, sending them might generate a large amount of network traffic. As long as the active-passive cluster fails over successfully, you can reduce the number of times gratuitous ARP packets are sent to reduce the amount of traffic produced by a failover. The valid range is 1 to 60. The default is 5.
arps-interval	Number of seconds to wait between each broadcast of ARP packets. Normally, you do not need to change this setting. Exceptions include: Decrease the interval if an active-passive cluster takes a long time to fail over or to train the network. Sending ARP packets more frequently may help the failover to happen faster. Increase the interval if the cluster has a large number of VLAN interfaces and virtual domains. Because gratuitous ARP packets are broadcast, sending them might generate a large amount of network traffic. As long as the active-passive cluster fails over successfully, you can increase the interval between when gratuitous ARP packets are sent to reduce the rate of traffic produced by a failover. The valid range is from 1 to 20. The default is 6 seconds.

auto-config-sync	Enable/disable automatic configuration synchronization. When enabled, synchronization occurs immediately when an appliance joins the cluster, and thereafter every 30 seconds. Disable if you prefer to manage synchronization manually.
datadev	Set the network interface to be used for data synchronization among cluster nodes. You can configure up to two data ports. If one data port fails, its traffic fails over to the next data port. If all data ports fail, data synchronization traffic fails over to the heartbeat port. If you do not configure a data port, the heartbeat port is used for synchronization. Use the same port numbers for all cluster members. For example, if you select port3 on the primary node, select port3 as the data port interface on the other member nodes.
group-id	Number that identifies the HA cluster. Nodes with the same group ID join the cluster. If you have more than one HA cluster on the same network, each cluster must have a different group ID. The group ID is used in the virtual MAC address that is sent in broadcast ARP messages. The valid range is 0 to 31. The default value is 0.
group-name	Name to identify the HA cluster if you have more than one. This setting is optional, and does not affect HA function. The maximum length is 63 characters.
ha-eth-type	A Layer-3 protocol number for the HA data channel. It is used for heartbeat packets type, and is also used for Layer-7/Layer-4 session persistence sync.
hatrans-eth-type	A Layer-3 protocol number for the HA data channel. It works in active-active (AA) mode, and is used for traffic relay between HA nodes in AA mode.
hb-interval	Number of 100-millisecond intervals at which heartbeat packets are sent. This is also the interval at which a node expects to receive heartbeat packets. This part of the configuration is pushed from the primary node to member nodes. The valid range is 1 to 20 (that is, between 100 and 2,000 milliseconds). **Note:** Although this setting is pushed from the primary node to member nodes, you should initially configure all nodes with the same Detection Interval to prevent inadvertent failover from occurring before the initial synchronization.

hb-type	Specify whether the destination MAC address of HA message is broadcast or multicast.
hb-lost-threshold	Number of times a node retries the heartbeat and waits to receive HA heartbeat packets from the other nodes before concluding the other node is down. This part of the configuration is pushed from the primary node to member nodes. Normally, you do not need to change this setting. Exceptions include: Increase the failure detection threshold if a failure is detected when none has actually occurred. For example, in an active-passive deployment, if the primary node is very busy during peak traffic times, it might not respond to heartbeat packets in time, and a standby node might assume that the primary node has failed. Decrease the failure detection threshold or detection interval if administrators and HTTP clients have to wait too long before being able to connect through the primary node, resulting in noticeable down time. The valid range is from 1 to 60. **Note:** Although this setting is pushed from the primary node to member nodes, you should initially configure all nodes with the same HB Lost Threshold to prevent inadvertent failover from occurring before the initial synchronization.
hbdev	Set the network interface to be used for heartbeat packets. You can configure one or two heartbeat ports. Use the same port number for all cluster members. For example, if you select port3 on the primary node, select port3 as the heartbeat interface on the other member nodes. **Note**: If a switch is used to connect the heartbeat interfaces, the heartbeat interfaces must be reachable by Layer 2 multicast.
l2ep-eth-type	A Layer-3 protocol number for the HA data channel. It is used for configuration sync, HC result sync, and applications dynamic data.

`http-persistence-pickup`	Enable to synchronize Layer 7 session data used for persistence to backend servers. When enabled, the Source Address Persistence table is synchronized between HA members. When not enabled, a node that receives traffic due to failover would not know that a session had been created already, so it will be treated as a new session. Synchronization of the persistence table is not required for cookie-based or hash-based persistence methods to get the desired result. Client traffic will be routed to the same backend server. Synchronization of the persistence table is not possible for SSL session ID. When the session via the first node is terminated, the client must re-establish an SSL connection via the second node. When a client requests a new SSL connection with an SSL server, the initial TCP connection has an SSL Session ID of 0. This zero value tells the server that it needs to set up a new SSL session and to generate an SSL Session ID. The server sends the new SSL Session ID in its response to the client as part of the SSL handshake.
`l4-persistence-pickup`	Enable to synchronize Layer 4 session data used for persistence to backend servers. When enabled, the Source Address Persistence table is synchronized between HA members. When not enabled, a node that receives traffic because of load balancing or failover would not know that a session had been created already, so it will be treated as a new session. Synchronization of the persistence table is not required for hash-based persistence methods to get the desired result. Client traffic will be routed to the same backend server.
`l4-session-pickup`	Enable to synchronize Layer 4 connection state data. When enabled, the TCP session table is synchronized. If subsequent traffic for the connection is distributed through a different cluster node because of failover, the TCP sessions can resume without interruption. When not enabled, a node that receives traffic because of failover would not know that a session had been created already, and the client will be required to re-initialize the connection.
`local-node-id`	A number that uniquely identifies the member within the cluster. The valid range is 0-7. In an active-active deployment, this number is used in the virtual MAC address that is sent in ARP responses. In an active-passive deployment, this number is not used.
`mgmt-status`	This setting must be enabled before other management options can be set.

mgmt-interface	Set a management interface.
mgmt-ip	Set a management IP address.
mgmt-ip-allowaccess	Set which methods are allowed access to the management IP.
mgmt-mac-addr	Set a management MAC address. This setting is optional. If it is not set, the system will assign a MAC address randomly.
monitor	One or more network interfaces that correlate with a physical link. These ports will be monitored for link failure. Port monitoring (also called interface monitoring) monitors physical network ports to verify that they are functioning properly and linked to their networks. You can monitor physical interfaces and 802.3ad aggregated interfaces. **Note:** To prevent an unintentional failover, do not configure port monitoring *until* you configure HA on all appliances and have plugged in the cables to link the physical network ports that will be monitored.
node-list	Specify the node IDs for the nodes in the cluster. An active-active cluster can have up to eight members.
override	Enable to make Device Priority a more important factor than uptime when selecting the primary node.
priority	Number indicating priority of the member node when electing the cluster primary node. This setting is optional. The smaller the number, the higher the priority. The valid range is 0 to 9. The default is 5. **Note**: By default, unless you enable Override, uptime is more important than this setting.
remote-ip-monitor	Enable/disable active monitoring of a beacon remote IP address.
remote-ip-failover-hold-time	If failover occurs due to a remote IP monitor test, and this node's role changes (to master or slave), it cannot change again until the holdtime elapses. Holdtime can be used to prevent looping.The default holdtime is 120 seconds. The valid range is 60-86400.
remote-ip-failover-threshold	Number of consecutive times that the remote IP address is unreachable that indicates failure. The default is 5. The valid range is 1-300.
config remote-ip-monitor-list	
health-check-interval	Seconds between each health check. Should be more than the timeout to prevent overlapping health checks. The default is 10.

health-check-retry	Number of retries to confirm up or down. The default is 3 retries. The valid range is 1-10.
health-check-timeout	Seconds to wait for a reply before assuming that the health check has failed. The default is 5.
interface	Interface to send the health check ping.
remote-address	Remote address to ping.

Example

```
FortiADC-VM # get system ha
mode : standalone
hbdev :
datadev :
group-id : 0
group-name :
priority : 5
config-priority : 100
override : disable
hb-interval : 2
arps : 5
hb-lost-threshold : 6
arps-interval : 6
l7-persistence-pickup : disable
l4-persistence-pickup : disable
l4-session-pickup : disable
auto-config-sync : enable
monitor :
remote-ip-monitor : disable
boot-time : 30
ha-eth-type : 8890
hatrans-eth-type : 8892
l2ep-eth-type : 8893
hb-type : multicast

FortiADC-VM # config system ha
FortiADC-VM (ha) # set hbdev port2
FortiADC-VM (ha) # set datadev port3
FortiADC-VM (ha) # set group-name dc1-pair
FortiADC-VM (ha) # set priority 1
FortiADC-VM (ha) # set mode active-passive
FortiADC-VM (ha) # end

(M) FortiADC-VM # get system ha
mode : active-passive
hbdev : port2
datadev : port3
group-id : 0
group-name : dc1-pair
priority : 1
config-priority : 100
override : disable
```

```
hb-interval : 2
arps : 5
hb-lost-threshold : 6
arps-interval : 6
l7-persistence-pickup : disable
l4-persistence-pickup : disable
l4-session-pickup : disable
auto-config-sync : enable
monitor :
remote-ip-monitor : disable
boot-time : 30
ha-eth-type : 8890
hatrans-eth-type : 8892
l2ep-eth-type : 8893
hb-type : multicast
```

config system health-check

Use this command to create health check configuration objects.

In server load balancing deployments, the system uses health checks to poll the members of the real server pool to test whether an application is available. You can also configure additional health checks to poll related servers, and you can include results for both in the health check rule. For example, you can configure an HTTP health check test and a RADIUS health check test. In a web application that requires user authentication, the web server is deemed available only if the web server and the related RADIUS server pass the health check.

In link load balancing deployments, the health check can poll either the ISP link group member itself or a “beacon” server that is deployed on the other side of the ISP link. A beacon is an IP address that must be reachable in order for the link to be deemed available. A beacon can be any IP address, such as a main office, core router, or virtual server at another data center.

If a pool member fails a health check and retries also fail, it is deemed unavailable. The ADC does not send it connections until it is deemed available.

If you expect a backend server is going to be unavailable for a long period, such as when it is undergoing hardware repair, it is experiencing extended down time, or when you have removed it from the server farm, you can improve the performance of the FortiADC system by setting the status of the pool member to Disabled, rather than allowing the system to continue to attempt health checks.

Table 21 describes the predefined health checks. You can get started with these or create custom objects.

Table 21: Predefined health check configuration objects

Predefined	Description
LB_HLTHCK_HTTP	Sends a HEAD request to the server port 80. Expects the server to return an HTTP 200.

Predefined	Description
LB_HLTHCK_HTTPS	Sends a HEAD request to the server port 443. Expects the server to return an HTTP 200.
LB_HLTHCK_ICMP	Pings the server.
LB_HLTHCK_TCP_ECHO	Sends a TCP echo to server port 7. Expects the server to respond with the corresponding TCP echo.

Before you begin:

- You must have a good understanding of TCP/IP and knowledge of the services running on your backend servers.
- You must know the IP address, port, and configuration details for the applications running on backend servers. For some application protocol checks, you must specify user credentials.
- You must have read-write permission for load balancing settings.

After you have configured a health check, you can select it in the server load balacing real server configuration or in the link-load-balancing gateway link configuration.

Syntax

```
config system health-check
   edit <name>
      set type {dns | ftp | http | https | icmp | imap4 | l2-detection | pop3 | radacct |
          radius | sip | sip-tcp | smtp | snmp | snmp-custom | ssh | tcp | tcp-echo |
          tcphalf | tcpssl | udp | mysql}
      set dest-addr <class_ip>
      set dest-addr-type {ipv4|ipv6}
      set hostname <string>
      set interval <integer>
      set retry <integer>
      set timeout <integer>
      set up-retry <integer>
      set addr-type {ivp4|ipv6}
      set domain-name <string>
      set host-addr <class_ip>
      set port <integer>
      set file <string>
      set passive {enable|disable}
      set username <string>
      set password <passwd>
      set method-type {http_get | http_head}
      set match-type {match_all | match_status | match_string}
      set send-string <string>
      set receive-string <string>
      set status-code <integer>
      set http-connect {local_connect|no_connect|remote_connect}
      set remote-host <string>
      set remote-port <integer>
      set nas-ip <string>
      set password-type {user-password | chap-password}
      set secret-key <string>
      set sip-request-type {register|options}
```

```
        set folder <string>
        set agent-type {UCD|WIN2000}
        set community <string>
        set cpu <integer>
        set disk <integer>
        set mem <integer>
        set version {v1|v2c}
        set oid <string>
        set value-type {ASN_COUNTER | ASN_INTEGER | ASN_OBJECT_ID | ASN_OCTET_STR | ASN_
            UINTEGER}
```

set user <user name>

```
        set password <password>
        set dest-addr <ip addr>
        set port <port>
    next
end
```

Table 22: Health check configuration

Settings	Guidelines
General	
<name>	Configuration name. No spaces or special characters. After you initially save the configuration, you cannot edit the name.
type	Specify the health check type. After you have specified the type, the CLI commands are constrained to the ones that are applicable to the specified type, not all of the settings described in this table.
dest-addr	Optional. If no destination IP address is specified, the real server health check is sent to the real server IP address and the gateway link health check is sent to the ISP link IP address. If you are creating rules that test related servers or a test to a “beacon” server, specify the destination IP address. If testing an HTTP proxy, specify the proxy address, not the remote server address.
dest-addr-type	IPv4 or IPv6
hostname	For HTTP or HTTPS health checks, you can specify the hostname (FQDN) instead of the destination IP address. This is useful in VM environments where multiple applications have the same IP address.
interval	Seconds between each health check. Should be more than the timeout to prevent overlapping health checks. The default is 10.

Settings	Guidelines
retry	Attempts to retry the health check to confirm availability. The default is 1.
timeout	Seconds to wait for a reply before assuming that the health check has failed. The default is 5.
up-retry	Attempts to retry the health check to confirm availability. The default is 1.
ICMP	
No specific options	Simple ping to test connectivity.
TCP / TCP Half Open / TCL SSL / UDP	
port	Listening port number of the backend server. Usually HTTP is 80, FTP is 21, DNS is 53, POP3 is 110, IMAP4 is 143, RADIUS is 1812, and SNMP is 161 or 162.
HTTP/HTTPS	
port	Listening port number of the backend server. Usually HTTP is 80. If testing an HTTP proxy server, specify the proxy port.
method-type	HTTP method for the test traffic: • HTTP GET—Send an HTTP GET request to the server. A response to an HTTP GET request includes HTTP headers and HTTP body. • HTTP HEAD—Send an HTTP HEAD request. A response to an HTTP HEAD request includes HTTP headers only.
send-string	The request URL, such as /contact.php.
receive-string	A string expected in return when the HTTP GET request is successful.
status-code	The health check sends an HTTP request to the server. Specify the HTTP status code in the server reply that indicates a successful test. Typically, you use status code 200 (OK). Other status codes indicate errors.

Settings	Guidelines
match-type	What determines a failed health check? • Match String • Match Status • Match All (match both string and status) Not applicable when using HTTP HEAD. HTTP HEAD requests test status code only.
http-connect	If the real server pool members are HTTP proxy servers, specify an HTTP CONNECT option: • local_connect—Use HTTP CONNECT to test the tunnel connection through the proxy to the remote server. The member is deemed available if the request returns status code 200 (OK). • remote_connect—Use HTTP CONNECT to test both the proxy server response and remote server application availability. If you select this option, you can configure an HTTP request within the tunnel. For example, you can configure an HTTP GET/HEAD request to the specified URL and the expected response. • no_connect—Do not use the HTTP CONNECT method. This option is the default. The HTTP CONNECT option is useful to test the availability of proxy servers only. See the FortiADC Deployment Guide for FortiCache for an example that uses this health check.
remote-host	If you use HTTP CONNECT to test proxy servers, specify the remote server IP address.
remote-port	If you use HTTP CONNECT to test proxy servers, specify the remote server port.
DNS	
port	Listening port number of the backend server. Usually DNS is 53.
addr-type	IPv4 or IPv6
domain-name	The FQDN, such as www.example.com, to use in the DNS A/AAAA record health check.
host-addr	IP address that matches the FQDN, indicating a successful DNS health check.
RADIUS / RADIUS Accounting	

Settings	Guidelines
port	Listening port number of the backend server. Usually RADIUS is 1812 and RADIUS accounting is 1813.
nas-ip	NAS IP address.
username	User name of an account on the backend server.
password	The corresponding password.
password-type	• User—If the backend server does not use CHAP, select this option. • CHAP—If the backend server uses CHAP and does not require a secret key, select this option.
secret-key	The secret set on the backend server.
SIP / SIP-TCP	
sip-request-type	Specify the SIP request type to be used for health checks: • register • options
status-code	The expected response code. If not set, response code 200 is expected. Specify 0 if any reply should indicate the server is available.
SMTP	
port	Listening port number of the backend server. Usually SMTP is 25.
domain-name	The FQDN, such as www.example.com, to use in the SMTP health check.
POP3	
port	Listening port number of the backend server. Usually POP3 is 110.
username	User name of an account on the backend server.
password	The corresponding password.
IMAP4	

Settings	Guidelines
port	Listening port number of the backend server. Usually IMAP4 is 143.
username	User name of an account on the backend server.
password	The corresponding password.
folder	Specify a mail folder name. The default is INBOX.
FTP	
port	Listening port number of the backend server. Usually FTP is 21.
username	User name of an account on the backend server.
password	The corresponding password.
file	Specify a file that exists on the backend server. Path is relative to the initial login path. If the file does not exist or is not accessible, the health check fails.
passive	Select this option if the backend server uses passive FTP.
SNMP	
port	Listening port number of the backend server. Usually SNMP is 161.
agent-type	UCD or Windows 2000
community	Must match the SNMP community string set on the backend server. If this does not match, all SNMP health checks fail.
cpu	Maximum normal CPU usage. If overburdened, the health check fails.
disk	Maximum normal disk usage. If the disk is too full, the health check fails.
mem	Maximum normal RAM usage. If overburdened, the health check fails.
version	SNMP v1 or v2c.
SNMP-Custom	

Settings	Guidelines
oid	String specifying the OID to query.
value-type	Abstract syntax notation (ASN) value type: • ASN_COUNTER • ASN_INTEGER • ASN_OBJECT_ID • ASN_OCTET_STR • ASN_UINTEGER
compare-type	• equal • greater • less
counter-value	Specify the value for the evaluation.
SSH	
port	Listening port number of the backend server. Usually SSH is 22.
username	Username for test login.
password	Corresponding password.
L2 Detection	
No specific options	Link Layer health checker. Sends ARP (IPv4) or NDP (IPv6) packets to test whether a physically connected system is available.
MySQL	
User	Specify the user name of the MySQL database.
Password	Specify the password corresponding to the MySQL database user name.
Dest-addr	Specify the IP address of the MySQL database server.
Port	Specify the MySQL listing port.

In SLB deployments, a health check port configuration specifying port 0 acts as a wildcard.The port for health check traffic is imputed from the real server pool member.

In LLB and GLB deployments, specifying port 0 is invalid because there is no associated configuration to impute a proper port. If your health check port configuration specifies port 0, you will not be able to use it in an LLB or GLB configuration.

Example

The following is an example of an HTTP health check for HTTP proxy servers:

```
FortiADC-VM # config system health-check
FortiADC-VM (health-check) # edit HTTP-CONNECT-TEST
Add new entry 'HTTP-CONNECT-TEST' for node 2763

FortiADC-VM (HTTP-CONNECT-T~S) # set type http
FortiADC-VM (HTTP-CONNECT-T~S) # set http-connect remote_connect

FortiADC-VM (HTTP-CONNECT-T~S) # get
type : http
interval : 10
timeout : 5
retry : 1
up-retry : 1
port : 0
dest-addr-type : ipv4
dest-addr : 0.0.0.0
method-type : http_head
send-string : /
status-code : 200
http-connect : remote_connect
remote-host :
remote-port : 0

FortiADC-VM (HTTP-CONNECT-T~S) # set remote-host 10.1.1.1
FortiADC-VM (HTTP-CONNECT-T~S) # set remote-port 113
FortiADC-VM (HTTP-CONNECT-T~S) # set send-string /myapp/index.html
FortiADC-VM (HTTP-CONNECT-T~S) # end
FortiADC-VM #
```

The following is an example of a SIP health check:

```
FortiADC-VM # config system health-check
FortiADC-VM (health-check) # edit sip-health-check
Add new entry 'sip-health-check' for node 2763
FortiADC-VM (sip-health-check) # set type sip
FortiADC-VM (sip-health-check) # get
type : sip
interval : 10
timeout : 5
retry : 1
up-retry : 1
```

```
port : 0
dest-addr-type : ipv4
dest-addr : 0.0.0.0
status-code : 200
sip-request-type : register
FortiADC-VM (sip-health-check) # set interval 15
FortiADC-VM (sip-health-check) # set retry 2
FortiADC-VM (sip-health-check) # set timeout 3
FortiADC-VM (sip-health-check) # set status-code 403
FortiADC-VM (sip-health-check) # end
```

The following is an example of an SNMP health check for a server running the UCD agent:

```
FortiADC-VM # config system health-check
FortiADC-VM (health-check) # edit lb-health-check
Add new entry 'lb-health-check' for node 2763
FortiADC-VM (lb-health-check) # set type snmp
FortiADC-VM (lb-health-check) # get
type : snmp
interval : 10
timeout : 5
retry : 1
up-retry : 1
port : 0
dest-addr-type : ipv4
dest-addr : 0.0.0.0
cpu : 96
mem : 96
disk : 96
agent-type : UCD
community :
version : v1

FortiADC-VM (lb-health-check) # set community company-string
FortiADC-VM (lb-health-check) # set port 161
FortiADC-VM (lb-health-check) # set cpu 50
FortiADC-VM (lb-health-check) # set mem 50
FortiADC-VM (lb-health-check) # set disk 50
FortiADC-VM (lb-health-check) # set version v2c

FortiADC-VM (lb-health-check) # get
type : snmp
interval : 10
timeout : 5
retry : 1
up-retry : 1
port : 161
dest-addr-type : ipv4
dest-addr : 0.0.0.0
cpu : 50
mem : 50
disk : 50
agent-type : UCD
community : company-string
version : v2c

FortiADC-VM (lb-health-check) # end
```

The following example configures a custom SNMP health check for a server that does not support the UCD or Windows 2000 agent type.

```
FortiADC-VM # config system health-check
FortiADC-VM (health-check) # edit snmp-linux
Add new entry 'snmp-linux' for node 2763
FortiADC-VM (snmp-linux) # set type snmp-custom
FortiADC-VM (snmp-linux) # get
type : snmp-custom
interval : 10
timeout : 5
retry : 1
up-retry : 1
port : 0
dest-addr-type : ipv4
dest-addr : 0.0.0.0
community :
version : v1
oid :
value-type :
FortiADC-VM (snmp-linux) # set version v2c
FortiADC-VM (snmp-linux) # set oid ".1.3.6.1.4.1.2021.10.1.3.1"
FortiADC-VM (snmp-linux) # set value-type ASN_INTEGER
FortiADC-VM (snmp-linux) # set compare-type greater
FortiADC-VM (snmp-linux) # set counter-value 80
FortiADC-VM (snmp-linux) # end
FortiADC-VM #
```

config system interface

Use this command to configure network interfaces.

Before you begin:

- You must have read-write permission for system settings.

Syntax

```
config system interface
   edit port1
      set floating {enable|disable}
      set floating-ip <string>
      set traffic-group <string>
      set allowaccess {http https ping snmp ssh telnet}
      set ip <ip&netmask>
      set ip6 <ip&netmask>
      set mac-addr <xx:xx:xx:xx:xx:xx>
      set mode {static|pppoe|DHCP}
      set disc-retry-timeout <integer>
      set dns-server-override {enable|disable}
      set idle-timeout <integer>
      set lcp-echo-interval <integer>
      set lcp-max-echo-fails <integer>
      set pppoe-default-gateway {enable|disable}
```

```
      set username <string>
      set password <passwd>
      set mtu <integer>
      set retrieve_physical_hwaddr {enable|disable}
      set speed {10full | 10half | 100full | 100half | 1000full | 1000half | auto}
      set status {down | up}
      set vdom <datasource>
      set type {vlan|aggregate}
      set retrieve_dhcp_gateway {enable | disable}
      set dhcp-gateway-distance <integer>
      set vlanid <integer>
      set interface <datasource>
      set aggregate-algorithm {layer2 | layer2-3 | layer3-4}
      set aggregate-mode {802.3ad | balance-alb | balance-rr | balance-tlb | balance-xor|
          broadcast}
      set member <datasource>
      set secondary-ip {enable|disable}
      config secondary-ip-list
         edit 1
            set allowaccess {http https ping snmp ssh telnet}
            set ip <ip&netmask>
            set floating {enable|disable}
            set floating-ip <string>
            set traffic-group <string>
         next
      end
      config ha-node-ip-list
         edit <No.>
            set ip <ip&netmask>
            set node <integer>
            set allowaccess {http https ping snmp ssh telnet}
         next
      end
      set ha-node-secondary-ip {enable|disable}
      config ha-node-secondary-ip-list
         edit <No.>
            set ip <ip&netmask>
            set node <integer>
            set allowaccess {http https ping snmp ssh telnet}
         next
      end
   next
end
```

Note: Since the 4.7.0 release, two new interface types (i.e., loop-back and soft-switch) have been supported. When setting the interface type to soft-switch, be sure to set the member ports, as illustrated in the commands below:

```
config system interface
   edit "testint"
      set type loopback| aggregate| soft-switch | vlan
      set member port8 port9
      … …
   next
end
```

allowaccess	Allow inbound service traffic. Select from the following options: • HTTP—Enables connections to the web UI. We recommend this option only for network interfaces connected to a trusted private network, or directly to your management computer. • HTTPS—Enables secure connections to the web UI. We recommend this option instead of HTTP. • Ping—Enables ping and traceroute to be received on this network interface. When it receives an ECHO_REQUEST (“ping”), FortiADC will reply with ICMP type 0 (ECHO_RESPONSE or “ping”). • SNMP—Enables SNMP queries to this network interface. • SSH—Enables SSH connections to the CLI. We recommend this option instead of Telnet. • Telnet—Enables Telnet connections to the CLI. We recommend this option only for network interfaces connected to a trusted private network, or directly to your management computer.
mac-addr	The MAC address is read from the interface. If necessary, you can set the MAC address.
retrieve_physical_hwaddr	Enable or disable.
mtu	The default is 1500. We recommend you maintain the default.
speed	Select one of the following speed/duplex settings: • Auto—Speed and duplex are negotiated automatically. Recommended. • 10half—10 Mbps, half duplex. • 10full—10 Mbps, full duplex. • 100half—100 Mbps, half duplex. • 100full—100 Mbps, full duplex. • 1000half—1000 Mbps, half duplex. • 1000full—1000 Mbps, full duplex.
status	This Status column is not the detected physical link status; it is the administrative status (Up/Down) that indicates whether you permit the network interface to receive and/or transmit packets.
vdom	If applicable, select the virtual domain to which the configuration applies.
mode	• Static—Specify a static IP address. The IP address must be on the same subnet as the network to which the interface connects. Two network interfaces cannot have IP addresses on the same subnet (i.e. overlapping subnets). • PPPoE—Use PPPoE to retrieve a configuration for the IP address, gateway, and DNS server. For example, if this interface uses a DSL connection to the Internet, your ISP may require this option.

type	If you are editing the configuration for a physical interface, you cannot set the type. If you are configuring a logical interface, you can select from the following options: • Aggregate—A logical interface you create to support the aggregation of multiple physical interfaces. • VLAN—A logical interface you create to VLAN subinterfaces on a single physical interface.
set mode static	
ip	Specify the IP address and CIDR-formatted subnet mask, separated by a forward slash (/), such as 192.0.2.5/24. Dotted quad formatted subnet masks are not accepted.
ip6	Specify the IP address and CIDR-formatted subnet mask, separated by a forward slash (/), such as 2001:0db8:85a3:::8a2e:0370:7334/64. Dotted quad formatted subnet masks are not accepted.
set mode pppoe	
disc-retry-timeout	Seconds the system waits before it retries to discover the PPPoE server.
dns-server-override	Use the DNS addresses retrieved from the PPPoE server instead of the one configured in the FortiADC system settings.
idle-timeout	Disconnect after idle timeout in seconds. The default is 0. The valid range is 0 to 32,000.
lcp-echo-interval	LCP echo interval in seconds. The default is 5. The valid range is 1 to 255.
lcp-max-echo-fails	Maximum missed LCP echo messages before disconnect. The default is 3. The valid range is 1 to 255.
pppoe-default-gateway	Use the default gateway retrieved from the PPPoE server instead of the one configured in the FortiADC system settings.
username	PPPoE account user name.
password	PPPoE account password.
set type vlan	

`vlanid`	VLAN ID of packets that belong to this VLAN. If one physical network port (that is, a VLAN trunk) will handle multiple VLANs, create multiple VLAN subinterfaces on that port, one for each VLAN ID that will be received. If multiple different physical network ports will handle the same VLANs, on each of the ports, create VLAN subinterfaces that have the same VLAN IDs. The valid range is between 1 and 4094. The value you specify must match the VLAN ID added by the IEEE 802.1q-compliant router or switch connected to the VLAN subinterface.
`interface`	Physical interface associated with the VLAN; for example, port2.
set type aggregate	
`aggregate-algorithm`	Connectivity layers that will be considered when distributing frames among the aggregated physical ports: • Layer 2 • Layer 2-3 • Layer 3-4
`aggregate-mode`	Link aggregation type: • 802.3ad • Balance-alb • Balance-rr • Balance-tlb • Balance-xor • Broadcast
`member`	Specify the physical interfaces that are included in the aggregation.
set type loopback	Set as the loopback interface, which is used by other features, such as VS, 1-1 NAT, GLB, VT, OSPF, BGP, etc.
set type soft-switch	Set the interface type used for transparent mode. All interfaces that belong to the same soft-switch will be in the same broadcast domain. Use of a soft-switch can greatly simplify customer deployment because they do not have to change their network topologies when adding new FortiADC devices to their environment.
config secondary-ip-list	

`allowaccess`	Allow inbound service traffic. Specify a space-separated list of the following options: • HTTP—Enables connections to the web UI. We recommend this option only for network interfaces connected to a trusted private network, or directly to your management computer. • HTTPS—Enables secure connections to the web UI. We recommend this option instead of HTTP. • Ping—Enables ping and traceroute to be received on this network interface. When it receives an ECHO_REQUEST (“ping”), FortiADC will reply with ICMP type 0 (ECHO_RESPONSE or “pong”). • SNMP—Enables SNMP queries to this network interface. • SSH—Enables SSH connections to the CLI. We recommend this option instead of Telnet. • Telnet—Enables Telnet connections to the CLI. We recommend this option only for network interfaces connected to a trusted private network, or directly to your management computer.
`ip`	Secondary IP addresses can be used when you deploy the system so that it belongs to multiple logical subnets. If you assign multiple IP addresses to an interface, you must assign them static addresses. To add secondary IP addresses, enable the feature and save the configuration. After you have saved it the first time, you can edit it to add secondary IP addresses and enable inbound traffic to that address.
config ha-node-ip-list	
`allowaccess`	Enable inbound service traffic on the IP address for the specified services.
`ip`	You use the HA node IP list configuration in an HA active-active deployment. For each HA cluster node, configure an HA node IP list that includes an entry for each cluster node. When the appliance is in standalone mode, it uses the physical port IP address; when it is in HA mode, it uses the HA node IP address. For each address, specify an IP address using the CIDR-formatted subnet mask, separated by a forward slash (/), such as 192.0.2.5/24.
`node`	ID of the corresponding node.
config ha-node-secondary-ip-list	
`allowaccess`	Enable inbound service traffic on the IP address for the specified services.

ip	You use the HA node secondary IP list configuration if the interfaces of the nodes in an HA active-active deployment are configured with secondary IP addresses. For each address, specify an IP address using the CIDR-formatted subnet mask, separated by a forward slash (/), such as 192.0.2.5/24.
node	ID of the corresponding node.

Example

The following example configures port1 (the management interface):

```
FortiADC-VM # get system interface port1
type : physical
mode : static
vdom : root
redundant-master :
ip : 192.168.1.99/24
ip6 : ::/0
allowaccess : https ping ssh snmp http telnet
mtu : 1500
speed : auto
status : up
mac-addr : 00:0c:29:e8:a0:86
secondary-ip : enable

FortiADC-VM # config system interface
FortiADC-VM (interface) # edit port1
FortiADC-VM (port1) # set ip 192.0.2.5/24
FortiADC-VM (port1) # end

FortiADC-VM # get system interface port1
type : physical
mode : static
vdom : root
redundant-master :
ip : 192.0.2.5/24
ip6 : ::/0
allowaccess : https ping ssh snmp http telnet
mtu : 1500
speed : auto
status : up
mac-addr : 00:0c:29:e8:a0:86
secondary-ip : enable

config system interface
   edit port1
      set floating enable
      set floating-ip 172.1.1.1
      set traffic-group traffic-group-1
      set secondary-ip enable
      config secondary-ip list
         edit 1
            set allow ping icmp http https
```

```
            set floating enable
            set floating-ip 67.1.1.1
            set traffic-group traffic-group-2
          next
        end
```

The following example configures vlan interfaces on port7:

```
FortiADC-VM # config system interface
FortiADC-VM (interface) # edit vlan102
Add new entry 'vlan102' for node 1
FortiADC-VM (vlan102) # set type vlan
FortiADC-VM (vlan102) # set vlanid 102
FortiADC-VM (vlan102) # set ip 10.10.100.102/32
FortiADC-VM (vlan102) # set interface port7
FortiADC-VM (vlan102) # next

FortiADC-VM (interface) # edit vlan103
Add new entry 'vland103' for node 1
FortiADC-VM (vland103) # set type vlan
FortiADC-VM (vland103) # set vlanid 103
FortiADC-VM (vland103) # set ip 10.10.103.102/32
FortiADC-VM (vland103) # set interface port7
FortiADC-VM (vland103) # end

FortiADC-VM # get system interface

== [ vlan102 ]
type: vlan
vdom: root
redundant-master: 0
ip: 10.10.100.102/32
ip6: ::/0
allowaccess:
status: up
interface: port7
== [ vlan103 ]
type: vlan
vdom: root
redundant-master: 0
ip: 10.10.103.102/32
ip6: ::/0
allowaccess:
status: up
interface: port7
```

config system isp-addr

Use this command to amend the predefined and restored ISP address books, or to configure new ISP address books.

The following policies use the ISP address book objects:

- ISP routes
- LLB proximity routes

- LLB policies
- GLB data center configuration

ISP address books contain IP subnet addresses and associated province location settings for ISP links. The province setting is used in GLB deployments in China to enable location awareness that is province-specific. For example, a user can be directed to a datacenter in Beijing or Guangdong rather than simply China.

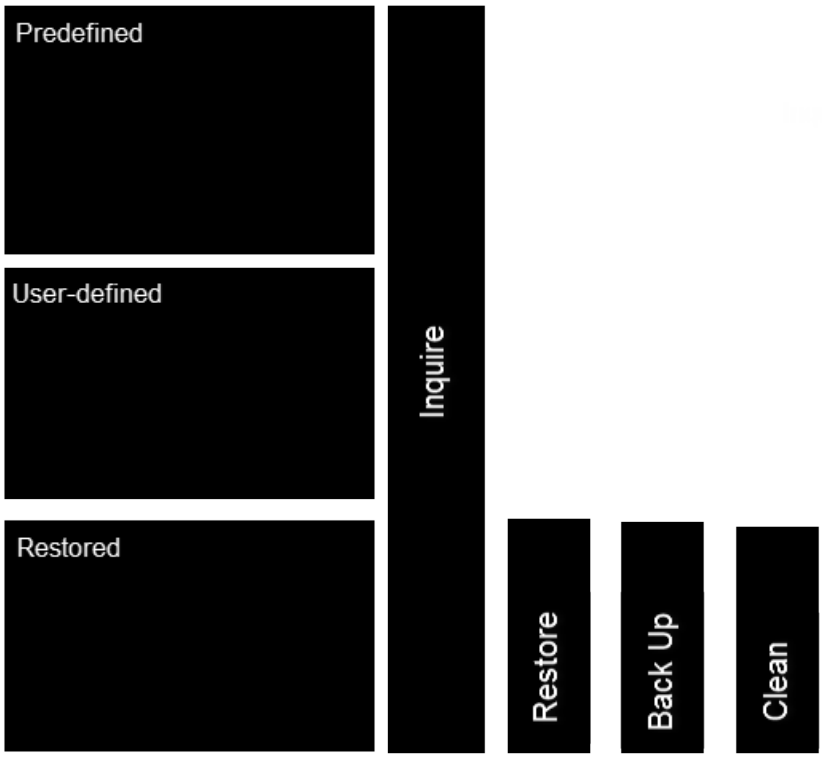
Figure 4 shows the three types of address book entries:

- Predefined—Addresses and associated province location settings for China Mobile, China Telecom, and China Unicom. The IP subnet addresses in the predefined address books are not exposed in the user interface. The predefined package is provided to make it easier for you to configure a route when all you know and all you need to know is the name of the ISP that hosts the link.
- Restored—Addresses imported from a text file. The IP subnet addresses in the restored address books are not exposed in the user interface. “Restored” addresses can help you rapidly build an ISP address book configuration.
- User-defined—In the ISP address configuration, you can modify the predefined and restored address books by specifying subnets to add or exclude from them. This gives you flexibility in case you encounter address conflicts or the ISP instructs you to add a subnet address manually. You can also create new user-defined entries for other ISPs.

In systems with multiple VDOMs, these commands apply to the current VDOM only. In other words, if you configure an exclusion, it is applicable to the current VDOM only; it does not change the predefined address book.

You can use the execute isplookup command to see whether an IP address belongs to any of the address books. If an address is can be found in more than one address book, the results are returned in the following priority: user-defined, restored, predefined.

Figure 4: ISP address book types



The text file for the Restored entries has the following format:

```
#this is a comment line
ISP name:ABC
Province:Beijing
1.1.1.0/24
Province:Unknown
2.2.0.0 255.255.0.0
#this is a comment line too
3.3.3.3/32
ISP name:DEF
Province:Shanghai
4.4.4.0 255.255.255.0
5.5.0.0/16
```

You use the execute restore command to import the file and the execute backup command to export it.

You use the execute clean command to erase entries that were imported from the text file. The clean operation does not affect the predefined addresses or user-configured entries. If a restored entry has user-configured elements (for example, an exclude list), the clean operation clears the addresses but preserves the configuration and converts it to a user-defined type.

Basic Steps

1. Create address objects.
2. Specify them when you configure your policies.

Before you begin:

- You must have read-write permission for system settings.

Syntax

```
config system isp-addr
   edit china-mobile
      config exclude-address
         edit <No.>
            set ip-netmask <ip&netmask>
         next
      end
      config address
         edit <No.>
            set ip-netmask <ip&netmask>
            set province <datasource>
         next
      end
   next
   edit china-telecom
      config exclude-address
         edit <No.>
            set ip-netmask <ip&netmask>
         next
      end
      config address
         edit <No.>
            set ip-netmask <ip&netmask>
            set province <datasource>
         next
      end
   next
   edit china-unicom
      config exclude-address
         edit <No.>
            set ip-netmask <ip&netmask>
         next
      end
      config address
         edit <No.>
            set ip-netmask <ip&netmask>
            set province <datasource>
         next
      end
   next
   edit <name>
      config address
         edit <No.>
            set ip-netmask <ip&netmask>
            set province <datasource>
         next
      end
   next
end
```

ip-netmask	Specify addresses to exclude or add using the address/mask notation.
province	Specify the associated province location. The configuration supports the following selections:

Anhui	Henan	Shanxi (taiyuan)
Beijing	Hubei	Shanxi (xian)
Chongqing	Hunan	Sichuan
Fujian	Jiangsu	Tianjin
Gansu	Jiangxi	Xianggang
Guangdong	Jilin Liaoning	Xinjiang
Guangxi	Neimenggu	Xizang
Guizhou	Ningxia	Yunnan
Hainan	Qinghai	Zhejiang
Hebei	Shandong	Unknown
Heilongjiang	Shanghai	

Note: Each VDOM can have up to 32 main entries.

Example

```
FortiADC-VM # config system isp-addr
FortiADC-VM (isp-addr) # edit china-mobile
FortiADC-VM (china-mobile) # get
type : predef

FortiADC-VM (china-mobile) # config address

FortiADC-VM (address) # edit 1
Add new entry '1' for node 2739

FortiADC-VM (1) # get
ip-netmask : 0.0.0.0/0
province :

FortiADC-VM (1) # set ip-netmask 192.168.1.0/24
FortiADC-VM (1) # set province Beijing
FortiADC-VM (1) # end
FortiADC-VM (china-mobile) # end
```

See also

- execute isplookup
- execute backup

- execute clean
- execute restore
- config system setting

config system mailserver

Use this command to configure an SMTP email server if you want to send notifications by email.

Before you begin:

- You must have read-write permission for system settings.

Syntax

```
config system mailserver
   set address <string>
   set port <integer>
   set security {starttls|none}
   set smtp-auth {enable|disable}
   set username <string>
   set password <passwd>
end
```

address	IP address or FQDN of an SMTP server (such as FortiMail) or email server that the appliance can connect to in order to send alerts and/or generated reports.
port	Listening port number of the server. Usually, SMTP is 25.
security	STARTTLS is an extension to plain text communication protocols. It enables a plain text connection to be upgraded to an encrypted (TLS or SSL) connection instead of using a separate port for encrypted communication. Specify this option if you have implemented STARTTLS for your mailserver; otherwise, leave unset or specify none.
smtp-auth	Enable if the SMTP server requires authentication.
username	Username for authentication to the SMTP server.
password	Password for authentication to the SMTP server.

Example

```
FortiADC-VM # get system mailserver
address :
port : 25
security:
smtp-auth : enable
username :
password : *

FortiADC-VM # config system mailserver
FortiADC-VM (mailserver) # set address 192.168.1.125
```

```
FortiADC-VM (mailserver) # set username admin
FortiADC-VM (mailserver) # set password strongpass
FortiADC-VM (mailserver) # end

FortiADC-VM # get system mailserver
address : 192.168.1.125
port : 25
security:
smtp-auth : enable
username : admin
password : *
```

config system overlay-tunnel

Use this command to configure an overlay tunnel.

FortiADC support two types of overlay protocols—VXLAN and NVGRE.

- Virtual Extensible LAN (VXLAN) is a network virtualization technology used in large cloud-computing deployments. It encapsulates OSI Layer-2 Ethernet frames within Layer-3 IP packets using the standard destination port 4789. VXLAN endpoints that terminate VXLAN tunnels are known as VXLAN tunnel endpoints (VTEPs), and can be virtual or physical switch ports. For more information, see RFC 7348.
- Network Virtualization using Generic Routing Encapsulation (NVGRE) is a network virtualization technology that attempts to alleviate the scalability problems associated with large cloud-computing deployments. It uses Generic Routing Encapsulation (GRE) to tunnel Layer-2 packets over Layer-3 networks.

Before you begin, make sure that you have read-write permission to configure system settings.

Syntax

```
config system vxlan
   edit <name> <string>
      set type {vxlan|nvgre}
      set interface <datasource>
      set vni <integer>
      set vsid <integer
      set ip-version {ipv4-unicast|ipv4-multicast}
      set dstport <integer>
      set multicast-ttl <integer>
      set destination-ip-addresses <class_ip>
      config remote-host
         edit <No.>
            set host-mac-address <xx:xx:xx:xx:xx:xx>
            set vtep <class_ip>
         next
      end
   next
end
```

type	Select a virtual overlay networking protocol: • VXLAN (default) • NVGRE
interface	The outing interface for VXLAN encapsulated traffic.
dstport	The VXLAN destination port (number). The default is 4789. The valid range is 1–6553.
vni	The VXLAN network ID. The valid range is 1–16777215.
vsid	The NVGRE ID. The valid range is 1–16777215.
ip-version	The IP version to use for the VXLAN interface and for communication over VXLAN. • ipv4-unicast—Use IPv4 unicast addressing over VXLAN or NVGRE. • ipv4-multicast—Use IPv4 multicast addressing over VXLAN.
destination-ip-address	Specify the destination IP address. **Note:** For IPv4 unicast, specify an IPv4 address of the VXLAN interface on the device at the remote end of the VXLAN. You can set multiple VTEP IP addresses, splitting with space char; for IPv4 multicast, specify one multicast IP address only.
multicast-ttl	The option applies to IPv4 multicast IP type only. Specify the multicast TTL. Valid values are from 0 (default) to 255.
remote-host	Add static MAC_to_VTEP to VXLAN mapping table.
host-mac-address	Set the remote host MAC address. The format is xx:xx:xx:xx:xx:xx
vtep	Set the remote VTEP IP address.

Example

The following commands create a VXLAN interface with two VTEP peers:

```
config system overlay-tunnel
   edit "vxlan1"
      set type vxlan
      set interface port2
      set ip-version ipv4-unicast
      set destination-ip-addresses 10.75.0.202 10.75.0.88
      set dstport 4789
      set vni 1122
      config remote-host
      end
next
```

The following commands create a VXLAN interface with a multicast IP:

```
config system overlay-tunnel
   edit "vxlan1"
```

```
        set type vxlan
        set interface vlan249
        set ip-version ipv4-multicast
        set destination-ip-addresses 239.1.1.1
        set dstport 4789
        set vni 1122
        config remote-host
           edit 1
              set host-mac-address 22:22:22:22:22:22
              set vtep 3.2.2.2
        end
   next
```

The following commands create an NVGRE interface with two remote gateway IPs:

```
   config system overlay-tunnel
      edit "nvgre1"
         set type nvgre
         set interface vlan249
         set ip-version ipv4-unicast
         set destination-ip-addresses 10.75.0.202 10.75.0.88
         set dstport 4789
         set vsid 1122
         config remote-host
         end
      next
```

After creating a VXLAN/NVGRE tunnel, the system will create one interface automatically accordingly.

To diagnose your VXLAN configuration, use the following command:

```
diagnose sys vxlan fdb list vxlan1
(M) FortiADC-VM# diagnose system vxlan-fdb vxlan1
ff:ff:ff:ff:ff:ff dst 10.249.100.31 via vlan249 self permanent
ff:ff:ff:ff:ff:ff dst 10.249.100.38 via vlan249 self permanent
22:22:22:22:22:22 dst 3.2.2.2 via vlan249 self permanent
```

config system password-policy

Use this command to set requirements for administrator passwords.

Before you begin:

- You must have read-write permission for system settings.

Syntax

```
config system password-policy
   set status {enable|disable}
   set apply-to admin-user
   set minimum-length <integer>
   set must-contain {lower-case-letter non-alphanumeric number upper-case-letter}
end
```

`status`	Enable/disable password requirements.

apply-to admin-user	Apply the policy to all admin users.
minimum-length	Specify a minimum length. The default is 8.
must-contain	Specify character requirements.

Example

```
FortiADC-VM # get system password-policy
status : disable

FortiADC-VM # config system password-policy
FortiADC-VM (password-policy) # set status enable
FortiADC-VM (password-policy) # end

FortiADC-VM # get system password-policy
status : enable
apply-to : admin-user
minimum-length : 8
must-contain :
```

config system schedule-group

Use this command to create schedule objects to use in link load balancing policies. A policy rule can be time-bound: one time, daily, weekly, or monthly.

Before you begin:

- You must have read-write permission for system settings.

Syntax

```
config system schedule-group
   edit <name>
      config schedule-member <No.>
         edit <name>
            set type {daily-recurring | monthly-recurring | one-time | weekly-recurring}
            set endtime-of-enddate <string>
            set starttime-of-startdate <string>
            set day-of-month <integer>
            set enddate <string>
            set startdate <string>
            set day-of-week {friday | monday | saturday | thursday | tuesday | wednesday}
         next
      end
   next
end
```

type	• One Time • Daily • Weekly • Monthly
endtime-of-enddate	HH:MM. Minutes must be 00, 15, 30, or 45.
startime-of-startdate	HH:MM.
day-of-month	1 - 31.
enddate	YYYY/MM/DD.
startdate	YYYY/MM/DD.
day-of-week	Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday.

config system scripting

This command is deprecated. You must use the web UI to upload a script file.

Before you begin:

- You must have read-write permission for system settings.

Syntax

```
config system scripting
```

Example

```
FortiADC-VM # config system scripting


FortiADC-VM (scripting) # edit ?
name scripting name

FortiADC-VM (scripting) # edit script_name
Add new entry 'script_name' for node 2800

FortiADC-VM (script_name) # set
Parsing error at 'set'. err=1
```

config system service

Use this command to create the service objects that you use in policies.

The following policies use service objects:

- Connection limit policies
- Firewall policies
- Link Load Balance policies
- QoS policies

Basic Steps

1. Create service objects.
2. Specify them when you configure your policies.

Before you begin:

- You must have read-write permission for system settings.

Syntax

```
config system service
   edit <name>
      set protocol-type {IP/ICMP/TCP/UDP/SCTP/TCP-AND-UDP}
      set specify-source-port {enable|disable}
      set destination-port-min <integer>
      set destination-port-max <integer>
      set protocol <integer>
      set source-port-min <integer>
      set source-port-max <integer>
   next
end
```

`destination-port-min`	First port number in the listening port number/range. For example, web servers usually listen on TCP port 80 (HTTP). Valid range: 0 - 65535.
`destination-port-max`	Last port number in the listening port number/range.
`protocol`	Number in the IPv4 Protocol/IPv6 Next Header field that identifies the protocol, such as 1 (ICMP), 6 (TCP) or 17 (UDP).
`source-port-min`	First port number in the originating port number/range. For some protocols, this is a single, predictable number, such as 162 (SNMP). For others, it is dynamically chosen from available ports in the 1024-65535 range.Valid range: 0 - 65535.
`source-port-max`	Last port number in the originating port number/range.

Example

```
FortiADC-docs # config system service
FortiADC-docs (service) # edit name name
FortiADC-docs (service) # edit http
Add new entry 'http' for node 3822
```

```
FortiADC-docs (http) # set ?
destination-port-max destination port max
destination-port-min destination port min
protocol protocol number
source-port-max source port max
source-port-min source port min

FortiADC-docs (http) # set protocol 6
FortiADC-docs (http) # set destination-port-min 80
FortiADC-docs (http) # set destination-port-max 80
FortiADC-docs (http) # get
protocol : 6
source-port-min : 0
source-port-max : 65535
destination-port-min : 80
destination-port-max : 80
FortiADC-docs (http) # end

FortiADC-docs # config system service
FortiADC-docs (service) # edit https
Add new entry 'https' for node 3822
FortiADC-docs (https) # set protocol 6
FortiADC-docs (https) # set destination-port-min 443
FortiADC-docs (https) # set destination-port-max 443
FortiADC-docs (https) # get
protocol : 6
source-port-min : 0
source-port-max : 65535
destination-port-min : 443
destination-port-max : 443
FortiADC-docs (https) # end
```

config system servicegrp

Use this command to create the service group objects that you use to specify matching services in policies.

The following policies use service group objects:

- Link Load Balance policies

Basic Steps

1. Create service group objects.
2. Specify them when you configure your policies.

Before you begin:

- You must have read-write permission for system settings.
- You must have created service objects.

Syntax

```
config system servicegrp
   edit "servicegrp-name"
      set member-list <A> <B> <C>
end
```

servicegrp-name	The name of the service-group.
member-list	List of supported system services, which include the following: • HTTP • HTTPS • ICMP • TELNET • SSH • FTP • SMTP • SMTPS • IMAP • IMAPS • POP3 • POP3S • DHCP • DNS • NTP • SNMP • SNMP_TRAP • SYSLOG • LDAP • LDAPS • RADIUS • RADIUS_OLD • KERBEROS • SMB • SAMBA • MYSQL • GRE • ALL • service1

Example

```
config system service
   edit "http"
      set protoco-type tcp
```

```
      set specify-source-port enable
      set source-port-min 1
      set source-port-max 65535
      set destination-port-min 80
      set destination-port-max 80
   next
   edit "icmp"
      set protoco-type icmp
   next
end

config system servicegrp
      edit "servicegrp_test"
         set member-list HTTP ICMP
      next
   end

config system addrgrp
      edit "1"
         set member-list 10_10 10_20
      next
   end

config system addrgrp6
      edit "v6_1"
         set member-list v6_10 v6_20
      next
end
```

config system setting

Use this command to configure log database behavior when disk utilization reaches its capacity.

Before you begin:

You must have read-write permission for system settings.

Syntax

```
config system setting
   set statistics-db-full {overwrite | nowrite}
   set log-db-full {overwrite | nowrite}
   set predefine-isp {enable|disable}
end
```

`statistics-db-full`	Specify whether to overwrite stats or stop writing stats when the database disk allocation (10% of total disk space) is full. The default is overwrite the earliest stats.

log-db-full	Specify whether to overwrite logs or stop writing logs when the database disk allocation (40% of total disk space) is full. The default is overwrite the earliest logs.
predefine-isp	Enable/disable the predefined ISP address book. Enabled by default. You can use this setting to disable if you experience address conflicts that you cannot resolve using the ISP address book exceptions list.

Example

```
FortiADC-VM # get system setting
statistics-db-full : overwrite
log-db-full : overwrite
predefine-isp: enable

FortiADC-VM # config system setting

FortiADC-VM (setting) # set statistics-db-full nowrite

FortiADC-VM (setting) # end
```

config system snmp community

Use this command to configure SNMP community settings.

Before you begin:

- You must have read-write permission for system settings.

Syntax

```
config system snmp community
   edit <No.>
      set name <string>
      set queryportv1 <integer>
      set queryportv2c <integer>
      set queryv1-status {enable|disable}
      set queryv2c-status {enable|disable}
      set status {enable|disable}
         config host
            edit <No.>
               set host-type <query>
               set ip <subnet>
            next
         end
   next
end
```

`name`	Name of the SNMP community to which the FortiADC system and at least one SNMP manager belongs, such as `management`. You must configure the FortiADC system to belong to at least one SNMP community so that community's SNMP managers can query system information and receive SNMP traps. You can add up to three SNMP communities. Each community can have a different configuration for queries and traps, and the set of events that trigger a trap. You can also add the IP addresses of up to eight SNMP managers to each community to designate the destination of traps and which IP addresses are permitted to query the FortiADC system.
`queryportv1`	Port number on which the system listens for SNMP queries from the SNMP managers in this community. The default is 161.
`queryportv2c`	Port number on which the system listens for SNMP queries from the SNMP managers in this community. The default is 161.
`queryv1-status`	Enable/disable SNMP v1 queries.
`queryv2c-status`	Enable/disable SNMP v2c queries.
`status`	Enable/disable the configuration.
config host	
host-type	• query—Accept queries from this host.
`ip`	Specify a subnet address for the SNMP manager to receive traps and be permitted to query the FortiADC system. SNMP managers have read-only access. You can add up to 8 SNMP managers for a user. To allow any IP address using this SNMP username to query the FortiADC system, enter `0.0.0.0/0`. For security best practice reasons, however, this is not recommended. **Caution:** The system sends security-sensitive traps, which should be sent only over a trusted network, and only to administrative equipment. **Note:** If there are no other host IP entries, entering only `0.0.0.0/0` effectively disables traps because there is no specific destination for trap packets. If you do not want to disable traps, you must add at least one other entry that specifies the IP address of an SNMP manager.

Example

```
FortiADC-VM # config system snmp community

FortiADC-VM (community) # edit 1
```

```
Add new entry '1' for node 318

FortiADC-VM (1) # get
name :
status : enable
queryv1-status : enable
queryportv1 : 161
queryv2c-status : enable
queryportv2c : 161
trapv1-status : enable

FortiADC-VM (1) # set name community1

FortiADC-VM (1) # config host
<Enter>

FortiADC-VM (1) # config host
FortiADC-VM (host) # edit 1
Add new entry '1' for node 333

FortiADC-VM (1) # get
ip : 0.0.0.0
host-type : any

FortiADC-VM (1) # set ip 192.0.2.1/32

FortiADC-VM (1) # end
FortiADC-VM (1) # end
```

config system snmp sysinfo

Use this command to configure SNMP settings.

Before you begin:

- You must have read-write permission for system settings.

Syntax

```
config system snmp sysinfo
   set contact <string>
   set description <string>
   set location <string>
   set status {enable|disable>
end
```

`contact`	Contact information for the administrator or other person responsible for this system, such as a phone number (`555-5555`) or name (`jdoe`). The contact information can be up to 35 characters long, and can contain only letters (a-z, A-Z), numbers, hyphens (-) and underscores (_).

`description`	A description or comment about the system, such as `dont-reboot`. The description can be up to 35 characters long, and can contain only letters (a-z, A-Z), numbers, hyphens (-) and underscores (_).
`location`	Physical location of the appliance, such as `floor2`. The location can be up to 35 characters long, and can contain only letters (a-z, A-Z), numbers, hyphens (-) and underscores (_).
`status`	Enable/disable the SNMP agent, so that the system can send traps and receive queries.

Example

```
FortiADC-VM # get system snmp sysinfo
status : disable
description :
location :
contact :

FortiADC-VM # config system snmp sysinfo
FortiADC-VM (sysinfo) # set status enable
FortiADC-VM (sysinfo) # end

FortiADC-VM # get system snmp sysinfo
status : enable
description :
location :
contact :
```

config system snmp user

Use this command to manage SNMP settings.

Before you begin:

- You must have read-write permission for system settings.

Syntax

```
config system snmp user
   edit <name>
      set query-status {enable|disable}
      set queryport <integer>
      set security-level {authnopriv | authpriv | noauthnopriv}
      set auth-proto {sha1|md5}
      set auth-pwd <passwd>
      set priv-proto {aes|des}
      set priv-pwd <passwd>
      set status {enable|disable}
      config host
```

```
            edit <name>
               set ip <subnet>
            next
          end
       next
    end
```

query-status	Enable/disable SNMP queries.
queryport	Port number on which the system listens for SNMP queries from the SNMP managers in this community. The default is 161.
security-level	• authnopriv—Authenticated but unencrypted. • authpriv—Authenticated and encrypted. • noauthnopriv—Unauthenticated and unencrypted.
auth-proto	• SHA1 • MD5
auth-pwd	Passphrase used to generate the key.
priv-proto	• AES • DES
priv-pwd	Passphrase used to generate the key.
status	Enable/disable the user configuration.
config host	
ip	Specify a subnet address for the SNMP manager to receive traps and be permitted to query the FortiADC system. SNMP managers have read-only access. You can add up to 8 SNMP managers for a user. To allow any IP address using this SNMP username to query the FortiADC system, enter `0.0.0.0/0`. For security best practice reasons, however, this is not recommended. **Caution:** The system sends security-sensitive traps, which should be sent only over a trusted network, and only to administrative equipment. **Note:** If there are no other host IP entries, entering only `0.0.0.0/0` effectively disables traps because there is no specific destination for trap packets. If you do not want to disable traps, you must add at least one other entry that specifies the IP address of an SNMP manager.

Example

```
FortiADC-VM # config system snmp user
```

```
FortiADC-VM (user) # edit docs
Add new entry 'docs' for node 1152
FortiADC-VM (docs) # set status enable
FortiADC-VM (docs) # end

FortiADC-VM # get system snmp user docs
status : enable
security-level :
query-status : disable
queryport : 161
trap-status : disable
trapport-local : 162
trapport-remote : 162
trapevent : cpu mem logdisk system raid ha remote-storage
```

config system tcpdump

This configuration is for the tcpdump utility in the Web UI. The configuration saves TCP dump commands and filter expressions so that they can be re-run from the Web UI. The CLI supports its own tcpdump service. See execute packet-capture/packet-capture6.

Before you begin:

- You must have read-write permission for system settings.

Syntax

```
config system tcpdump
   edit <No.>
   set host <ip&netmask>
   set interface <datasource>
   set logtraffic {enable|disable}
   set max-packet-count <integer>
   set port <integer>
   set protocol {arp icmp tcp udp}
   set specified-protocol {enable|disable}
   set status {enable|disable}
end
```

host	IP address for the interface used for tcpdump.
interface	Interface to use for tcpdump.
logtraffic	Enable/disable event logs about using tcpdump.
max-packet-count	Maximum number of packets to capture.
port	Port to use for tcpdump.
protocol	Specify the protocol traffic to capture.

specified-protocol	Enable/disable the protocol option.
status	Enable/disable the configuration.

Example

```
FortiADC-VM # config system tcpdump
FortiADC-VM (tcpdump) # edit 1
Add new entry '1' for node 2725
FortiADC-VM (1) # set interface port1
FortiADC-VM (1) # set status enable
FortiADC-VM (1) # set max-packet-count 5
FortiADC-VM (1) # end

FortiADC-VM # get system tcpdump 1
interface : port1
status : enable
logtraffic : enable
ipv6 : disable
host :
port :
specified-protocol : disable
max-packet-count : 5
```

config system time manual

Use this command to manage system time.

Before you begin:

- You must have read-write permission for system settings.

Syntax

```
config system time manual
   set daylight-saving-time {enable|disable}
   set zone <0-71>
   next
end
```

daylight-saving-time	Enable if you want the system to adjust its own clock when its time zone changes between daylight saving time (DST) and standard time.
zone	Specify the code number for the time zone where the appliance is located.

Example

```
FortiADC-VM # get system time manual
daylight-saving-time: enable
```

```
zone : 4
```

See also

- execute date

config system time ntp

Use this command to manage the connection to an NTP server.

Before you begin:

- You must have read-write permission for system settings.

Syntax

```
config system time ntp
   set ntpsync {enable|disable}
   set ntpserver <string>
   set syncinterval <integer>
end
```

ntpsync	Enable/disable use of NTP.
ntpserver	Specify the IP address or domain name of an NTP server or pool, such as pool.ntp.org. To find an NTP server, go to http://www.ntp.org.
syncinterval	Specify how often the system synchronizes its time with the NTP server. The default is 60 minutes. The valid range is 1-1440.

Example

```
FortiADC-VM # get system time ntp
ntpsync : disable

FortiADC-VM # config system time ntp
FortiADC-VM (ntp) # set ntpsync enable
FortiADC-VM (ntp) # end

FortiADC-VM # get system time ntp
ntpsync : enable
ntpserver : pool.ntp.org
syncinterval : 60
```

config system traffic-group

A traffic group is similar to a VRRP group. You can create a new traffic group using the `config system traffic-group` command, and then invoke using the `config system interface` or the `config load-balance virtual-server` command. If no traffic group is specified in the "virtual-server", it belongs to the default traffic group.

Syntax

```
config system traffic-group
   edit traffic-group-1
      set preempt {enable|disable}
      set network-failover {enable|disable}
      set failover-order <string>
   next
end
```

preempt	Enable or disable the preempt mode.
network-failover	Enable or disable the network failover track.
failover-order	Set the node ID set.

```
config system interface
   edit port1
      set floating {enable|disable}
      set floating-ip <string>
      set traffic-group <string>


   config secondary-ip list
      edit 1
         set floating {enable|disable}
         set floating-ip <string>
         set traffic-group <string>
      next
   end
end
```

`floating`	Enable or disable floating IP.
`floating-ip`	Set the floating IP for this secondary IP.
`traffic-group`	Specify the traffic group for this secondary IP.

```
config load-balance virtual-server
   edit "VS"
      set traffic-group <string>
   next
end
```

`traffic-group`	Specify the traffic group for this virtual server (VS).

Example

```
config system traffic-group
   edit traffic-group-1
      set preempt enable
      set network-failover enable
      set failover-order 1 3 5
   next


config system interface
   edit port1
      set floating enable
      set floating-ip 172.1.1.1
      set traffic-group traffic-group-1
      set secondary-ip enable
      config secondary-ip list
         edit 1
            set allow ping icmp http https
            set floating enable
            set floating-ip 67.1.1.1
            set traffic-group traffic-group-2
         next
      end


config load-balance virtual-server
   edit "l7vs"
      set type l7-load-balance
      set interface port1
      set ip 172.1.1.2
      set traffic-group traffic-group-1
   next
end
```

config system web-filter

Use this command to manage FortiGuard web filter category updates. FortiGuard maintains massive lists of web sites classified into categories so that you can enforce categorical decisions in your rules, like "do not do SSL forward proxy for sites belonging to the Personal Privacy category."

Before you begin:

- You must have read-write permission for system settings.

Syntax

```
config system web-filter
   set cache-status {enable|disable}
   set cache-ttl <integer>
   set fds-port <integer>
end
```

cache-status	Enable/disable caching of the categorical lists of websites.
cache-ttl	Specify cache expiration. The default is 3600. The valid range is 10 to 86,400. When the cache expires, FortiADC initiates an update from FortiGuard.
fds-port	Specify the port to receive updates. The default is 53. An alternative is 8888.

Example

```
FortiADC-VM # config system web-filter
FortiADC-VM (web-filter) # set cache-status enable
FortiADC-VM (web-filter) # end
```

See also

- config system fortiguard

config system tunneling

Use this command to configure the proxy server for FortiADC VMs that do not have access to Internet, and therefore cannot connect to the FortiGuard Distribution Network (FDN) to validate its license. Be sure to enable the set override-server-status when using this feature..

Before you begin, make sure you have read-write permission for system settings.

Syntax

```
config system tunneling
   set address <proxy_address>
   set password <password>
   set port <proxy_port>
   set status {enable | disable}
   set username
end
```

status	Enable/disable Web proxy tunneling for FDN. Disabled by default.
address	Web proxy IP address.
port	Web proxy port.
username	The username for Web proxy authentication.
password	The password for Web proxy authentication.

Example

```
FortiADC-VM # config system fortiguard
FortiADC-VM (fortiguard) # set tunneling-status enable
FortiADC-VM (fortiguard) # set tunneling-address 1.1.1.101
FortiADC-VM (fortiguard) # set tunneling-port 808
FortiADC-VM (fortiguard) # set tunneling-username user1
FortiADC-VM (fortiguard) # set tunneling-password 123
FortiADC-VM (fortiguard) # set override-server-status enable
FortiADC-VM (fortiguard) # set override-server-address 62.209.40.78
FortiADC-VM (fortiguard) # end
```

config system alert-syslog

Use this command to configure syslog alert objects.

Syntax

```
config system alert-syslog
   edit "syslog_name"
      set server <ipv4 address>
      set port <integer>
   next
end
```

syslog_name	The name of an syslog configuration.
server	The IP address of the syslog server.
port	The syslog port.

Example

```
config system alert-syslog
   edit "1"
      set server 10.0.11.16
      set port 514
   next
end
config system alert-email
   edit "email1"
      set from fortiadc_send@fortinet.com
      set to receiver@fortinet.com
   next
end
```

config system alert-email

Use this command to configure email alert objects.

Syntax

```
config system alert-email
   edit "email_name"
      set from <string_email_format>
      set to <string_email_format>
   next
end
```

email_name	The name of an email alert object.
from	The sender's email address, e.g., fortiadc_send@fortinet.com.
to	The recipient's email address, e.g., receiver@fortinet.com.

Example

```
config system alert-syslog
   edit "1"
      set server 10.0.11.16
      set port 514
   next
end
config system alert-email
   edit "email1"
      set from fortiadc_send@fortinet.com
      set to receiver@fortinet.com
   next
end
```

config system alert-snmp-trap

Use this command to configure SNMP alert traps.

Syntax

```
config system alert-snmp-trap
   edit "snmp_trap_name"
      set ip <ipv4 address>
      set version {version1|version2c|version3}
      set trapport-local <integer>
      set trapport-remote <integer>
   next
end
```

snmp_trap_name	Add or edit a table value
ip	The IP address of the SNMP trap server.
version	The version of the SNMP trap server.
trapport-local	The local trap port number of the SNMP server.
trapport-remote	The remote trap port number of the SNMP server.

Example

```
config system alert-snmp-trap
   edit "1"
      set ip 10.0.11.16
      set version version2c
      set trapport-local 162
      set trapport-remote 162
   next
end
```

config system alert-action

Use this command to configure system alert actions.

Syntax

```
config system alert-action
   edit "alert_action_name"
      set syslog <datasource>
      set email mail1 <datasource>
      set snmp-trap <datasource>
   next
end
```

aler_action_name	The name of an alert action configuration.
syslog	The name of a syslog alert action configuration, as configured in "config system alert-syslog".
email	The name of an email alert action, as configured in "config system alert-email".
snmp_trap	The name of an SNMP trap alert action, as configured in "config system alert-snmp-trap".

Example

```
config system alert-action
   edit "all"
      set syslog 1
      set email mail1
      set snmp-trap 1
   next
end
```

config system alert

Use this command to configure that monitor critical events and metric data of various objects in the FortiADC appliance, and then provides reactions for cases such as email, SNMP trap, and syslog, etc..

Before you begin:

You must have read-write permission for system settings.

Syntax

```
config system alert
   edit "alert_name"
      set priority {high|low|middle}
      set use-rolling-window {enable|disable}
      set rolling-window <integer>
      set occurrence-number <integer>
      set expire-time <integer>
      set throttle-alert <integer>
      set alert-source-type {metric|event}
      set metric-object-type {interface|slb-virtual-server|system}
      set metric-object-instance <string>
      set duration <integer>
      set comments comments
      config alert-metric-expr-member
         edit "member_name"
            set metric <datasource>
            set metric-comparator {eq|le|ge}
            set value <integer>
         next
end
```

alert_name	The name of an alert configuration.
priority	Select one of the following: • high • medium • low

use-rolling-window	Enable or disable.
rolling-window	The rolling window in seconds. **Note:** This parameter can be configured only when use-rolling-window is enabled. If occurrence-number (see below) is set to 1, then every occurrence will trigger the alert. If occurrence-number is set to a higher number, such as 100, then the alert is triggered every 100 times the event happens. When use-rolling-window is enabled, a corresponding rolling-window must be specified. If the number of occurrences is true within the specified rolling-window, then the alert is triggered. For example, if a client attempts more than 100 TCP connections within a five-minute rolling-window, that triggers the alert.
occurrence-number	The number of times an event must have occurred to trigger an alert. **Note:** This parameter can be configured only when use-rolling-window is enabled.
expire-time	The length of time an alert remains visible on FortiADC's web interface. **Note:** Alerts "older" than their expire-time are grayed out.
throttle--alert	The interval (in seconds) at which the system sends out an alert. **Note:** Valid values range from 0 to 3,600 (seconds). For example, if you set the value to 10, the system will send out an alert every 10 seconds. A value of 0 indicates there will be no such time-based throttling — the system will send out alerts as soon as they are triggered. The timer starts all over again once an alert is triggered.
alert-source-type	Specify either of • event • metric
metric-object-type	Specify one of the following: • interface • slb-virutal-server • system
metric-object-instance	If "metric-object-type" is interface or slb-virtual-server, you need to select the metric-object-instance to specify the monitoring resource. If "metric-object-type" is interface, the instance should be the interface name. If "metric-object-type" is slb-virtual-server, the instance should be the virtual server name.

`duration`	Metric duration. An alert is triggered if the metric's value is >=, =, or <= to the specified value field, averaged over the period of time specified by the `duration` value.
`metric`	If metric-object-type is interface, the metric could be: • dev_if.avg_bandwidth_rx • dev_if.avg_bandwidth_tx If metric-object-type is slb-virtual-server, the metric could be: • slb.avg_new_conns • slb.current_conns • slb.avg_bandwidth_rx • slb.avg_bandwidth_tx • slb.avg_bandwidth • slb.http.avg_client_rtt • slb.http.avg_server_rtt • slb.http.avg_app_resonse • slb.http.avg_new_http_request • slb.http.avg_cache_hit_ratio • slb.ssl.avg_ssl_bandwidth_rx • slb.ssl.avg_ssl_bandwidth_tx • slb.ssl.avg_ssl_bandwidth • slb.ssl.avg_ssl_failed_sessions • slb.ssl.avg_ssl_new_sessions • slb.ssl.avg_ssl_current_sessions If metric-object-type is system, the metric could be: • dev_stats.avg_cpu_usage • dev_stats.avg_mem_usage • dev_stats.avg_disk_usage • dev_stats.avg_cpu_temperature • dev_stats.avg_sys_temperature • dev_stats.avg_psu_temperature
`metric-comparator`	Alert metric comparator. Set eq, ge, or le relative to the `value` (see below)
`value`	Metric value. Specify a value pertinent to the metric specified (see above). **Note:** The unit of measurement of the value you set here may vary, depending on the metric specified (see above). For CPU, memory, and disk usage, it's a percentage of the total capacity of the metric. For example, a value of 50 means 50% of the system's CPU, memory, or disk space.

Example

```
config system alert
   edit "metric-sys"
      set priority high
      set use-rolling-window enable
      set rolling-window 50
      set occurrence-number 2
      set expire-time 3600
      set throttle-alert 0
      set alert-source-type metric
      set metric-object-type system
      set duration 5
      config alert-metric-expr-member
         edit "mem-usage"
            set metric dev_stats.avg_mem_usage
            set metric-comparator ge
            set value 90
         next
      end
   next
   edit "metric-vs"
      set priority middle
      set expire-time 3600
      set throttle-alert 0
      set alert-source-type metric
      set metric-object-type slb-virtual-server
      set metric-object-instance l7http
      set duration 5
      config alert-metric-expr-member
      end
   next
   edit "metric-int"
      set priority low
      set expire-time 3600
      set throttle-alert 0
      set alert-source-type metric
      set metric-object-type interface
      set metric-object-instance port2
      set duration 5
      config alert-metric-expr-member
         edit "avg-bw-tx"
            set metric dev_if.avg_bandwidth_tx
            set metric-comparator le
            set value 20
         next
      end
   next
      edit "rs_enable"
         set priority high
         set use-rolling-window disable
         set occurrence-number 300
         set expire-time 86400
         set throttle-alert 300
         set alert-source-type event
         set event SLB_Server_ENABLED
```

```
            set comments comments
        next
    end
```

config system alert-policy

Use this command to configure system alert policies.

Before you begin:

You must have read-write permission for system settings.

Syntax

```
config system alert-policy
   edit "alert_policy_name"
      set status {enable|disable}
      set action <datasource>
      set comments comments
      config alert-member
         edit "alert_member_name"
            set status {enable|disable}
            set alert-name <datasource>
            set alert-action-inherit {disable|enable}
            set action <datasource>
         next
      end
   next
end
```

Policy	
`alert_polciy_name`	The name of an alert policy configuration.
`status`	Enable or disable the alert policy.
`action`	Set the alert action for the entire policy. **Note:** Alert actions include syslog, email, and snmp trap, which can be configured using "`config system alert-action`". The action you set here affects all members.
Member	
`alert-member-name`	The name of a member of an alert policy.
`status`	Enable or disable an alert-member.

`alert-name`	The name of an alert configuration.
`alert-action-iherit`	Enable or disable. **Note:** If enabled, the alert policy member will inherit the action set in the alert policy.
`action`	Set the action for the alert policy member. **Note:** Alert actions include syslog, email, and snmp trap, which can be configured using "`config system alert-action`". The action you set here affects the policy-member only.

Example

```
config system alert-policy
   edit "disk"
      set status disable
      set action all
      config alert-member
         edit "1"
            set alert-name disk
            set alert-action-inherit disable
            set action all
         next
      end
   next
end
```

config user

The `config user` commands configure the authentication framework for administrator accounts and user accounts.

This chapter is a reference for the following commands:

- "config user ldap" on page 356
- "config user local " on page 357
- "config user radius" on page 357
- "config user user-group" on page 358
- "config user authentication-relay" on page 360

config user ldap

Use this command to configure a connection to an LDAP server that can authenticate administrator or user logins.

Basic steps:

1. Create an LDAP authentication server configuration.
2. Select the LDAP server configuration when you add administrator users or create user groups.

Before you begin:

- You must know the IP address and port used to access the LDAP server. You must know the CN and DN where user credentials are stored on the LDAP server.
- You must have read-write permission for system settings.

Syntax

```
config user ldap
   edit <name>
      set cnid <string>
      set dn <string>
      set port <integer>
      set server <string>
      set vdom <datasource>
   next
end
```

`cnid`	Common name (cn) attribute for the LDAP record. For example: `cn`
`dn`	Distinguished name (dn) attribute for the LDAP record. For example: `cn=John%20Doe,dc=example,dc=com`
`port`	Port number for the server. The commonly used port for LDAP is 389.

server	IP address for the server.
vdom	Reserved for future use.

config user local

Use this command to configure user accounts in the local authentication server. You can add or delete accounts, or change the password, but you cannot edit usernames.

Before you begin:

- You must have read-write permission for system settings.

Syntax

```
config user local
   edit <name>
      set password <password>
   next
end
```

<name>	Name of the user account, such as user1 or user1@example.com. Do not use spaces or special characters except the 'at' symbol (@) or dot (.). The maximum length is 35 characters. After you initially save the configuration, you cannot edit the name.
password	Specify a password. The stored password will be encrypted.

config user radius

Use this command to configure a connection to a RADIUS server that can authenticate administrator or user logins.

Basic steps:

1. Create a RADIUS authentication server configuration.
2. Select the RADIUS server configuration when you add administrator users or user groups.

Before you begin:

- You must know the IP address, port, authentication protocol, and shared secret used to access the RADIUS server.
- You must have read-write permission for system settings.

Syntax

```
config user radius
   edit <name>
      set auth-type {chap|ms_chap|ms_chapv2|pap}
```

```
        set port <integer>
        set secret <passwd>
        set server <string>
        set vdom <datasource>
    next
end
```

auth-type	• chap—Challenge-Handshake Authentication Protocol. • ms_chap—Microsoft version of CHAP. • ms_chapv2—Microsoft version of CHAP, version 2. • pap—Password authentication protocol.
port	Port number for the server. The commonly used port for RADIUS is 1812.
secret	Shared secret string used when connecting to the server.
server	IP address for the server.
vdom	Reserved for future use.

config user user-group

Use this command to configure user groups. User groups are authorized by the virtual server authorization policy. The user group configuration references the authentication servers that contain valid user credentials.

Suggested steps:

1. Configure LDAP and RADIUS servers, if applicable.
2. Configure local users.
3. Configure user groups (reference servers and local users).
4. Configure an authorization policy (reference the user group).
5. Configure the virtual server (reference the authorization policy).

Before you begin:

- You must have created configuration objects for any LDAP and RADIUS server you want to use, and you must have created user accounts for local users.
- You must have read-write permission for system settings.

After you have created user groups, you can specify them in the `load-balance auth-policy` configuration.

Syntax

```
config user user-group
   edit <name>
      set auth-log {none|fail|success|all}
      set auth-timeout <integer>
      set user-cache {enable|disable}
      set user-cache-timeout <integer>
      set client-auth-method http_auth|html_form_auth
      set group-type normal|SSO
```

```
        config member
           edit <No.>
              set type {local|ldap|radius}
              set local-user {<name> <name> ...}
              set ldap-server <datasource>
              set radius-server <datasource>
           next
        end
     next
  end
```

auth-log	Specify one of the following logging options for authentication events: • No logging • Log failed attempts • Log successful attempts • Log all (both failed and successful attempts)
auth-timeout	Timeout for query sent from FortiADC to a remote authentication server.
user-cache	Enable to cache the credentials for the remote users (LDAP, RADIUS) once they are authorized.
user-cache-timeout	Timeout for cached user credentials.
client-auth-method	Specify http_auth or html_form_auth.
group-type	Specify normal or SSO.
config member	
type	Authentication server type.
local-user	To add local users, specify the local usernames.
ldap-server	To add LDAP users, specify the LDAP server configuration name.
radius-server	To add RADIUS users, specify the server configuration name.

Example

```
config user user-group
   edit "normal-group"
      config member
         edit 1
               set local-user local-user-1
         next
         edit 2
               set type ldap
```

```
            set ldap-server ldap-server
         next
         edit 3
            set type radius
            set radius-server radius-server
         next
      end
   next
   edit "SSO-Kerbros-Group"
      set group-type SSO
      set authentication-relay auth-relay-1
      set logoff-path logoff.html
      set sso-support enable
      set sso-domain kfor.com
      config member
         edit 1
            set local-user local-user-1
         next
         edit 2
            set type ldap
            set ldap-server ldap-server
         next
         edit 3
            set type radius
            set radius-server radius-server
         next
      end
   next
   edit "SSO-HTTPBasic-Group"
      set group-type SSO
      set authentication-relay auth-relay-2
      set logoff-path logoff
      set sso-support enable
      set sso-domain sss.com
      config member
      end
   next
end
```

config user authentication-relay

Use this command to configure the authentication relay, which includes Kerberos and HTTP basic SSO configurations.

Syntax

```
config user authentication-relay
   edit <authentication-relay name>
      set authorization HTTPError401 | always
      set delegation-type Kerberos | http-basic
      set kdc-ip <string> FQDN/ip of kdc
      set kdc-port <integer> the port number of kdc server
```

```
        set realm <string> realm (upper case)
        set domain-prefix-support enable/disable
        set domain-prefix <string> domain to prefix
        set delegator-account <string> KCD delegator principal
        set delegator-password <passwd> KCD delegator password
        set delegated-spn <string> KCD delegated service principal
    next
end
```

The following table describes parameters used for configuring authentication relay using Kerberos SSO.

delegation-type	Select Kerberos or HTTP Basic. **Note:** You MUST select Kerberos when configuring authentication relay for Kerberos SSO.
authorization	Can select HTTPError401 or always. After a client account authenticates successfully, FortiADC first sends the request to the server and waits for the server's response before performing authentication on its part. If `HTTPErr401` is set, FortiADC will do the authentication only when it has received the 401 response. Furthermore, if the client requests for more information from the web after FortiADC has gotten the authentication service ticket, FortiADC will send the request without the ticket. FortiADC will send another request with the service ticket only when the server returns the 401 unauthorized response. When `always` is set, FortiADC always does the authentication no matter what response it receives from the server. If the client requests for more information from the web after FortiADC has gotten the Kerberos service ticket, FortiADC will always send the request with the service ticket.
kdc-ip	The KDC server IP address.
kdc-port	The port on which the KDC server listens for Kerberos authentication.
realm	The realm which supports Kerberos authentication. **Note:** You must use uppercase letters and '.' in the string.
delegated-spn	The identification which shows the service running on the server. The SPN uses this format: `HTTP/sharepoint.ft3.local@FT3.LOCAL` Where • HTTP— Refers to the service running on the server. • The string between / and @ —Refers to the host, which supports regexp. • The string after @ — Refers to the realm that supports the service. It MUST be in upper-case letters.
delegator-account	The FortiADC proxy Kerberos authentication account.

delegator-password	The delegator account password.
domain-prefix-support	**Domain prefix support:** This is a switch to enable or disable the default domain prefix function. Sometimes the domain controller requires the user to log in with the user name format "`domain\username`" such as '`KFOR\user1`' When this option is enabled, the user can also successfully log in by only entering '`user1`' because FortiADC is able to automatically add the prefix '`KFOR\`'and then send '`KFOR\user1`'to the server. **Domain prefix:** The value will be added as the domain prefix when the switch above is enabled and when the user inputs the username without the domain. The value of this domain prefix MUST be a valid NetBIOS domain name.

Example 1: Configure Kerberos authentication relay:

```
config user authentication-relay
   edit "auth-relay-1"
      set kdc-ip 2.2.1.202
      set realm KFOR.COM
      set delegator-account test
      set delegator-password ENC
      set delegated-spn http/server11202.kfor.com@kfor.com
   next
end
```

Example 2: Configure HTTP-basic authentication relay:

```
config user authentication-relay
   edit "auth-relay-2"
      set delegation-type http-basic
      set authorization always
      set domain-prefix-support enable
      set domain-prefix SSS
   next
end
```

diagnose

The `diagnose` commands display diagnostic information that can help you troubleshoot problems. These commands do not have an equivalent in the web UI.

This chapter is a reference for the following commands:

- "diagnose debug application" on page 364
- "diagnose debug cli" on page 366
- "diagnose debug config-error-log" on page 367
- "diagnose debug crashlog" on page 367
- "diagnose debug enable/disable" on page 368
- "diagnose debug flow" on page 369
- "diagnose debug info" on page 371
- "diagnose debug kernel" on page 372
- "diagnose debug report" on page 373
- "diagnose debug timestamp" on page 373
- "diagnose hardware deviceinfo" on page 374
- "diagnose hardware ioport" on page 375
- "diagnose hardware pciconfig" on page 376
- "diagnose hardware sysinfo" on page 379
- "diagnose llb policy list " on page 380
- "diagnose netlink backlog" on page 380
- "diagnose netlink device" on page 381
- "diagnose netlink interface" on page 382
- "diagnose netlink ip/ipv6" on page 382
- "diagnose netlink neighbor/neighbor6" on page 383
- "diagnose netlink route/route6" on page 384
- "diagnose netlink tcp" on page 385
- "diagnose netlink udp" on page 386
- "diagnose sniffer packet" on page 390
- "diagnose system top " on page 392
- "diagnose system vm " on page 394
- "diagnose debug application fnginx" on page 394
- "diagnose debug application httproxy ssl" on page 395

diagnose debug application

Use this command to set the debug level for application daemons.

Syntax

```
diagnose debug application {alertmaild | cmdb_event | crlupdated | dnsproxy | flg_accessd
    | flg_indexd | flg_reportd | gdns | httproxy | hasyncd | healthcheckd | info_centerd |
    kernelconfd | lb | llb | miglogd | netd | ntpd | opsips | ospfd | rtmd | snmpd | sshd
    | synconf | udproxy | updated} [<level>] <Enter>
```

alertmaild	Get/set the debug level for alertmaild daemon.
cmdb_event	Get/set the debug level for dmdb_event daemon.
crlupdated	Get/set the debug level for crlupdated daemon.
dnsproxy	Get/set the debug level for dnsproxy daemon.
flg_accessd	Get/set the debug level for flg_accessd daemon.
flg_indexd	Get/set the debug level for flg_indexd daemon.
flg_reportd	Get/set the debug level for flg_reportd daemon.
gdns	Get/set the debug level for gdns daemon.
httproxy	Get/set the debug category for httproxy daemon.
hasyncd	Get/set the debug level for hasyncd daemon.
healthcheckd	Get/set the debug level for healthcheckd daemon.
info_centerd	Get/set the debug level for info_centerd daemon.
kernelconfd	Get/set the debug level for kernelconfd daemon.
lb	Get/set the debug level for lb daemon.
llb	Get/set the debug level for llb daemon.
miglogd	Get/set the debug level for miglogd daemon.
netd	Get/set the debug level for netd daemon.
ntpd	Get/set the debug level for ntpd daemon.

opsips	Get/set the debug level for opsips daemon.
ospfd	Get/set the debug level for ospfd daemon.
rtmd	Get/set the debug level for rtmd daemon.
snmpd	Get/set the debug level for snmpd daemon.
sshd	Get/set the debug level for sshd daemon.
synconf	Get/set the debug level for sysconf daemon.
udproxy	Get/set the debug level for udproxy daemon.
updated	Get/set the debug level for update daemon.
<Enter>	If you do not specify a debug level and press Enter, the command displays the current debug level.
<level>	<level> is a mask. Valid levels are the following values added together: 1 - error message, 2 - main event, 4 - config event, 8 - file sync message, 16 - hb message, 31 - start all. For example, 3 means error messages and main events.

Example

```
FortiADC-VM # diagnose debug application ?
alertmaild set/get debug level for alertmaild daemon
cmdb_event set/get debug level for cmdb event
crlupdated set/get debug level for crlupdated daemon
dnsproxy set/get debug level for dnsproxy daemon
flg_accessd set/get debug level for flg_accessd daemon
flg_indexd set/get debug level for flg_indexd daemon
flg_reportd set/get debug level for flg_reportd daemon
gdns set/get debug level for gdns daemon
httproxy set/get debug level for httproxy daemon
hasyncd set/get debug level for HA synchronisation events
healthcheckd set/get debug level for healthcheck daemon
info_centerd set/get debug level for info_centerd daemon
kernelconfd set/get debug level for L4 kernelconf daemon
lb set/get debug level for lb daemon
llb set/get debug level for llb daemon
miglogd set/get debug level for miglogd events
netd set/get debug level for netd events
ntpd set/get debug level for ntpd daemon
opsips set/get debug level for opsips daemon
ospfd set/get debug level for ospfd daemon
rtmd set/get debug level for rtmd daemon
snmpd set/get debug level for snmp daemon
sshd set/get debug level for sshd daemon
synconf set/get debug level for synconf daemon
udproxy set/get debug level for udproxy daemon
updated set/get debug level for updated daemonupdated feature
```

```
FortiADC-VM # diagnose debug application lb ?
<level> set/get debug level for lb daemon

FortiADC-VM # diagnose debug application lb
lb debug level is 0

FortiADC-VM # diagnose debug application lb 3

FortiADC-VM # diagnose debug application lb
lb debug level is 3
```

Httproxy is not only organized by level.

```
diagnose debug application httproxy {submodule}/
    {all/alert/warning/confi/verbose}/{show/set-filter/show-
    filter/unset-filter}

show: Shows httproxy debug status
set-filter: Set debug filter for httproxy
unset-filter: Unset debug filter for httproxy
show-filter: Show debug filter of httproxy
all: All
alert: Httproxy Alert Message
warning: Httproxy Warning Message
conf: Httproxy config debug info
verbose: Httproxy traffic verbose debug info
ssl_major: Httproxy sll major debug info
```

diagnose debug cli

Use this command to set the debug level for CLI commands. The debug messages are returned when you enter CLI commands.

Syntax

```
diagnose debug cli [<level>] <Enter>
```

<Enter>	If you do not specify a debug level and press Enter, the command displays the current debug level.
<level>	Valid range is 0 to 8, where 0 disables debug logs and 8 generates the most verbose logging.

Example

```
FortiADC-VM # diagnose debug cli 8
```

After you set the debug level, messages are written to the CLI when you enter commands:

```
FortiADC-VM # config system interface
```

```
FortiADC-VM (interface) # edit 2
Add new entry '2' for node 1

FortiADC-VM (2) # set ip 123
set attribute [4]ip
invalid ip address/mask 123.
data converting failed 4
Command fail. Return code is -39

FortiADC-VM (2) # end
attribute 'type' must be set
fgtlog: added a new entry '2' failed (-56) for "system interface"
Command fail. Return code is -56

FortiADC-VM #
```

diagnose debug config-error-log

Use this command to display or clear the configuration debug error log. Typically, you would use this command to debug errors that occur after an upgrade or major configuration change.

Syntax

```
diagnose debug config-error-log {read|clear}
```

`read`	Display the debug error log.
`clear`	Clear the debug error log.

Example

```
FortiADC-VM # diagnose debug config-error-log read
No information
```

diagnose debug crashlog

Use this command to manage crashlog files. Typically, you use these commands to gather information for Fortinet Services & Support.

Syntax

```
diagnose debug crashlog clear
diagnose debug crashlog delete <filename>
diagnose debug crashlog interval <seconds>
diagnose debug crashlog list
diagnose debug crashlog upload {tftp|ftp} {all|<filename>} <ip>
```

clear	Clear the crashlog collection.
delete	Delete a single crashlog file.
interval	Set minimum interval time for saving a coredump file of the same daemon.
list	List crashlog files.
upload	Upload the crashlog file.
{tftp|ftp}	Specify whether to use TFTP or FTP.
{all|<filename>}	Specify all files in the collection or a specific filename.
<ip>	Specify the IP address of the TFTP or FTP server.

Example

```
FortiADC-VM # diagnose debug crashlog list
6.8M Jun 12 15:17 cli-10229-1434147454.gz
6.8M Jun 19 16:45 cli-28917-1434757535.gz
3.5M Jun 4 13:25 flg_accessd-16401-1433449541.gz
3.5M Jun 4 13:25 flg_accessd-16696-1433449554.gz
3.5M Jun 4 13:26 flg_accessd-17009-1433449561.gz
3.5M Jun 4 13:26 flg_accessd-17165-1433449568.gz
3.5M Jun 4 13:26 flg_accessd-17339-1433449574.gz
3.5M Jun 4 13:26 flg_accessd-17541-1433449581.gz
3.5M Jun 4 13:26 flg_accessd-17711-1433449588.gz
3.5M Jun 4 13:26 flg_accessd-17877-1433449594.gz
3.5M Jun 4 13:26 flg_accessd-18221-1433449607.gz
3.5M Jun 4 13:26 flg_accessd-18392-1433449614.gz
3.6M Jun 10 16:42 info_centerd-1076-1433979763.gz

FortiADC-VM # diagnose debug crashlog upload tftp all 192.168.1.23
crash.tar 81% |************************ | 43808k 0:00:44 ETA
```

diagnose debug enable/disable

Use this command to turn debug log output on or off.

Debug logging can be very resource intensive. To minimize the performance impact on your system, use debugging only during periods of minimal traffic, with a local console CLI connection rather than a Telnet or SSH CLI connection. Disable debugging when you are finished.

By default, the most verbose logging that is available from the web UI for any log type is the **Information** severity level. Due to their usually unnecessary nature, logs at the severity level of **Debug** are disabled and hidden. They can only be enabled and viewed from the CLI. Typically this is done only if your configuration seems to be correct,

you cannot diagnose the problem without more information, and possibly suspect that you may have found either a hardware failure or software bug.

To use debug logs, you must:

1. Set the verbosity level for the specific module whose debugging information you want to view, via a debug log command such as:
   ```
   debug application hasyncd 5
   ```
2. Enable debug logs overall. To do this, enter:
   ```
   diagnose debug enable
   ```
3. View the debug logs. For convenience, debugging logs are immediately output to your local console display or terminal emulator, but debug log files can also be uploaded to a server. For more complex issues or bugs, this may be required in order to send debug information to Fortinet Technical Support.

Debug logs will be generated only if the application is running. To verify the application is running, use diagnose system top .

4. The CLI displays debug logs as they occur until you disable it by entering:
   ```
   diagnose debug disable
   ```
   - Close your terminal emulator, thereby ending your administrative session.
   - Send a termination signal to the console by pressing Ctrl+C.
   - Reboot the appliance. To do this, you can use the command:
     ```
     execute reboot
     ```

Syntax

```
diagnose debug {enable|disable}
```

`debug {enable|disable}`	Select whether to enable or disable recording of logs at the debug severity level.

diagnose debug flow

Use this command to debug particular traffic flows. Debug messages for traffic matching the filter and mask are displayed to the terminal screen.

Syntax

```
diagnose debug flow filter {addr <addr>|saddr <addr>| daddr <addr>| proto
    <integer>|clear|negate <addr|saddr|daddr|proto>|show}
diagnose debug flow mask {packet|session|persist|drop|all|custom <mask>}
diagnose debug flow show
diagnose debug flow start [<count>]
diagnose debug flow stop
```

`filter`	Specify filters. Issue multiple commands to add filters. Use the negate option to define "not in" matching. Filters determine the traffic flows for which the debug logs are written. You can match flows based on host address, source address, destination address, and protocol.
`mask`	Specify a mask that sets the type of data written to the screen.
`show`	Show current status, filters, and mask options.
`start`	Start debugging. The `[<count>]` option specifies a number of debug lines to output.
`stop`	Stop debugging.

Example

```
FortiADC-docs # diagnose debug flow ?
filter filter
mask mask
show Stop trace.
start Start trace.
stop Stop trace.

FortiADC-docs # diagnose debug flow stop

FortiADC-docs # diagnose debug flow filter ?
addr IP address.
clear Clear filter.
daddr Destination IP address.
negate negate
proto Protocol number.
saddr Source IP address.
show Show filter configuration.

FortiADC-docs # diagnose debug flow filter saddr 3.3.3.3
FortiADC-docs # diagnose debug flow filter daddr 4.4.4.4
FortiADC-docs # diagnose debug flow filter proto 1

FortiADC-docs # diagnose debug flow mask ?
all all
debug info.
custom custom flow mask.
drop drop packet info.
packet packet info(default is on).
persist-cache persistence cache info.
session session info.

FortiADC-docs # diagnose debug flow mask all

FortiADC-docs # diagnose debug flow show
---------running status && config-----------
----flow debug is not running
```

```
---------current terminal config-----------
----flow filter-------------
proto: 1
Host addr: any
Host saddr: 3.3.3.3
host daddr: 4.4.4.4
----flow mask---------------
packet session persist-cache drop

FortiADC-docs # diagnose debug flow start
Start flow debug, set debug info count to 1000000000

FortiADC-VM (root) # [trace id:11]recv a ip packet, MAC 00:0c:29:4d:fe:84 ->
    00:0c:29:b2:41:f2 3.3.3.3 -> 4.4.4.4 iif port2 proto 1dent 0 flags 0x40 length 84 ttl
    64
[trace id:11]record reverse route info into session: iif port2 mac 00:0c:29:4d:fe:84
[trace id:11]No session matched, create new session
[trace common]tuple src 0x3030303 sport 0, dst 0x4040404 dport 0, proto
[trace common]use dest address hash, len=1
[trace common]iif 7 oif 0 tuple src 0x3030303 dst 0x4040404 proto 1 sport 0 dport 0
[trace common]matched policy 1
[trace common]llb route table id 4097
[trace id:11]find input route interface vlan100 nexthop 5.5.100.1
[trace id:11]ip output by if vlan100
[trace id:11]DSTCACHE: save dst dir 0, nexthop 5.5.100.1 dev vlan100 filled into SESSION
    prot 1 [3.3.3.3:24104, 4.4.4.4:2048] -> [4.4.4.4:24104, 3.3.3.3:0]
[trace id:11]Confirm conntrack:protocol 1, In if 0 3.3.3.3:24104 -> 4.4.4.4:2048
    Reverse:In if 0 4.4.4.4:24104 -> 3.3.3.3:0
[trace id:11]ip finish output2 nexthop by route 0x1640505 if vlan100
[trace id:12]recv a ip packet, MAC 00:0c:29:44:92:d2 -> 00:0c:29:b2:41:10 4.4.4.4 ->
    3.3.3.3 iif vlan100 proto 1dent 6851 flags 0x0 length 84 ttl 63
[trace id:12]Session found
[trace id:12]find input route interface port2 nexthop 0.0.0.0
[trace id:12]ip output by if port2
[trace id:12]DSTCACHE: save dst dir 1, nexthop 0.0.0.0 dev port2 filled into SESSION prot
    1 [3.3.3.3:24104, 4.4.4.4:2048] -> [4.4.4.4:24104, 3.3.3.3:0]
[trace id:12]Transmit packet by reverse route, dev port2 dest mac 00:0c:29:4d:fe:84

FortiADC-docs # diagnose debug flow stop
```

diagnose debug info

Use this command to display a list of debug log settings.

Syntax

```
diagnose debug info
```

Example

```
FortiADC-VM # diagnose debug info
debug output: disable
kernel debug level: 0 (0x0)
cli/cmdb debug level: 0 (0x0)
```

```
cmdb_event debug level: 0 (0x0)
gdns debug level: 0 (0x0)
kernelconfd debug level: 0 (0x0)
info_centerd debug level: 0 (0x0)
hasyncd debug level: 0 (0x0)
updated debug level: 0 (0x0)
miglogd debug level: 0 (0x0)
sshd debug level: 0 (0x0)
healthcheckd debug level: 2 (0x2)
netd debug level: 0 (0x0)
lb debug level: 0 (0x0)
udproxyd debug level: 0 (0x0)
httproxyd debug level: 0 (0x0)
dnsproxyd debug level: 0 (0x0)
alertmaild debug level: 0 (0x0)
synconf debug level: 0 (0x0)
ntpd debug level: 0 (0x0)
crlupdated debug level: 0 (0x0)
snmpd debug level: 0 (0x0)
flg_indexd debug level: 0 (0x0)
flg_reportd debug level: 0 (0x0)
flg_accessd debug level: 0 (0x0)
rtmd debug level: 0 (0x0)
ospfd debug level: 0 (0x0)
llb debug level: 0 (0x0)
```

diagnose debug kernel

Use this command to set the debug log level for kernel debugging. When enabled, kernel errors are printed to the screen.

Syntax

```
diagnose debug kernel [<level>] <Enter>
```

<Enter>	If you do not specify a debug level and press Enter, the command displays the current debug level.
<level>	Valid range is 0 to 8, where 0 disables debug logs and 8 generates the most verbose logging.

Example

```
FortiADC-VM # diagnose debug kernel ?
<Integer> debug level (0-8).

FortiADC-VM # diagnose debug kernel 5

FortiADC-VM # diagnose debug kernel
Kernel debug level is 5
```

diagnose debug report

Use this command to run a batch of commands that Fortinet support can use to troubleshoot issues you have reported. You might be directed to copy and paste the screen output into an email or email attachment.

Syntax

```
diagnose debug report
```

Example

```
FortiADC-VM # diagnose debug report
```

diagnose debug timestamp

Use this command to timestamp debug messages.

Syntax

```
diagnose debug timestamp {enable|disable}
```

Example

```
FortiADC-VM (root) # diagnose debug timestamp enable
FortiADC-VM (root) # 2016-01-11 18:10:03 [trace common]Destroy conntrack:protocol 1, In if 0
    3.3.3.3:24104 -> 4.4.4.4:2048 Reverse:In if 0 4.4.4.4:24104 -> 3.3.3.3:0
2016-01-11 18:10:03 [trace id:13]recv a ip packet, MAC 00:0c:29:4d:fe:84 ->
    00:0c:29:b2:41:f2 3.3.3.3 -> 4.4.4.4 iif port2 proto 1dent 0 flags 0x40 length 84 ttl
    64
2016-01-11 18:10:03 [trace id:13]record reverse route info into session: iif port2 mac
    00:0c:29:4d:fe:84
2016-01-11 18:10:03 [trace id:13]No session matched, create new session
2016-01-11 18:10:03 [trace common]tuple src 0x3030303 sport 0, dst 0x4040404 dport 0,
    proto
2016-01-11 18:10:03 [trace common]use dest address hash, len=1
2016-01-11 18:10:03 [trace common]iif 7 oif 0 tuple src 0x3030303 dst 0x4040404 proto 1
    sport 0 dport 0
2016-01-11 18:10:03 [trace common]matched policy 1
2016-01-11 18:10:03 [trace common]llb route table id 4097
2016-01-11 18:10:03 [trace id:13]find input route interface port3 nexthop 1.1.1.1
2016-01-11 18:10:03 [trace id:13]ip output by if port3
2016-01-11 18:10:03 [trace id:13]DSTCACHE: save dst dir 0, nexthop 1.1.1.1 dev port3
    filled into SESSION prot 1 [3.3.3.3:24106, 4.4.4.4:2048] -> [4.4.4.4:24106, 3.3.3.3:0]

2016-01-11 18:10:03 [trace id:13]Confirm conntrack:protocol 1, In if 0 3.3.3.3:24106 ->
    4.4.4.4:2048 Reverse:In if 0 4.4.4.4:24106 -> 3.3.3.3:0
2016-01-11 18:10:03 [trace id:13]ip finish output2 nexthop by route 0x1010101 if port3
2016-01-11 18:10:03 [trace id:14]recv a ip packet, MAC 00:0c:29:44:93:be ->
    00:0c:29:b2:41:fc 4.4.4.4 -> 3.3.3.3 iif port3 proto 1dent 6852 flags 0x0 length 84
    ttl 63
2016-01-11 18:10:03 [trace id:14]Session found
```

```
2016-01-11 18:10:03 [trace id:14]find input route interface port2 nexthop 0.0.0.0
2016-01-11 18:10:03 [trace id:14]ip output by if port2
2016-01-11 18:10:03 [trace id:14]DSTCACHE: save dst dir 1, nexthop 0.0.0.0 dev port2
    filled into SESSION prot 1 [3.3.3.3:24106, 4.4.4.4:2048] -> [4.4.4.4:24106, 3.3.3.3:0]

2016-01-11 18:10:03 [trace id:14]Transmit packet by reverse route, dev port2 dest mac
    00:0c:29:4d:fe:84
```

diagnose hardware deviceinfo

Use this command to display hardware information that might be useful in debugging.

Syntax

```
diagnose hardware {get|set} deviceinfo nic [<port>] <Enter>
diagnose hardware {get|set} deviceinfo nic-detail [<port>] <Enter>
```

`nic`	Displays port settings. If you do not specify a port and press Enter, the command displays output for all ports.
`nic-detail`	Displays detailed port settings and statistics. If you do not specify a port and press Enter, the command displays output for all ports.

Example

```
FortiADC-VM # diagnose hardware get deviceinfo ?
nic display network interface controller status
nic-detail display detailed network interface controller status

FortiADC-VM # diagnose hardware get deviceinfo nic-detail port1
Interface: port1
driver: vmxnet3
version: 1.1.29.0-k-NAPI
firmware-version:
bus-info: 0000:03:00.0
supports-statistics: yes
supports-test: no
supports-eeprom-access: no
supports-register-dump: yes
supports-priv-flags: no

Settings for port1:
Supported ports: [ TP ]
Supported link modes: 1000baseT/Full
10000baseT/Full
Supported pause frame use: No
Supports auto-negotiation: No
Advertised link modes: Not reported
Advertised pause frame use: No
Advertised auto-negotiation: No
Speed: 10000Mb/s
Duplex: Full
Port: Twisted Pair
```

```
PHYAD: 0
Transceiver: internal
Auto-negotiation: off
MDI-X: Unknown
Supports Wake-on: uag
Wake-on: d
Link detected: yes

Pause parameters for port1:
Cannot get device pause settings: Operation not supported
Inter-| Receive | Transmit
face |bytes packets errs drop fifo frame compressed multicast|bytes packe ts errs drop
    fifo colls carrier compressed
port10: 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
```

diagnose hardware ioport

Use this command to display I/O information that might be useful in debugging.

Syntax

```
diagnose hardware {get|set} ioport {byte|word|long} <address_hex>
```

ioport	Specify whether to read byte, word, or long from the port.
address_hex	The hexadecimal address of the I/O port.

Example

First, use the `diagnose hardware sysinfo` command to find the address hex number for the port you want to diagnose:

```
FortiADC-VM # diagnose hardware get sysinfo ioports
0000-0cf7 : PCI Bus 0000:00
 0000-001f : dma1
0020-0021 : pic1
0040-0043 : timer0
0050-0053 : timer1
0060-0060 : keyboard
0064-0064 : keyboard
0070-0077 : rtc
0080-008f : dma page reg
00a0-00a1 : pic2
00c0-00df : dma2
00f0-00ff : fpu
0170-0177 : 0000:00:07.1
0170-0177 : piix
01f0-01f7 : 0000:00:07.1
01f0-01f7 : piix
02f8-02ff : serial
0376-0376 : 0000:00:07.1
0376-0376 : piix
```

```
03c0-03df : vga+
03f6-03f6 : 0000:00:07.1
03f6-03f6 : piix
03f8-03ff : serial
0cf0-0cf1 : pnp 00:00
0cf8-0cff : PCI conf1
0d00-feff : PCI Bus 0000:00
1000-103f : 0000:00:07.3
1000-103f : pnp 00:00
1000-1003 : ACPI PM1a_EVT_BLK
1004-1005 : ACPI PM1a_CNT_BLK
1008-100b : ACPI PM_TMR
100c-100f : ACPI GPE0_BLK
1010-1015 : ACPI CPU throttle
1040-104f : 0000:00:07.3
1040-104f : pnp 00:00
1060-107f : pnp 00:0b
1080-10bf : 0000:00:07.7
10c0-10cf : 0000:00:07.1
10c0-10cf : piix
10d0-10df : 0000:00:0f.0
1400-14ff : 0000:00:10.0
2000-3fff : PCI Bus 0000:02
4000-4fff : PCI Bus 0000:03
4000-400f : 0000:03:00.0
5000-5fff : PCI Bus 0000:0b
5000-500f : 0000:0b:00.0
6000-6fff : PCI Bus 0000:13
6000-600f : 0000:13:00.0
7000-7fff : PCI Bus 0000:1b
7000-700f : 0000:1b:00.0
8000-8fff : PCI Bus 0000:04
8000-800f : 0000:04:00.0
9000-9fff : PCI Bus 0000:0c
9000-900f : 0000:0c:00.0
a000-afff : PCI Bus 0000:14
a000-a00f : 0000:14:00.0
b000-bfff : PCI Bus 0000:1c
b000-b00f : 0000:1c:00.0
c000-cfff : PCI Bus 0000:05
c000-c00f : 0000:05:00.0
d000-dfff : PCI Bus 0000:0d
d000-d00f : 0000:0d:00.0
e000-efff : PCI Bus 0000:15
```

Then, use the `diagnose hardware ioport` command to display the ioport value:

```
FortiADC-VM # diagnose hardware get ioport long 001f
inl(001f)=ffffffff
```

diagnose hardware pciconfig

Use this command to display PCI registers that might be useful in debugging.

Syntax

```
diagnose hardware {get|set} pciconfig [bus <bus> | id <id> | option <option>] <Enter>
```

bus	Display registers for the specified bus.
id	Display registers for the specified id.
option	Options for displaying the register.

Example

```
FortiADC-VM # diagnose hardware get pciconfig ?
bus list devices on the specified bus
id list devices with the specified vendor and device ID
option v n t x H1
<Enter>

FortiADC-VM # diagnose hardware get pciconfig
00:00.0 Class 0600: 8086:7190 (rev 01)
00:01.0 Class 0604: 8086:7191 (rev 01)
00:07.0 Class 0601: 8086:7110 (rev 08)
00:07.1 Class 0101: 8086:7111 (rev 01)
00:07.3 Class 0680: 8086:7113 (rev 08)
00:07.7 Class 0880: 15ad:0740 (rev 10)
00:0f.0 Class 0300: 15ad:0405
00:10.0 Class 0100: 1000:0030 (rev 01)
00:11.0 Class 0604: 15ad:0790 (rev 02)
00:15.0 Class 0604: 15ad:07a0 (rev 01)
00:15.1 Class 0604: 15ad:07a0 (rev 01)
00:15.2 Class 0604: 15ad:07a0 (rev 01)
00:15.3 Class 0604: 15ad:07a0 (rev 01)
00:15.4 Class 0604: 15ad:07a0 (rev 01)
00:15.5 Class 0604: 15ad:07a0 (rev 01)
00:15.6 Class 0604: 15ad:07a0 (rev 01)
00:15.7 Class 0604: 15ad:07a0 (rev 01)
00:16.0 Class 0604: 15ad:07a0 (rev 01)
00:16.1 Class 0604: 15ad:07a0 (rev 01)
00:16.2 Class 0604: 15ad:07a0 (rev 01)
00:16.3 Class 0604: 15ad:07a0 (rev 01)
00:16.4 Class 0604: 15ad:07a0 (rev 01)
00:16.5 Class 0604: 15ad:07a0 (rev 01)
00:16.6 Class 0604: 15ad:07a0 (rev 01)
00:16.7 Class 0604: 15ad:07a0 (rev 01)
00:17.0 Class 0604: 15ad:07a0 (rev 01)
00:17.1 Class 0604: 15ad:07a0 (rev 01)
00:17.2 Class 0604: 15ad:07a0 (rev 01)
00:17.3 Class 0604: 15ad:07a0 (rev 01)
00:17.4 Class 0604: 15ad:07a0 (rev 01)
00:17.5 Class 0604: 15ad:07a0 (rev 01)
00:17.6 Class 0604: 15ad:07a0 (rev 01)
00:17.7 Class 0604: 15ad:07a0 (rev 01)
00:18.0 Class 0604: 15ad:07a0 (rev 01)
00:18.1 Class 0604: 15ad:07a0 (rev 01)
```

```
00:18.2 Class 0604: 15ad:07a0 (rev 01)
00:18.3 Class 0604: 15ad:07a0 (rev 01)
00:18.4 Class 0604: 15ad:07a0 (rev 01)
00:18.5 Class 0604: 15ad:07a0 (rev 01)
00:18.6 Class 0604: 15ad:07a0 (rev 01)
00:18.7 Class 0604: 15ad:07a0 (rev 01)
03:00.0 Class 0200: 15ad:07b0 (rev 01)
04:00.0 Class 0200: 15ad:07b0 (rev 01)
05:00.0 Class 0200: 15ad:07b0 (rev 01)
0b:00.0 Class 0200: 15ad:07b0 (rev 01)
0c:00.0 Class 0200: 15ad:07b0 (rev 01)
0d:00.0 Class 0200: 15ad:07b0 (rev 01)
13:00.0 Class 0200: 15ad:07b0 (rev 01)
14:00.0 Class 0200: 15ad:07b0 (rev 01)
1b:00.0 Class 0200: 15ad:07b0 (rev 01)
1c:00.0 Class 0200: 15ad:07b0 (rev 01)

FortiADC-VM # diagnose hardware get pciconfig option ?
v verbose information
n display number id
t tree view of bus
x dump configuration space data in hexadecimal
H1 direct access hardware

FortiADC-VM # diagnose hardware get pciconfig option t
-[00]-+-00.0
+-01.0-[01]--
+-07.0
+-07.1
+-07.3
+-07.7
+-0f.0
+-10.0
+-11.0-[02]--
+-15.0-[03]----00.0
+-15.1-[04]----00.0
+-15.2-[05]----00.0
+-15.3-[06]--
+-15.4-[07]--
+-15.5-[08]--
+-15.6-[09]--
+-15.7-[0a]--
+-16.0-[0b]----00.0
+-16.1-[0c]----00.0
+-16.2-[0d]----00.0
+-16.3-[0e]--
+-16.4-[0f]--
+-16.5-[10]--
+-16.6-[11]--
+-16.7-[12]--
+-17.0-[13]----00.0
+-17.1-[14]----00.0
+-17.2-[15]--
+-17.3-[16]--
+-17.4-[17]--
+-17.5-[18]--
+-17.6-[19]--
```

```
+-17.7-[1a]--
+-18.0-[1b]----00.0
+-18.1-[1c]----00.0
+-18.2-[1d]--
+-18.3-[1e]--
+-18.4-[1f]--
+-18.5-[20]--
+-18.6-[21]--
`-18.7-[22]--
```

diagnose hardware sysinfo

Use this command to display system information that might be useful in debugging.

Syntax

```
diagnose hardware {get|set} sysinfo {cpu | interrupts | iomen | ioports | memory | mtrr |
    slab | stream | df>
```

cpu	Display detailed information for all CPU.
interrupts	Display system interrupt information.
iomem	Display the memory map of I/O ports.
ioports	Display the address list of I/O ports.
memory	Display system memory information.
mttr	Display the memory type range register.
slab	Display memory allocation information.
stream	Display STREAM benchmark results.
df	Display disk free information.

Example

```
FortiADC-VM # diagnose hardware get sysinfo ?
cpu display detailed information for all installed CPU(s)
interrupts display system interrupts information
iomem display the memory map of I/O ports
ioports display the address list of I/O ports
memory display system memory information
mtrr display the memory type range register
slab display memory allocation information
stream display STREAM benchmark results
df display disk free information

FortiADC-VM # diagnose hardware get sysinfo df
```

```
Filesystem Size Used Available Use% Mounted on
/dev/root 193.7M 141.6M 52.1M 73% /
none 0 0 0 0% /proc
none 0 0 0 0% /sys
none 0 0 0 0% /sys/kernel/debug
none 256.0M 7.6M 248.4M 3% /tmp
none 0 0 0 0% /dev/pts
none 256.0M 0 256.0M 0% /dev/shm
/dev/sda2 96.8M 68.8M 23.1M 75% /data
/dev/sdb1 23.5G 1.3G 21.0G 6% /var/log
/dev/sda3 378.3M 10.1M 348.7M 3% /home
/dev/loop0 984.3M 35.2M 899.1M 4% /var/log/debug
```

diagnose llb policy list

Use this command to display diagnostic information about link load balancing policies.

Syntax

```
diagnose llb policy list
```

Example

```
FortiADC-docs # diagnose llb policy list
------------------------------------------------------------
policy index 1, route table id 4097
flag (0):
ingress if(1): 7
dest(0):
service(0):
```

diagnose netlink backlog

Use this command to set the backlog length.

Syntax

```
diagnose netlink backlog [get] [<integer>]
```

[get]	Specify the get option to display the current setting. Otherwise, the command sets the backlog length.
<integer>	Backlog length.

Example

```
FortiADC-VM # diagnose netlink backlog ?
get see current backlog length
<backlog> set new backlog length

FortiADC-VM # diagnose netlink backlog get
Current backlog is 1000

FortiADC-VM # diagnose netlink backlog 2000

FortiADC-VM # diagnose netlink backlog get
Current backlog is 2000
```

diagnose netlink device

Use this commad to display network interface RX/TX statistics.

Syntax

```
diagnose netlink device
```

Example

```
FortiADC-VM # diagnose netlink device
Inter-| Receive | Transmit
face |bytes packets errs drop fifo frame compressed multicast|bytes packe ts errs drop
    fifo colls carrier compressed
vtb0: 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
vtb1: 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
port3: 418337774 4267852 0 168 0 0 0 363608 260 2 0 0 0 0 0 0
port10: 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
port8: 418337474 4267847 0 163 0 0 0 363608 260 2 0 0 0 0 0 0
vsport-101010A: 0 0 0 0 0 0 0 0 2 60 2 0 0 0 0 0 0
port5: 418337654 4267850 0 166 0 0 0 363608 260 2 0 0 0 0 0 0
gre0: 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
gre1: 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
port2: 418334234 4267793 0 169 0 0 0 363608 2910 63 0 0 0 0 0 0
bond0: 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
imq0: 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
port7: 418337534 4267848 0 164 0 0 0 363608 260 2 0 0 0 0 0 0
lo: 123360587 775740 0 0 0 0 0 0 123360587 7 75740 0 0 0 0 0 0
port4: 418337714 4267851 0 167 0 0 0 363608 260 2 0 0 0 0 0 0
port9: 418337474 4267847 0 162 0 0 0 363609 1034285 1 2167 0 0 0 0 0 0
port1: 491225752 5104578 0 170 0 0 0 363608 174736576 15 03116 0 0 0 0 0 0
sit0: 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
port6: 418337594 4267849 0 165 0 0 0 363608 260 2 0 0 0 0 0 0
haport0: 0 0 0 0 0 0 0 0 1034025 12 165 0 5 0 0 0 0
```

diagnose netlink interface

Use this command to display detailed network interface information, such as family, type, MTU, flags. It is similar to the shell command `ifconfig`.

Syntax

```
diagnose netlink interface list [<interface>] <Enter>
```

Example

```
FortiADC-VM # diagnose netlink interface ?
list list interface

FortiADC-VM # diagnose netlink interface list ?
<interface-name> interface name
port1 physical
port2 physical
port3 physical
port4 physical
port5 physical
port6 physical
port7 physical
port8 physical
port9 physical
port10 physical


FortiADC-VM # diagnose netlink interface list port1

if=port1 family=00 type=1 index=4 mtu=1500 link=0 master=0
flags=up broadcast run multicast
Qdisc=pfifo_fast hw_addr=00:09:0f:09:00:01: broadcast_addr=ff:ff:ff:ff:ff:ff:
stat: rxp=6453991526227804 txp=749850502384418443 rxb=0 txb=170 rxe=363546 txe=0 rxd=0
    txd=0 mc=0 collision=0
re: rxl=0 rxo=6474731918196736 rxc=5103452 rxf=1502687 rxfi=491093643 rxm=174588 175
te: txa=0 txc=0 txfi=170 txh=0 txw=363546
```

diagnose netlink ip/ipv6

Use these commands to list interface details, or to add or delete a physical network interface.

Back up the configuration before deleting a network interface table entry.

Syntax

```
diagnose netlink {ip|ipv6} add <interface_name> <ipaddress> <netmask>
diagnose netlink {ip|ipv6} delete <interface_name> <ipaddress>
diagnose netlink {ip|ipv6} flush
diagnose netlink {ip|ipv6} list
```

<interface_name>	Name of the interface to add or delete from the network interface table.
<ipaddress>	IP address of the network interface.
<netmask>	Subnet mask.

Example

```
FortiADC-VM # FortiADC-VM # diagnose netlink ip ?
add add netlink ip address
delete delete netlink ip address
flush flush netlink ip address
list list netlink ip address

FortiADC-VM # diagnose netlink ip list
IP=127.0.0.1 MASK=255.255.255.0 index=1 devname=lo
IP=127.129.1.1 MASK=255.255.255.255 index=1 devname=lo
IP=172.30.144.100 MASK=255.255.252.0 index=4 devname=port1
IP=10.1.1.1 MASK=255.255.255.255 index=4 devname=port1
IP=7.7.7.7 MASK=255.255.255.255 index=7 devname=port2
IP=5.5.5.5 MASK=255.255.255.255 index=7 devname=port2
IP=11.11.11.11 MASK=255.255.255.255 index=7 devname=port2
IP=12.12.12.12 MASK=255.255.255.255 index=7 devname=port2
IP=172.0.0.9 MASK=255.255.255.255 index=7 devname=port2
IP=172.0.0.8 MASK=255.255.255.255 index=7 devname=port2
IP=172.0.0.7 MASK=255.255.255.255 index=7 devname=port2
IP=172.0.0.6 MASK=255.255.255.255 index=7 devname=port2
IP=172.0.0.5 MASK=255.255.255.255 index=7 devname=port2
IP=172.0.0.4 MASK=255.255.255.255 index=7 devname=port2
IP=172.0.0.3 MASK=255.255.255.255 index=7 devname=port2
IP=172.0.0.2 MASK=255.255.255.255 index=7 devname=port2
IP=172.0.0.1 MASK=255.255.255.255 index=7 devname=port2
IP=172.0.0.0 MASK=255.255.255.255 index=7 devname=port2
IP=1.1.100.1 MASK=255.255.255.255 index=7 devname=port2
IP=1.1.100.2 MASK=255.255.255.255 index=7 devname=port2
IP=169.254.160.134 MASK=255.255.0.0 index=17 devname=haport0
```

diagnose netlink neighbor/neighbor6

Use these commands to list the neighbor table (ARP cache), or to add or delete neighbors.

Syntax

```
diagnose netlink {neighbor|neighbor6} add <interface_name> <ipaddress> <macaddress>
```

```
diagnose netlink {neighbor|neighbor6} delete <interface_name> <ipaddress>
diagnose netlink {neighbor|neighbor6} flush
diagnose netlink {neighbor|neighbor6} list
```

<interface_name>	Name of the interface to add or delete from the neighbors table.
<ipaddress>	IP address of the network interface.
<macaddress>	MAC address.

Example

```
FortiADC-VM # diagnose netlink neighbor list
ifindex=1 ifname=lo 127.0.0.1 00:00:00:00:00:00 state=00000040 use=2255 confirm=8255
    update=2255 ref=0
```

diagnose netlink route/route6

Use this command to display the route table.

Syntax

```
diagnose netlink {route|route6} [list | flush]
```

Example

```
FortiADC-VM # diagnose netlink route ?
list list routing table
flush flush routing table

FortiADC-VM # diagnose netlink route list
tab=252 type=local protocol=boot flag=00000000 oif=1(lo) prio=400
tab=0 type=unreachable protocol=kernel flag=00000000 oif=1(lo) prio=ffffffff
tab=254 type=unicast protocol=kernel flag=00000000 oif=17(haport0) dst:fe80::/64 prio=100
tab=254 type=unicast protocol=kernel flag=00000000 oif=4(port1) dst:fe80::/64 prio=100
tab=254 type=unicast protocol=kernel flag=00000000 oif=7(port2) dst:fe80::/64 prio=100
tab=254 type=unicast protocol=kernel flag=00000000 oif=10(port3) dst:fe80::/64 prio=100
tab=254 type=unicast protocol=kernel flag=00000000 oif=12(port4) dst:fe80::/64 prio=100
tab=254 type=unicast protocol=kernel flag=00000000 oif=5(port5) dst:fe80::/64 prio=100
tab=254 type=unicast protocol=kernel flag=00000000 oif=8(port6) dst:fe80::/64 prio=100
tab=254 type=unicast protocol=kernel flag=00000000 oif=11(port7) dst:fe80::/64 prio=100
tab=254 type=unicast protocol=kernel flag=00000000 oif=13(port8) dst:fe80::/64 prio=100
tab=254 type=unicast protocol=kernel flag=00000000 oif=6(port9) dst:fe80::/64 prio=100
tab=254 type=unicast protocol=kernel flag=00000000 oif=9(port10) dst:fe80::/64 prio=100
tab=0 type=unreachable protocol=kernel flag=00000000 oif=1(lo) prio=ffffffff
tab=255 type=local protocol=unspec flag=00000000 oif=1(lo) dst:::1/128 gwy::: prio=0
tab=255 type=local protocol=unspec flag=00000000 oif=1(lo) dst:fe80::/128 gwy::: prio=0

[...]
```

diagnose netlink tcp

Use this command to view a list of TCP raw socket details, including:

- `sl` — Kernel socket hash slot.
- `local_address` — IP address and port number pair of the network interface in hexadecimal, such as `DD01010A:0050`.
- `rem_address` — Remote host network interface and port number pair. If not connected, this will contain `00000000:0000`.
- `st` — TCP state code (e.g. `OA` for listening, `01` for established, or `06` for timeout wait)
- `tx_queue` — Kernel memory usage by the transmission queue.
- `rx_queue` — Kernel memory usage by the retransmission queues.
- `tr`, `tm-> when`, `retrnsmt` — Kernel socket state debugging information.
- `uid` — User ID of the socket's creator (on FortiADC, always `0`).
- `timeout` — Connection timeout.
- `inode` — Pseudo-file system i-node of the process.

Syntax

```
diagnose netlink tcp
```

Example

```
FortiADC-VM # diagnose netlink tcp
sl local_address rem_address st tx_queue rx_queue tr tm->when retrnsmt ui d timeout inode
0: 86A0FEA9:0015 00000000:0000 0A 00000000:00000000 00:00000000 00000000 0 0 2455 1
    ffff88005ad16f40 100 0 0 10 0
1: 0100007F:0035 00000000:0000 0A 00000000:00000000 00:00000000 00000000 0 0 2852 1
    ffff88005c6acd80 100 0 0 10 0
2: 64901EAC:0035 00000000:0000 0A 00000000:00000000 00:00000000 00000000 0 0 2855 1
    ffff88005c6ad440 100 0 0 10 0
3: 64901EAC:0016 00000000:0000 0A 00000000:00000000 00:00000000 00000000 0 0 38004000 1
    ffff88005f4ce880 100 0 0 10 0
4: 86A0FEA9:0016 00000000:0000 0A 00000000:00000000 00:00000000 00000000 0 0 38004001 1
    ffff88005f4cc6c0 100 0 0 10 0
5: 0100007F:0016 00000000:0000 0A 00000000:00000000 00:00000000 00000000 0 0 38004003 1
    ffff88005f4ce1c0 100 0 0 10 0
6: 64901EAC:0017 00000000:0000 0A 00000000:00000000 00:00000000 00000000 0 0 2451 1
    ffff88005ad15b00 100 0 0 10 0
7: 86A0FEA9:0017 00000000:0000 0A 00000000:00000000 00:00000000 00000000 0 0 2452 1
    ffff88005ad161c0 100 0 0 10 0
8: 0100007F:0017 00000000:0000 0A 00000000:00000000 00:00000000 00000000 0 0 2453 1
    ffff88005ad16880 100 0 0 10 0
9: 0100007F:03B9 00000000:0000 0A 00000000:00000000 00:00000000 00000000 0 0 2959 1
    ffff88005c6adb00 100 0 0 10 0

[...]
```

diagnose netlink udp

Use this command to view a list of UDP raw socket details, including:

- `sl` — Kernel socket hash slot.
- `local_address` — IP address and port number pair of the network interface in hexadecimal, such as `DD01010A:0050`.
- `rem_address` — Remote host network interface and port number pair. If not connected, this will contain `00000000:0000`.
- `st` — TCP state code in hexadecimal (e.g. `0A` for listening, `01` for connection established, or `06` for waiting for data)
- `tx_queue` — Kernel memory usage by the transmission (Tx) queue.
- `rx_queue` — Kernel memory usage by the retransmission (Rx) queues. (This is not used by UDP, since the protocol itself does not support retransmission.)
- `tr`, `tm-> when`, `retrnsmt` — Kernel socket state debugging information. (These are not used by UDP, since the protocol itself does not support retransmission.)
- `uid` — User ID of the socket's creator (on FortiADC, always `0`).
- `timeout` — Connection timeout.
- `inode` — Pseudo-file system inode of the process.
- `ref`, `pointer` — Pseudo-file system references.

Syntax

```
diagnose netlink udp
```

Example

```
FortiADC-VM # diagnose netlink udp
sl local_address rem_address st tx_queue rx_queue tr tm->when retrnsmt ui d timeout inode
    ref pointer drops
171: 0100007F:0FA0 00000000:0000 07 00000000:00000000 00:00000000 00000000 0 0 1165 2
    ffff88006bf90000 0
202: 00000000:87BF 00000000:0000 07 00000000:00000000 00:00000000 00000000 0 0 4962 2
    ffff88006bf91500 0
223: 00000000:F7D4 00000000:0000 07 00000000:00000000 00:00000000 00000000 0 0 38534860 2
    ffff88005f319180 0
318: 00000000:3033 00000000:0000 07 00000000:00000000 00:00000000 00000000 0 0 38504036 2
    ffff88005f318700 0
319: 00000000:D034 00000000:0000 07 00000000:00000000 00:00000000 00000000 0 0 3279 2
    ffff88006bf90e00 0
320: 64901EAC:0035 00000000:0000 07 00000000:00000000 00:00000000 00000000 0 0 2854 2
    ffff88006bf90a80 0
320: 0100007F:0035 00000000:0000 07 00000000:00000000 00:00000000 00000000 0 0 2851 2
    ffff88006bf90700 0
475: 00000000:ECD0 00000000:0000 07 00000000:00000000 00:00000000 00000000 0 0 24123242 2
    ffff88005f318000 0
494: 00000000:24E3 00000000:0000 07 00000000:00000000 00:00000000 00000000 0 0 38500439 2
    ffff88005f318a80 0
546: 00000000:2D17 00000000:0000 07 00000000:00000000 00:00000000 00000000 0 0 20533867 2
    ffff88005f318380 0
```

```
610: 00000000:9957 00000000:0000 07 00000000:00000000 00:00000000 00000000 0 0 37907911 2
    ffff88005f319500 0
1010: 00000000:52E7 00000000:0000 07 00000000:00000000 00:00000000 00000000 0 0 3576 2
    ffff88006bf90380 0
```

diagnose server-load-balance persistence

Use this command to filter and display the persistence table (current sessions).

Syntax

```
diagnose server-load-balance persistence filter {'<option>'|show|clear}
diagnose server-load-balance persistence list
diagnose server-load-balance persistence clear [l4]
```

`filter`	Create, show, or clear session list filters. Use multiple commands to add filters to the filter list. For example, one command to add a source-ip filter and another to add a vs-name filter. Put the filter expression in single quotes. Filter options include: • `source-ip`—Single IP address or specify start and end addresses of a range. • `source-port`—Single port number or start and end port numbers of a range. • `dest-ip`—Single IP address or specify start and end addresses of a range. • `dest-port`—Single port number or start and end port numbers of a range. • `vs-name`—Specify a space-separated list of up to 8 virtual server configuration names.
`list`	List matching sessions.
`clear`	Clear the list of matching sessions.

Example

```
FortiADC-VM # diagnose server-load-balance persistence filter 'source-ip 10.1.1.1
    10.1.1.100'
FortiADC-VM # diagnose server-load-balance persistence filter 'vs-name vs1 vs2'
FortiADC-VM # diagnose server-load-balance persistence filter show
filter=[flag:1000
source ip range: :: - :: port range: 0 - 0
dest ip range: :: - :: port range: 0 - 0
```

```
virtual server: vs1 vs2 ]
FortiADC-VM # diagnose server-load-balance persistence list
client-ip/port virtual-server-ip/port local-ip/port real-server-ip/port protocol service
    state in-bytes out-bytes expire virtual-server-name real-server-name
FortiADC-VM #
```

diagnose server-load-balance session

Use this command to filter and display the session table (current sessions).

Syntax

```
diagnose server-load-balance session filter {'<option>'|show|clear}
diagnose server-load-balance session list
diagnose server-load-balance session clear [l4]
```

`filter`	Create, show, or clear session list filters. Use multiple commands to add filters to the filter list. For example, one command to add a source-ip filter and another to add a vs-name filter. Put the filter expression in single quotes. Filter options include: • `source-ip`—Single IP address or specify start and end addresses of a range. • `source-port`—Single port number or start and end port numbers of a range. • `dest-ip`—Single IP address or specify start and end addresses of a range. • `dest-port`—Single port number or start and end port numbers of a range. • `trans-source-ip`—Single IP address or specify start and end addresses of a range. • `trans-source-port`—Single port number or start and end port numbers of a range. • `trans-dest-ip`—Single IP address or specify start and end addresses of a range. • `trans-dest-port`—Single port number or start and end port numbers of a range. • `type`—Specify `ipv4`, `ipv6`, `ipv4v6`, or `ipv6v4`. • `protocol`—Specify `tcp` or `udp`. • `vs-name`—Specify a space-separated list of up to 8 virtual server configuration names. • `rs-name`—Specify a space-separated list of up to 8 real server configuration names.
`list`	List matching sessions.
`clear`	Clear the list of matching sessions.

Example

```
FortiADC-VM # diagnose server-load-balance session filter 'source-ip 10.1.1.1 10.1.1.100'
FortiADC-VM # diagnose server-load-balance session filter 'vs-name vs1 vs2'
FortiADC-VM # diagnose server-load-balance session filter show
filter=[flag:1000 type:0 protocol:0 service:0
source ip range: :: - :: port range: 0 - 0
dest ip range: :: - :: port range: 0 - 0
trans source ip range: :: - :: port range: 0 - 0
trans dest ip range: :: - :: port range: 0 - 0
virtual server: vs1 vs2
real server:]
FortiADC-VM # diagnose server-load-balance session list
```

```
    client-ip/port virtual-server-ip/port local-ip/port real-server-ip/port protocol service
        state in-bytes out-bytes expire virtual-server-name real-server-name
    FortiADC-VM #
```

diagnose sniffer packet

Use this command to perform a packet trace on one or more network interfaces.

Packet capture, also known as sniffing or packet analysis, records some or all of the packets seen by a network interface (that is, the network interface is used in promiscuous mode). By recording packets, you can trace connection states to the exact point at which they fail, which may help you to diagnose some types of problems that are otherwise difficult to detect.

FortiADC appliances have a built-in sniffer. Packet capture on FortiADC appliances is similar to that of FortiGate appliances. Packet capture output appears on your CLI display until you stop it by pressing Ctrl+C, or until it reaches the number of packets that you have specified to capture.

Packet capture can be very resource intensive. To minimize the performance impact on your FortiADC appliance, use packet capture only during periods of minimal traffic, with a local console CLI connection rather than a Telnet or SSH CLI connection, and be sure to stop the command when you are finished.

For additional information on the packet sniffer utility, see the Fortinet Knowledge Base article Using the FortiOS built-in packet sniffer.

Syntax

```
diagnose sniffer packet [{any | <interface_name>} [{none | '<filter_str>'} [{1 | 2 | 3}
    [<packets_int>]]]]
```

`{any | <interface_name>}`	Type the name of a network interface whose packets you want to capture, such as `port1`, or type `any` to capture packets on all network interfaces. If you omit this and the following parameters for the command, the command captures all packets on all network interfaces.

{none | '<filter_str>'}	Type either `none` to capture all packets, or type a filter that specifies which protocols and port numbers that you do or do not want to capture, such as `'tcp port 25'`. Surround the filter string in quotes (`'`).
	
	Filters use tcpdump syntax:
	
	`'[[src|dst] host {<host1_fqdn> | <host1_ipv4>}] [and|or] [[src|dst] host {<host2_fqdn> | <host2_ipv4>}] [and|or] [[arp|ip|gre|esp|udp|tcp] port <port1_int>] [and|or] [[arp|ip|gre|esp|udp|tcp] port <port2_int>]'`
	To display only the traffic between two hosts, specify the IP addresses of both hosts. To display only forward or reply packets, indicate which host is the source, and which is the destination.
	
	For example, to display UDP port 1812 traffic between 1.example.com and either 2.example.com or 3.example.com, you would enter:
	
	`'udp and port 1812 and src host 1.example.com and dst \ ( 2.example.com or 2.example.com \)'`

{1 | 2 | 3}	Type one of the following integers indicating the depth of packet headers and payloads to capture: `1` — Display the packet capture timestamp, plus basic fields of the IP header: the source IP address, the destination IP address, protocol name, and destination port number. Does *not* display all fields of the IP header; it omits: • IP version number bits • Internet header length (`ihl`) • type of service/differentiated services code point (`tos`) • explicit congestion notification • total packet or fragment length • packet ID • IP header checksum • time to live (`TTL`) • IP flag • fragment offset • options bits `2` — All of the output from `1`, plus the packet payload in both hexadecimal and ASCII. `3` — All of the output from `2`, plus the the link layer (Ethernet) header. For troubleshooting purposes, Fortinet Technical Support may request the most verbose level (`3`).
<packets_int>	Type the number of packets to capture before stopping. If you do not specify a number, the command will continue to capture packets until you press Ctrl+C.

Example

The following example captures three packets of traffic from any port number or protocol and between any source and destination (a filter of `none`), which passes through the network interface named port1. The capture uses a low level of verbosity (indicated by `1`).

```
FortiADC-VM # diagnose sniffer packet port1 none 1 3
interfaces=[port1]
filters=[none]
0.000000 172.30.144.20.53800 -> 172.30.144.100.22: ack 202368347
0.000000 172.30.144.100.22 -> 172.30.144.20.53800: psh 202368415 ack 2508304372
0.000000 172.30.144.100.22 -> 172.30.144.20.53800: psh 202368531 ack 2508304372
```

If you are familiar with the TCP protocol, you might notice that the packets are from the middle of a TCP connection. Because port 22 is used (highlighted above in bold), which is the standard port number for SSH, the packets might be from an SSH session.

Example

The following example captures packets traffic on TCP port 80 (typically HTTP) between two hosts, 192.168.0.1 and 192.168.0.2. The capture uses a low level of verbosity (indicated by `1`). Because the filter does not specify either host as the source or destination in the IP header (`src` or `dst`), the sniffer captures both forward and reply traffic.

```
FortiADC# diagnose sniffer packet port1 'host 192.168.0.2 or host 192.168.0.1 and tcp port
    80' 1
```

A specific number of packets to capture is not specified. As a result, the packet capture continues until the administrator presses Ctrl+C. The sniffer then confirms that five packets were seen by that network interface. Below is a sample output.

```
192.168.0.2.3625 -> 192.168.0.1.80: syn 2057246590
192.168.0.1.80 -> 192.168.0.2.3625: syn 3291168205 ack 2057246591
192.168.0.2.3625 -> 192.168.0.1.80: ack 3291168206
192.168.0.2.3625 -> 192.168.0.1.80: psh 2057246591 ack 3291168206
192.168.0.1.80 -> 192.168.0.2.3625: ack 2057247265
5 packets received by filter
0 packets dropped by kernel
```

diagnose system top

Use this command to view a list of the most system-intensive processes and to change the refresh rate.

Syntax

```
diagnose system top [delay <integer>]
```

`delay`	Refresh interval (seconds).

Once you execute this command, it continues to run and display in the CLI window until you enter `q` (quit).

While the command is running, you can press `Shift + P` to sort the five columns of data by CPU usage (the default) or `Shift + M` to sort by memory usage.

Example

This example displays a list of the top system processes and sets the update interval at 10 seconds.

```
FortiADC-VM # diagnose system top ?
delay refresh display period

FortiADC-VM # diagnose system top delay ?
<delay> delay in seconds

FortiADC-VM # diagnose system top delay 30
Run Time: 13 days, 5 hours and 9 minutes
0U, 1S, 97I; 1620T, 613F
php-fpm 635 S 1.9 0.7
php-fpm 636 S 1.9 0.7
mysqld 528 S 0.0 5.8
named 1238 S 0.0 1.0
alertemail 522 S 0.0 0.9
php-fpm 13467 S 0.0 0.6
php-fpm 525 S 0.0 0.6
cmdbsvr 86 S 0.0 0.6
cli 13065 S 0.0 0.5
snmpd 536 S 0.0 0.2
miglogd 523 S 0.0 0.2
nginx 524 S 0.0 0.2
updated 512 S 0.0 0.2
cli 21276 R 0.0 0.2
flg_indexd 10367 S 0.0 0.2
lb 520 S 0.0 0.2
sshd 515 S 0.0 0.2
scheduled 506 S 0.0 0.2
info_cente 533 S 0.0 0.2
crlupdated 535 S 0.0 0.2
hasyncd 518 S 0.0 0.2
flg_access 10370 S 0.0 0.2
llbd 507 S 0.0 0.1
netd 511 S 0.0 0.1
lvs 517 S 0.0 0.1
gdns 516 S 0.0 0.1
llbr_hcd 509 S 0.0 0.1
keepalived 519 S 0.0 0.1
getty 513 S 0.0 0.1
```

The first line indicates the up time. The second line lists the processor and memory usage, where the parameters from left to right mean:

- U — Percent of user CPU usage (in this case 0%)
- S — Percent of system CPU usage (in this case 1%)
- I — Percentage of CPU idle (in this case 97%)
- T — Total memory in kilobytes (in this case 1620 KB)
- F — Available memory in kilobytes (in this case 613 KB)

The five columns of data provide the process name (such as `updated`), the process ID (`pid`), the running status, the CPU usage, and the memory usage. The status values are:

- S — Sleeping (idle)
- R — Running
- Z — Zombie (crashed)
- < — High priority
- N — Low priority

diagnose system vm

Use this command to view information about a virtual appliance.

Syntax

```
diagnose system vm
```

Example

```
FortiADC-VM # diagnose system vm
UUID: 564d2ec7705469089699f1852ce8a086
File: License file and resources are valid.
Resources: 1 CPU/1 allowed, 1620 MB RAM/2048 MB allowed, 23 GB Disk/1024 GB allowed
Registered: 1 (True)
Status: 1 (Valid: License has been successfully authenticated with registration servers.)
FDS code: 200
Warn count: 0
Copy count: 0
Received: 113788700
Warning: 0
Recv: 201503092104
Dup:
```

diagnose debug application fnginx

Use this command to view information about an rtsp/rtmp/mysql/smtpdiameter appliance.

Syntax

```
diagnose debug application fnginx < rtsp/rtmp/mysql/smtpdiameter/config/stat/all>
    <set/unset>
```

Example

```
FortiADC-VM # diagnose debug application fnginx mysql set
```

```
profile type is mysql.
addr type 1.
make pool member conf, ip addr 20.6.2.1, port 80.
make pool member conf, ip addr 20.6.2.2, port 80.
make pool member conf, ip addr 20.6.2.3, port 80.
add vdom rlimit, vdom id: 1, ip: 1.1.1.1, port: 80, ssl: 0
test temp config success
dump configure data:
adc {
upstream mysql {
server 20.6.2.1:80 weight=1 up group_id=0 rs_name=pool1-1 id=3200;
server 20.6.2.2:80 weight=1 up group_id=0 rs_name=pool1-2 id=3201;
server 20.6.2.3:80 weight=1 up group_id=0 rs_name=pool1-3 id=3202;
mysql;
}
server mysql {
listen 1.1.1.1:80;
proxy_pass mysql;
fngx_log off;
persistence none;
source_address off;
mysql;
proxy_mode transaction;
mysql_mode 0;
}
}
```

diagnose debug application httproxy ssl

Use this command to view information about ssl.

Syntax

```
diagnose debug application httproxy ssl_major set/unset
diagnose debug application httproxy ssl_minor set/unset
diagnose debug application httproxy ssl_error set/unset
diagnose debug application httproxy ssl_ae_info set/unset
```

Example

```
FortiADC-VM # diagnose debug application httproxy ssl_major set
Thu Oct 5 2017 18:01:21.262797 16456 ssl_sock_init@(src/ssl_sock.c:3492) [sess id:4 vs:vs
    clt:5.1.1.1:44498] fd=2:client-side:common:ssl_init: Initing SSL
Thu Oct 5 2017 18:01:21.262797 16456 ssl_sock_handshake@(src/ssl_sock.c:5191) [sess id:4
    vs:vs clt:5.1.1.1:44498] fd=2:client-side:common:handshake: start calling SSL_do_
    handshake
Thu Oct 5 2017 18:01:21.262797 16456 ssl_sock_handshake@(src/ssl_sock.c:5220) [sess id:4
    vs:vs clt:5.1.1.1:44498] fd=2:client-side:common:handshake: Enable FD Read Poll
Thu Oct 5 2017 18:01:21.482538 16456 ssl_sock_handshake@(src/ssl_sock.c:5191) [sess id:4
    vs:vs clt:5.1.1.1:44498] fd=2:client-side:common:handshake: start calling SSL_do_
    handshake
Thu Oct 5 2017 18:01:21.482538 16456 ssl_sock_handshake@(src/ssl_sock.c:5220) [sess id:4
    vs:vs clt:5.1.1.1:44498] fd=2:client-side:common:handshake: Enable FD Read Poll
```

```
Thu Oct 5 2017 18:01:21.487098 16456 ssl_sock_handshake@(src/ssl_sock.c:5191) [sess id:4
    vs:vs clt:5.1.1.1:44498] fd=2:client-side:common:handshake: start calling SSL_do_
    handshake
Thu Oct 5 2017 18:01:21.487098 16456 shctx_new_cb@(src/shctx.c:435) [sess id:4 vs:vs
    clt:5.1.1.1:44498] fd=2:client-side:common:client_cache: new session
Thu Oct 5 2017 18:01:21.487098 16456 shsess_store@(src/shctx.c:357) [sess id:4 vs:vs
    clt:5.1.1.1:44498] fd=2:client-side:common:client_cache: trying to store
Thu Oct 5 2017 18:01:21.487098 16456 shsess_get_next@(src/shctx.c:312) [sess id:4 vs:vs
    clt:5.1.1.1:44498] fd=2:client-side:common:client_cache: trying to get vacuum space
Thu Oct 5 2017 18:01:21.487098 16456 shsess_store@(src/shctx.c:417) [sess id:4 vs:vs
    clt:5.1.1.1:44498] fd=2:client-side:common:client_cache: succeed
```

execute

The `execute` commands have an immediate and decisive effect on your FortiADC appliance and, for that reason, should be used with care. Unlike `config` commands, most `execute` commands do not result in any configuration change.

This chapter is a reference for the following commands:

- "execute backup " on page 398
- "execute caching" on page 400
- "execute certificate ca" on page 400
- "execute certificate crl" on page 401
- "execute certificate local" on page 401
- "execute certificate remote" on page 402
- "execute certificate config" on page 401
- "execute checklogdisk" on page 403
- "execute clean" on page 403
- "execute date" on page 404
- "execute discovery-glb-virtual-server" on page 405
- "execute dumpsystem" on page 405
- "execute dumpsystem-file" on page 406
- "execute factoryreset" on page 407
- "execute fixlogdisk" on page 407
- "execute formatlogdisk" on page 408
- "execute geolookup" on page 408
- "execute glb-dprox-lookup" on page 408
- "execute glb-persistence-lookup" on page 409
- "execute ha force sync-config" on page 409
- "execute ha manage" on page 410
- "execute health-check-verify" on page 410
- "execute isplookup" on page 411
- "execute log delete-file" on page 411
- "execute log delete-type" on page 412
- "execute log list-type" on page 412
- "execute log rebuild-db" on page 413
- "execute nslookup" on page 413
- "execute packet-capture/packet-capture6" on page 413
- "execute packet-capture-file" on page 414
- "execute ping/ping6" on page 417
- "execute ping-option/ping6-option" on page 415
- "execute reboot" on page 419
- "execute reload" on page 419

- "execute restore " on page 419
- "execute shutdown" on page 421
- "execute ssh" on page 421
- "execute statistics-db" on page 422
- "execute telnet" on page 422
- "execute traceroute" on page 423
- "execute vm license" on page 423
- "execute web-category-test" on page 424
- "execute SSL client-side session statistics" on page 424
- "execute SSL handshake record statistics" on page 424

execute backup

Use the following commands to manually back up system files to an FTP or TFTP server or disk, as indicated:

- `execute backup config`—Create a backup of the configuration file. This backup is a text file that contains only user-specified configuration, not defaults. It is sent to a TFTP server.
- `execute backup full-config`—Create a backup of the configuration file. This backup is a text file that contains user-specified configuration and default configuration. It is sent to a TFTP server.
- `execute backup full-config-file`—Create a backup that inclues the configuration file (user-specified configuration and default configuration), plus some other type of files you have imported, including error page files, script files, and isp-address files. This backup is a tar file. It is sent to a TFTP server.
- `execute backup isp-address`—Create a backup of the ISP address book. It is sent to a TFTP server.
- `execute backup log`—Create a backup of logs. It is sent to an FTP server.
- `execute backup config disk <filename>`—Use this command to manually back up the configuration file to the disk.
- `execute backup full-config disk <filename>`—Use this command to manually back up the full configuration to the disk.
- `execute backup full-config-file disk <filename>`—Use this command to manually back up the full configuration file to the disk.

TFTP is not secure, and it does not support authentication. You should run it only on trusted administrator-only networks, and never on computers directly connected to the Internet. Turn off `tftpd` off immediately after completing this procedure.

Syntax

```
execute backup config tftp <filename> <ipaddress>
execute backup full-config tftp <filename> <ipaddress>
execute backup full-config-file tftp <filename> <ipaddress>
execute backup isp-address tftp <filename> <ipaddress> [<password>]
execute backup log ftp <ipaddress>[:port] <ftp_user> <ftp_password>
    {event|attack|traffic|all} [dir]
execute backup config disk <filename>
execute backup full-config disk <filename>
execute backup full-config-file disk <filename>
```

<filename>	Name of the file to be used for the backup file, such as FortiADC_backup.conf.
<ipaddress>	IP address of the FTP/TFTP server.
<password>	Password for use when encrypting the backup file using 128-bit AES. If you do not provide a password, the backup file will be stored as clear text.
<ipaddress>[:port]	IP address and optional port of the FTP server.
<ftp_user> <ftp_password>	FTP username and password.
{event|attack|traffic|all}	Specify the type of logs to back up.
[dir]	Optionally, specify a directory on the FTP server to copy the file.

Example

```
FortiADC-VM # execute backup config tftp config.test.txt 192.168.1.23
Connect to tftp server 192.168.1.23 ...
Please wait...
#
Send config file to tftp server OK.

FortiADC-VM # execute backup full-config tftp full-config.test.txt 192.168.1.23
Connect to tftp server 192.168.1.23 ...
Please wait...
#
Send config file to tftp server OK.

FortiADC-VM # execute backup full-config-file tftp full-config-file.tar 192.168.1.23
Connect to tftp server 192.168.1.23 ...
Please wait...
#
Send config file to tftp server OK.

FortiADC-VM # execute backup isp-address tftp isp-addr.txt 192.168.1.23
Connect to tftp server 192.168.1.23 ...
Please wait...
#
Send ISP address groups file to tftp server OK.

FortiADC-VM # execute backup log ftp 192.168.1.23 admin pass event
Connect to ftp server 192.168.1.23 ...
Please wait...

FortiADC-VM # execute backup config disk FortiADC-backup
```

This command uploads the system configuration to a file named FortiADC-backup on the disk.

```
FortiADC-VM # execute backup full-config disk FortiADC-backup
```

This command uploads the system full configuration to a file named FortiADC-backup on the disk.

```
FortiADC-VM # execute backup full-config-file disk FortiADC-backup
```

This command uploads the system full configuration to a file named FortiADC-backup on the disk.

execute caching

Use this command to show information about a virtual server cache or to clear the cache.

Syntax

```
execute caching {show|clean} <vsname>
```

show	Show cache statistics.
clean	Clear the cache.
<vsname>	Name of the virtual server.

Example

```
FortiADC-VM # execute caching ?
show show
clean clean
FortiADC-VM # execute caching show vs1
Warning: ram caching is not enabled on vs1
```

execute certificate ca

Use this command to import or export a certficate file. An alternative to config system certificate ca.

Syntax

```
execute certificate ca import tftp <filename> <ip>
execute certificate ca export tftp <cert> <filename> <ip>
```

<cert>	Local (FortiADC) certificate name.
<filename>	Name of the certificate file.
<ip>	IP address of the TFTP server.

Example

```
FortiADC-VM # execute certificate ca import tftp ca.crt 192.168.1.23
```

```
Done.

FortiADC-VM # execute certificate ca export tftp ca ca-export.crt 192.168.1.23
#
Done.
```

execute certificate config

Use this command to verify the certficate file is a supported type.

Syntax

```
execute certificate config verify
```

Example

```
FortiADC-VM # execute certificate config verify
```

execute certificate crl

Use this command to import or export a certficate file. An alternative to config system certificate crl.

Syntax

```
execute certificate crl import tftp <filename> <ip>
```

<filename>	Name of the certificate file.
<ip>	IP address of the TFTP server.

Example

```
FortiADC-VM # execute certificate crl import tftp crl.r0 192.168.1.23

Done.
```

execute certificate local

Use this command to import/export a certficate file or to generate/regenerate a CSR file. When you generate a CSR, you can create an RSA or ECDSA private key. An alternative to config system certificate local.

Note: Importing a local certificate with pfx format is not supported, unless you have first used FortiADC to generate the CSR.

Syntax

```
execute certificate local import tftp <filename> <ip>
execute certificate local export tftp <cert> <filename> <ip>
execute certificate local generate <cert_name> <keytype> {<curve_name>|<keysize>}
    <subject> <country> <state> <city> <org> <unit> <email>
execute certificate local regenerate
```

<cert>	Local (FortiADC) certificate name.
<filename>	Name of the certificate file.
<ip>	IP address of the TFTP server.

Example

```
FortiADC-VM # execute certificate local import tftp fortiadc.crt 192.168.1.23

FortiADC-VM # execute certificate local export tftp Factory fortiadc.crt 192.168.1.23
#
Done.

FortiADC-VM # execute certificate local generate csr-test ECDSA secp521r1 example null ca
    sunnyvale fortinet fadc root
Generating a 512 bit ECDSA private key with curve name secp521r1 and message digest
    algorithm SHA-512
Generating X.509 certificate request
Done.

FortiADC-VM # execute certificate local regenerate
self certificate regenerated!
```

execute certificate remote

Use this command to import or export a remote certficate file. An alternative to config system certificate remote.

Syntax

```
execute certificate remote import tftp <filename> <ip>
execute certificate remote export tftp <cert> <filename> <ip>
```

{import|export}	Whether to import or export the file.
<cert>	Local (FortiADC) certificate name.
<filename>	Name of the certificate file.
<ip>	IP address of the TFTP server.

Example

```
FortiADC-VM # execute certificate remote import tftp ca.crt 192.168.1.23

Done.

FortiADC-VM # execute certificate remote export tftp ca remote.crt 192.168.1.23

Done.
```

execute checklogdisk

Use this command to run diagnostics on the hard disk. If the command reports issues, you can run execute fixlogdisk to resolve them.

Note: The command name is a misnomer. The pair of commands troubleshoots all hard disk issues, not just issues relating to the log partition.

Syntax

```
execute checklogdisk
```

Example

```
FortiADC-docs # execute checklogdisk
This operation will temporarily pause the system, check and autofix log disk!
Do you want to continue? (y/n)y
System is checking ...
```

execute clean

Use this command to restore the factory default ISP address book definitions. In systems with multiple VDOMs, the command applies to the current VDOM only.

Syntax

```
execute clean isp-address
```

Example

```
FortiADC-VM # execute clean isp-address
This operation will clean the current restored ISP address-books and related ISP/proximity
    routes!
Do you want to continue? (y/n)y
```

execute config-sync

Use this command to push/pull a configuration to/from a remote FortiADC.

Syntax

```
execute config-sync {get|put} <datasource>
```

reset	Reset traffic statistics.
restore	Restore traffic statistics from its backup.

Example

```
FortiADC-VM # execute config-sync put data-center-east
>>> synconf fails : connect fails, please check server ip
FortiADC-VM # execute config-sync get data-center-east
>>> synconf fails : connect fails, please check server ip
```

See Also

- config config sync-list

execute date

Use this command to display or set the system date and time.

Syntax

```
execute date [<mm/dd/yyyy> [hh:mm:ss]] <Enter>
```

<Enter>	If you do not specify a date, the command returns the current system date.
<mm/dd/yyyy>	Current date where the FortiADC appliance is located. MM/DD/YY format.
[hh:mm:ss]	HH:MM:SS format.

Example

```
FortiADC-VM # execute date ?
date <mm/dd/yyyy> [hh:mm:ss]
<mm/dd/yyyy> mm/dd/yyyy, mm: 1-12, dd: 1-31, yyyy: 2001-2100

FortiADC-VM # execute date
Tue Mar 10 10:00:47 PDT 2015
```

```
FortiADC-VM # execute date 03/10/2015
send buff to ha. pid=31876, buff=
exec date
end
```

execute discovery-glb-virtual-server

Use this command to populate the global load balancing server configuration virtual server list for the specified virtual server.

Syntax

```
execute discovery-glb-virtual-server {server|override-server} <servername>
```

`{server|override-server} <servername>`	Use `server <servername>` to populate the virtual server member list with virtual servers from the local FortiADC configuration. <servername> is the name of the global-load-balance servers configuration. After the list had been populated, you can edit the configuration to add a gateway health check. Use `override-server <servername>` to discover the virtual server configuration and overwrite any local configuration information for those servers.

Example

```
FortiADC-VM # execute glb-dprox-lookup 172.30.144.100
Searching Address 172.30.144.100
get error sendmsg = Connection refused
Matched nothing!
```

execute dumpsystem

Use this command to generate a system dump file. System dump files can help Fortinet support engineers analyze an issue for you.

Syntax

```
execute dumpsystem [console <enable|disable>]
```

`[console <enable|disable>]`	Enable/disable writing debug information to the console during the dump.

Example

```
FortiADC-VM # execute dumpsystem console ?
enable debug info will output to console
disable debug info will not output to console
FortiADC-VM # execute dumpsystem console enable
FortiADC-VM # execute dumpsystem
This operation will reboot the system!
Do you want to continue? (y/n)y
Begins to dump userspace information
Failed to open /proc/1185/comm, No such file or directory
Failed to open /proc/1186/comm, No such file or directory
Failed to open /proc/1187/comm, No such file or directory
Failed to open /proc/1188/comm, No such file or directory
Failed to open /proc/1189/comm, No such file or directory
Failed to open /proc/1190/comm, No such file or directory
Failed to open /proc/1191/comm, No such file or directory
Failed to open /proc/1192/comm, No such file or directory
Failed to open /proc/1193/comm, No such file or directory
Failed to open /proc/1194/comm, No such file or directory
Begins to dump kernel information
```

See also

- execute dumpsystem-file

execute dumpsystem-file

You use this command to manage system dump files. System dump files can help Fortinet support engineers analyze an issue for you.

Syntax

```
execute dumpsystem-file {delete <filename>|list|upload {ftp|tftp} <filename> <ip>}
```

`delete <filename>`	Delete the specified file.
`list`	List all system dump files.
`upload {ftp|tftp} <filename> <ip>`	Upload the specified file to the specified TFTP server.

Example

```
FortiADC-VM # execute dumpsystem-file list
-rw------- 1 0 0 96719189 Mar 15 13:35 coredump-2016-03-15-13_35
-rw-r--r-- 1 0 0 16654391 Mar 15 13:34 user_coredump_2016_03_15_13_34_46.tar.bz2
```

```
FortiADC-VM # execute dumpsystem-file upload tftp coredump-2016-03-15-13_35 172.30.184.77
coredump-2016-03-15- 7% |** | 7152k 0:09:58 ETA
```

See also

- execute dumpsystem

execute factoryreset

Use this command to reset the system to its default settings for the currently installed firmware version. If you have not upgraded or downgraded the firmware, this restores factory default settings.

Back up your configuration first. This command resets all changes that you have made to the configuration file and reverts the system to the default values for the firmware version. Depending on the firmware version, this could include factory default settings for the IP addresses of network interfaces.

Syntax

```
execute factoryreset
```

Example

```
FortiADC-VM # execute factoryreset
This operation will change all settings to factory defaults!
Do you want to continue? (y/n)y

System is resetting to factory defaults...
```

execute fixlogdisk

Use this command to fix hard disk issues reported by the execute checklogdisk command.

Note: The command name is a misnomer. The pair of commands troubleshoots all hard disk issues, not just issues relating to the log partition.

Syntax

```
execute fixlogdisk
```

Example

```
FortiADC-docs # execute fixlogdisk
This operation will temporarily pause the system, check and fix the log disk!
Do you want to continue? (y/n)
```

execute formatlogdisk

Use this command to clear the logs from the hard disk and reformat the disk.

This operation deletes all locally stored log files.

Syntax

```
execute formatlogdisk
```

Example

```
FortiADC-VM # execute formatlogdisk
This operation will erase all data on the log disk!
Do you want to continue? (y/n)
```

execute geolookup

Use this command to look up the country for the specified IP address.

Syntax

```
execute geolookup <ip>
```

<ip>	IP address to look up.

Example

```
# execute geolookup 8.8.8.8
8.8.8.8 "United States"
```

execute glb-dprox-lookup

Use this command to query the dynamic proximity RTT record for the specified IP address.

Syntax

```
execute glb-dprox-lookup <class_ip>
```

<ip>	Lookup the specified IPv4 or IPv6 address.

Example

```
FortiADC-docs # execute glb-dprox-lookup 192.168.0.1
Searching Address 192.168.0.1
get error sendmsg = Connection refused
Matched nothing!
FortiADC-docs #
```

execute glb-persistence-lookup

Use this command to query the GSLB persistence table to see if an IP address has an entry in it.

Syntax

```
execute glb-persistence-lookup <classip>
```

<classip>	IP address you want to look up.

Example

```
FortiADC-VM # execute glb-dprox-lookup 172.30.144.100
Searching Address 172.30.144.100
get error sendmsg = Connection refused
Matched nothing!
FortiADC-VM #
```

execute ha force sync-config

Use this command to manually sync the configuration from the master to slave nodes.

Syntax

```
execute ha force sync-config
```

Example

```
(M) FortiADC-VM # execute ha force sync-config
This operation will overwrite slaves config!
Do you want to continue? (y/n)y
(M) FortiADC-VM #
```

execute ha force standby traffic-group

Use this command to manually set a traffic-group in a standby mode.

Syntax

```
execute ha force standby traffic-group <traffic-group name>
```

Example

```
down2000D (global) # execute ha force standby traffic-group default
This operation will make traffic group on this device force to stanby,all traffic in this
    traffic group will be taken over!
Do you want to continue? (y/n)y

down2000D (global) #
```

execute ha manage

Use this command to telnet to the command-line interface of a peer HA cluster node. This is useful when you want to configure node-specific settings, like HA priority. Most settings are pushed from the primary node to member nodes.

Syntax

```
execute ha manage <serialnumber>
```

Example

```
FortiADC-VM # execute ha manage FADV010000028122
```

execute health-check-verify

Use this command to use the specified health check to check the status of any IP address.

Syntax

```
execute health-check-verify <ip address> <hc name> <port>|<enter>
```

<ip address>	The IP address of the health check object.

<hc name>	The name of the health check object. Note: The health check MUST be an existing Health Check in FortiADC.
<port>|<enter>	If you set a port value, health check traffic will use the port. If you do not set the port value but press Enter instead, health check traffic will use the port value from the specified health check name.

Example

```
FortiADC-VM # execute health-check-verify LB_HLTHCK_ICMP 10.0.0.1
recv hc state is UP
FortiADC-VM # execute health-check-verify LB_HLTHCK_HTTP 10.0.0.1 8080
recv hc state is DOWN
```

execute isplookup

Use this command to query whether an IP address belongs to an ISP address book.

Syntax

```
execute isplookup <ip>
```

<ip>	Lookup the specified IP address.

Example

```
FortiADC-VM # execute isplookup 1.1.1.1
ISP: china-mobile, province Beijing, subnet 1.1.1.0/24
```

execute log delete-file

Use this command to delete a log file.

Syntax

```
execute log delete-file <filename>
```

<filename>	Log filename.

execute log delete-type

Use this command to delete a log files for a specified log type.

Syntax

```
execute log delete-type {elog|tlog|alog|all}
```

elog	Delete event logs.
tlog	Delete traffic logs.
alog	Delete securty logs.
all	Delete logs for all types.

execute log list-type

Use this command to list log files for a specified log type.

Syntax

```
execute log list-type {elog|tlog|alog|all}
```

elog	List event logs.
tlog	List traffic logs.
alog	List securty logs.
all	List logs for all types.

Example

```
FortiADC-VM # execute log list-type ?
<type|all> list all log file by <type>(elog|tlog|alog|all)

FortiADC-VM # execute log list-type all
1.admin.elog 31440 Tue Mar 10 10:01:36 2015
1.app.elog 30578 Tue Feb 24 08:59:09 2015
1.config.elog 23239 Tue Mar 10 13:26:06 2015
1.system.elog 2291 Tue Mar 10 13:50:08 2015
1.dns.tlog 0 Tue Dec 9 12:10:52 2014
1.fw.tlog 0 Tue Dec 9 12:10:52 2014
1.slb_http.tlog 0 Tue Dec 9 12:10:52 2014
1.slb_layer4.tlog 0 Tue Dec 9 12:10:52 2014
1.slb_radius.tlog 0 Tue Dec 9 12:10:52 2014
1.slb_tcps.tlog 0 Tue Dec 9 12:10:52 2014
```

```
1.ip_reputation.alog 0 Tue Dec 9 12:10:52 2014
1.synflood.alog 0 Tue Dec 9 12:10:52 2014
FortiADC-VM # execute log rebuild-db
You need to wait 2 minutes at least until log rebuild completes
```

execute log rebuild-db

Use this command to rebuild the log database.

Syntax

```
execute log rebuild-db
```

Example

```
FortiADC-VM # execute log rebuild-db
You need to wait 2 minutes at least until log rebuild completes
```

execute nslookup

Use this command to perform nslookup queries.

Syntax

```
execute nslookup name {<fqdn>|<ip>}
```

<fqdn>	Lookup the IP address for the specified host.
<ip>	Lookup the FQDN for the specified IP address.

Example

```
FortiADC-VM # execute nslookup name example.com

Non-authoritative answer:
Name: example.com
Address: 93.184.216.34
```

execute packet-capture/packet-capture6

You use these commands to capture packets using tcpdump.

Syntax

```
execute {packet-capture|packet-capture6} <interface> ["Expression"] [<count>]
    [pcap|text] [<filename>]
```

<interface>	Network interface to listen for traffic, such as port1 or port2.
["Expression"]	Specify a filter expression to determine the packets that are captured. Only packets that match the expression are captured. If no expression is specified, all packets received at the interface are captured. For information on filter expressions, see the TCP dump man page: http://www.tcpdump.org/manpages/pcap-filter.7.html
[<count>]	Specify the number of packets to capture and then exit. The valid range is 1 to 10,000. If you do not specify a count, you can terminate the capture by pressing Ctrl-C.
[pcap|text]	Specify pcap or text. If you do not specify a file type, the results are printed to the screen and not to a file.
[<filename>]	Specify the filename for the saved capture. Do not specify a filename extension. The extension .pcap or .txt is added automatically.

Example

The following examples show the tcpdump commands:

```
FortiADC-VM # execute packet-capture port1 "tcp port 80" 5 text test1
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on port1, link-type EN10MB (Ethernet), capture size 65535 bytes
5 packets captured
5 packets received by filter
0 packets dropped by kernel

FortiADC-VM # execute packet-capture-file list
-rw-r--r-- 1 0 0 577 Sep 3 14:31 test1.txt

FortiADC-VM # execute packet-capture-file upload tftp test1.txt 192.168.1.23
```

See also

execute packet-capture-file

execute packet-capture-file

You use this command to manage tcpdump files.

Syntax

```
execute packet-capture-file {cat <filename>|delete <filename>|list|upload tftp <filename>
    <ip>}
```

`cat <filename>`	Display file contents to the screen.
`delete <filename>`	Delete the specified file.
`list`	List all packet capture files.
`upload tftp <filename> <ip>`	Upload the specified file to the specfied TFTP server.

Example

```
FortiADC-VM # execute packet-capture-file ?
cat show one file
delete delete one file
list list all files
upload upload

FortiADC-VM # execute packet-capture-file list
-rw-r--r-- 1 0 0 802 Mar 10 14:17 test1.txt

FortiADC-VM # execute packet-capture-file cat test1.txt
14:16:58.073847 IP 1.1.1.2.80 > 172.30.144.100.27361: Flags [R.], seq
    3807765751, ack 1748607346, win 2896, options [nop,nop,TS val 836272587 ecr
    1224723070], length 0
14:16:58.599663 IP 172.30.144.100.27363 > 1.1.1.2.80: Flags [R.], seq
    504059189, ack 4210316583, win 2920, options [nop,nop,TS val 1224738073 ecr
    836272140], length 0
14:16:58.599684 IP 172.30.144.100.32792 > 1.1.1.1.80: Flags [R.], seq
    802377254, ack 4202724881, win 2920, options [nop,nop,TS val 1224738073 ecr
    836272140], length 0
14:17:01.723398 IP 1.1.1.1.80 > 172.30.144.100.32792: Flags [R.], seq 1, ack
    0, win 2896, options [nop,nop,TS val 836272952 ecr 1224733072], length 0
14:17:01.723872 IP 1.1.1.2.80 > 172.30.144.100.27363: Flags [R.], seq 1, ack
    0, win 2896, options [nop,nop,TS val 836272952 ecr 1224733072], length 0

FortiADC-VM # execute packet-capture-file upload tftp test1.txt 192.168.1.23
```

execute ping-option/ping6-option

Use these commands to configure the behavior of the execute ping/ping6 command.

Syntax

```
execute ping-option data-size <bytes_int>
execute ping-option df-bit {yes | no}
execute ping-option pattern <bufferpattern_hex>
execute ping-option repeat-count <repeat_int>
```

```
execute ping-option source {auto | <interface_ipv4>}
execute ping-option timeout <seconds_int>
execute ping-option tos {<service_type>}
execute ping-option ttl <hops_int>
execute ping-option validate-reply {yes | no}
execute ping-option view-settings
```

data-size	Datagram size in bytes. The default is 56. This option enables you to send out packets of different sizes for testing the effect of packet size on the connection. If you want to configure the pattern that will be used to buffer small datagrams to reach this size, also configure pattern <bufferpattern_hex>.
df-bit	Enter either `yes` to set the DF bit in the IP header to prevent the ICMP packet from being fragmented, or enter `no` to allow the ICMP packet to be fragmented.
pattern	Hexadecimal pattern, such as `00ffaabb`, to fill the optional data buffer at the end of the ICMP packet. The size of the buffer is determined by data-size <bytes_int>.
repeat-count	Number of times to repeat the ping. The default is 5.
source	Network interface from which the ping is sent. Enter either `auto` or a FortiADC network interface IP address. The default is auto.
timeout	Response timeout in seconds. The default is 2.
tos	Type-of-service option value, either: `default` — Do not indicate. (That is, set the TOS byte to 0.) `lowcost` — Minimize cost. `lowdelay` — Minimize delay. `reliability` — Maximize reliability. `throughput` — Maximize throughput.
ttl	Time-to-live (TTL) value. The default is 64.
validate-reply	Whether or not to validate ping replies.
view-settings	Display the current ping option settings.

Example

```
FortiADC-VM # execute ping-option view-settings
Ping Options:
  Repeat Count: 5
  Data Size: 56
  Timeout: 2
  Interval: 1
  TTL: 64
```

```
 TOS: 0
 DF bit: unset
 Source Address: auto
 Pattern:
 Pattern Size in Bytes: 0
 Validate Reply: no

FortiADC-VM # execute ping-option ?
 data-size ping option settings
 df-bit set DF bit in IP header <yes | no>
 pattern hex format of pattern, e.g. 00ffaabb
 repeat-count integer value to specify how many times to repeat ping
 source auto | <source interface ip>
 timeout integer value to specify timeout in seconds
 tos IP type-of-service option
 ttl integer value to specify time-to-live
 validate-reply validate reply data <yes | no>
 view-settings view the current settings for ping option
```

FortiADC-VM # execute ping-option repeat-count 3

```
FortiADC-VM # execute ping-option view-settings
Ping Options:
 Repeat Count: 3
 Data Size: 56
 Timeout: 2
 Interval: 1
 TTL: 64
 TOS: 0
 DF bit: unset
 Source Address: auto
 Pattern:
 Pattern Size in Bytes: 0
 Validate Reply: no
```

execute ping/ping6

Use these commands to perform an ICMP `ECHO` request (also called a ping) to a host by specifying its fully qualified domain name (FQDN) or IPv4 address, using the options configured by execute ping-option/ping6-option.

Pings are often used to test IP-layer connectivity during troubleshooting.

Syntax

```
execute {ping|ping6} {<hostname> | <ipaddress>}
```

`<hostname>`	Fully qualified domain name (FQDN) of the host to ping.
`<ipaddress>`	IP address to ping.

Example

This example pings a host with the IP address 172.16.1.10.

```
execute ping 172.16.1.10
```

The CLI displays the following:

```
PING 172.16.1.10 (172.16.1.10): 56 data bytes
    64 bytes from 172.16.1.10: icmp_seq=0 ttl=128 time=0.5 ms
    64 bytes from 172.16.1.10: icmp_seq=1 ttl=128 time=0.2 ms
    64 bytes from 172.16.1.10: icmp_seq=2 ttl=128 time=0.2 ms
    64 bytes from 172.16.1.10: icmp_seq=3 ttl=128 time=0.2 ms
    64 bytes from 172.16.1.10: icmp_seq=4 ttl=128 time=0.2 ms
--- 172.16.1.10 ping statistics ---
    5 packets transmitted, 5 packets received, 0% packet loss
    round-trip min/avg/max = 0.2/0.2/0.5 ms
```

The results indicate that a route exists between the FortiADC appliance and 172.16.1.10. It also indicates that during the sample period, there was no packet loss, and the average response time was 0.2 milliseconds.

Example

This example pings a host with the IP address 10.0.0.1.

```
execute ping 10.0.0.1
```

The CLI displays the following:

```
PING 10.0.0.1 (10.0.0.1): 56 data bytes
```

After several seconds, no output appears. The administrator halts the ping by pressing Ctrl+C. The CLI displays the following:

```
--- 10.0.0.1 ping statistics ---
5 packets transmitted, 0 packets received, 100% packet loss
```

The results indicate the host may be down, or there is no route between the FortiADC appliance and 10.0.0.1. To determine the point of failure along the route, further diagnostic tests are required, such as execute traceroute.

Example

This example pings a host with the IP address 2001:0db8:85a3:::8a2e:0370:7334.

```
execute ping6 2607:f0b0:f:420::
```

The CLI displays the following:

```
PING 2607:f0b0:f:420:: (2607:f0b0:f:420::): 56 data bytes
```

After several seconds, no output appears. The administrator halts the ping by pressing Ctrl+C. The CLI displays the following:

```
--- 2607:f0b0:f:420:: ping statistics ---
5 packets transmitted, 0 packets received, 100% packet loss
```

The results indicate the host may be down, or there is no route between the FortiADC appliance and 2607:f0b0:f:420::. To determine the point of failure along the route, further diagnostic tests are required, such as execute traceroute.

execute reboot

Use this command to restart the FortiADC appliance.

Syntax

```
execute reboot
```

Example

This example shows the reboot command in action.

```
execute reboot
```

The CLI displays the following:

```
This operation will reboot the system !
Do you want to continue? (y/n)
```

After you enter `y` (yes), the CLI displays the following:

```
System is rebooting...
```

If you are connected to the CLI through a local console, the CLI displays messages while the reboot is occurring.

If you are connected to the CLI through the network, the CLI will not display any notification while the reboot is occurring, as this occurs after the network interfaces have been shut down. Instead, you may notice that the connection is terminated. Time required by the reboot varies by many factors, such as whether or not hard disk verification is required, but may be several minutes.

execute reload

Use this command to reload the system.

Syntax

```
execute reload
```

Example

```
FortiADC-VM # execute reload
This operation will reload the system!
Do you want to continue? (y/n)y

System is checking ...
```

execute restore

Use the following commands to manually import system files from an FTP/TFTP server or a disk as indicated:

- `execute restore config`—Imports a backup of the configuration text file. It is imported from a TFTP server.
- `execute restore config-file`—Imports a tar file that inclues the configuration text file, error page files, script files, and ISP address book files. It is imported from a TFTP server.
- `execute restore image—Imports a firmware image. It is imported from an FTP or TFTP server.`
- `execute restore isp-address`—Imports an ISP address book text file. When you perform the restore operation, the imported address book takes priority over entries from the predefined address book (default for the firmware image). In systems with multiple VDOMs, the command applies to the current VDOM only. It is imported from a TFTP server.
- `execute restore waf-signature`—Imports a WAF signature database update. It is imported from an FTP or TFTP server.
- `execute restore config disk <filename>`—Use this command to restore the configuration from a configuration backup file on the disk, or to install primary or backup firmware.

Back up a configuration before restoring a different version. This command restores configuration changes only, and does not affect settings that remain at their default values. Default values might vary by firmware version.

Syntax

```
execute restore config tftp <filename> <ip>
execute restore config-file tftp <filename> <ip>
execute restore image <ftp|tftp|tftp-ha-sync> <filename> <ip>
execute restore isp-address tftp <filename> <ip>
execute restore waf-signature <ftp|tftp> <filename> <ip>
execute restore config disk <filename>
```

`<filename>`	Name of the file.
`<ftp|tftp|tftp-ha-sync>`	FTP or TFTP server. For HA upgrades, use `tftp-ha-sync` to upgrade an HA cluster. For details on the HA cluster upgrade process, refer to the FortiADC Handbook.
`<ip>`	IP address of the FTP/TFTP server.

Example

```
FortiADC-VM # execute restore config tftp backup.conf 192.168.1.23
This operation will overwrite the current settings!
Do you want to continue? (y/n)
```

The FortiADC appliance then applies the configuration backup and reboots.

```
FortiADC-VM # execute restore config disk FortiADC-backup
```

This command downloads a configuration file named FortiADC-backup from the disk to the FortiADC appliance.

execute shutdown

Use this command to prepare the FortiADC appliance to be powered down by halting the software, clearing all buffers, and writing all cached data to disk.

Power off the FortiADC appliance only after issuing this command. Unplugging or switching off the FortiADC appliance without issuing this command could result in data loss.

Syntax

```
execute shutdown
```

Example

```
FortiADC-VM # execute shutdown
This operation will halt the system!
Do you want to continue? (y/n) y

System is shutting down...(power-cycle needed to restart)
```

If you are connected to the CLI through a local console, the CLI displays a message when the shutdown is complete.

If you are connected to the CLI through the network, the CLI will not display any notification when the shutdown is complete, as this occurs after the network interfaces have been shut down. Instead, you may notice that the connection times out.

execute ssh

Use this command to open an SSH connection to a remote host using the specified username.

Syntax

```
execute ssh <user@host> [port]
```

`<user@host>`	Username@host or IP address. username@ is optional. If not specified, the user named **admin** is inferred by default.
`[port]`	Specify a port if not the commonly used port 22.

Example

```
FortiADC-docs $ execute ssh admin2@192.168.0.1
FortiADC-QA #
```

execute statistics-db

Use this command to reset statistics or restore traffic statistics.

Syntax

```
execute statistics-db {reset|restore}
```

reset	Reset traffic statistics.
restore	Restore traffic statistics from its backup.

Example

```
FortiADC-VM # execute statistics-db restore
You need to wait 2 minutes at least until statistics db restore completes
```

execute telnet

Use this command to open an Telnet connection to a remote host.

Syntax

```
execute telnet <ip> [port]
```

<ip>	IP address of the remote host.
[port]	Specify a port if not the commonly used port 23.

Example

```
FortiADC-VM # execute telnet 192.168.0.1
Entering character mode
Escape character is '^]'.
Remote Host login: admin
Password:
Welcome!
Remote Host #
```

execute traceroute

Use this command to use ICMP to test the connection between the FortiADC appliance and another network device, and display information about the time required for network hops between the device and the FortiADC appliance.

Syntax

```
execute traceroute {<hostname> | <ipaddress>}
```

<hostname>	Fully qualified domain name (FQDN) of the other network device.
<ipaddress>	IP address of the other network device.

Example

This example tests connectivity between the FortiADC appliance and docs.fortinet.com. In this example, the trace times out after the first hop, indicating a possible connectivity problem at that point in the network.

```
FortiADC# execute traceroute docs.fortinet.com
traceroute to docs.fortinet.com (65.39.139.196), 30 hops max, 38 byte packets
1  172.16.1.200 (172.16.1.200) 0.324 ms 0.427 ms 0.360 ms
 2  * * *
```

execute vm license

Use this command to upload license files for a virtual appliance deployment.

Syntax

```
execute vm license tftp <filename> <ip> [<password>]
```

<filename>	Name of the license file.
<ip>	IP address of the TFTP server.
<password>	Password if the license file is encrypted.

Example

```
FortiADC-VM # execute vm license tftp license.lic 192.168.1.23
This operation will replace the current vmware license and reload the system!
Do you want to continue? (y/n)
```

execute web-category-test

Use this command to see the FortiGuard web category that a specified URL has been mapped to. You can also find a lookup tool on http://fortiguard.com/webfilter.

Syntax

```
execute web-category-test <url>
```

Example

```
FortiADC-VM # execute web-category-test docs.fortinet.com
```

execute SSL client-side session statistics

Use this command to see the SSL client-side session reuse statistics. You can see the statistics of session ID reuse and session ticket reuse.

Syntax

```
execute ssl-client-side-session-statistics show/clean <datasource>
```

Example

```
FortiADC-VM # execute ssl-client-side-session-statistics show VS
FortiADC-VM # execute ssl-client-side-session-statistics clean VS
```

execute SSL handshake record statistics

Use this command to see the SSL handshake record statistics. You can see the statistics of successful and failed handshakes.

Syntax

```
execute ssl-handshake-n-record-statistics show/clean <datasource>
```

Example

```
FortiADC-VM # execute ssl-handshake-n-record-statistics show VS
FortiADC-VM # execute ssl-handshake-n-record-statistics clean VS
```

get

Use `get` commands to display configuration settings and values. You must have read permission for the configuration object you want to display.

`show` commands display user-configured setings but not default settings; `get` commands display all settings, including both user-configured settings and defaults.

For example, you might get the current DNS settings:

```
FortiADC-VM # get system dns
primary : 8.8.8.8
secondary : 0.0.0.0

FortiADC-VM #
```

Notice that the command displays the setting for the secondary DNS server, even though it has not been configured, or has reverted to its default value.

Also unlike `show`, unless used from within an object or table, `get` requires that you specify the object or table whose settings you want to display.

For example, at the root prompt, the following command is valid:

```
FortiADC-VM # get system dns
primary : 8.8.8.8
secondary : 0.0.0.0
```

The following command displays no output:

```
FortiADC-VM # get
```

Like `show`, depending on whether or not you have specified an object, `get` displays one of two different outputs:

- The configuration you have just entered but not yet saved
- The configuration as it currently exists on the flash disk

For example, immediately after configuring the secondary DNS server setting but before saving it, `get` displays two different outputs. In the following example, the first output from `get` indicates the value that you have configured but not yet saved; the second output from `get` indicates the value that was last saved to disk.

```
FortiADC-VM # config system dns

FortiADC-VM (dns) # set secondary 192.168.1.10

FortiADC-VM (dns) # get
primary : 8.8.8.8
secondary : 192.168.1.10

FortiADC-VM (dns) # get system dns
primary : 8.8.8.8
secondary : 0.0.0.0
```

If you were to now enter `end`, saving your setting to disk, `get` output for both syntactical forms would again match. However, if you were to enter `abort` at this point and discard your recently entered secondary DNS setting instead of saving it to disk, the configuration would therefore match the second output, not the first.

If you have entered settings but cannot remember how they differ from the existing configuration, the two different forms of `get`, with and without the object name, can be a useful way to remind yourself.

Most `get` commands, such as `get system dns`, are used to display configured settings. You can find information the configuration details in the corresponding config command reference.

Other `get` commands, such as get router info ospf, get router info routing-table, get security waf-signature-status, get system performance, get system performance, and get system status, are used to display status, not configuration.

get router info ospf

Use this command to display status for OSPF.

Syntax

```
FortiADC-VM # get router info ospf ?
database database
interface show ospf interfaces
neighbor show ospf neighbors
route show ospf routing table
status show ospf status

FortiADC-VM # get router info ospf database ?
asbr-summary show ospf database ASBR summary link states
brief show ospf LSA list
external show ospf database external link states
max-age LSAs in MaxAge list
network show ospf database network link states
nssa-external show ospf database NSSA external link states
router show ospf database router link states
self-originate show ospf database self-originated link states
summary show ospf database network summary link states
```

Example

```
FortiADC-VM # get router info ospf status
OSPF Routing Process, Router ID: 1.1.1.2
Supports only single TOS (TOS0) routes
This implementation conforms to RFC2328
RFC1583Compatibility flag is disabled
OpaqueCapability flag is disabled
Initial SPF scheduling delay 200 millisec(s)
Minimum hold time between consecutive SPFs 1000 millisec(s)
Maximum hold time between consecutive SPFs 10000 millisec(s)
Hold time multiplier is currently 1
SPF algorithm has not been run
SPF timer is inactive
Refresh timer 10 secs
Number of external LSA 0. Checksum Sum 0x00000000
```

```
Number of opaque AS LSA 0. Checksum Sum 0x00000000
Number of areas attached to this router: 0

FortiADC-VM # get router info ospf database summary

OSPF Router with ID (1.1.1.2)
```

get router info routing-table

Use this command to display the routing table.

Syntax

```
FortiADC-VM # get router info routing-table ?
all show all routing table entries
kernel-all show all routing table entries
kernel-connected show connected routing table entries
kernel-llb show llb routing table entries
kernel-static show static routing table entries
```

Example

```
FortiADC-VM # get router info routing-table all
Codes: K - kernel route, C - connected, S - static, O - OSPF, P - PPPoE
> - selected route, * - FIB route

S>* 0.0.0.0/0 [10/0] via 172.30.147.254, port1
C>* 169.254.0.0/16 is directly connected, haport0
C>* 172.30.144.0/22 is directly connected, port1
```

get security waf-signature-status

Use this command to display version information for the WAF signature updates from FortiGuard.

Syntax

```
get security waf-signature-status
```

Example

```
FortiADC-VM # get security waf-signature-status
Version : 1.1.0
Engine Version : 1.0
Signature Number : 1758
Release Date : 2015-07-06 11:00:00 UTC
```

get system ha-status

Use this command to display ha status information including:

- Mode
- State
- Sync status and sync statistics
- Serial number
- Node ID
- IP address
- Monitor status
- Peer count

Syntax

```
get system ha-status
```

Example

```
(M) FADC-VM (global) # get system ha-status
Mode: active-active
State: Master
Config-sync: In sync (not sync)
Serial-number: FADV010000039883
Node-id: 1
IP address: 169.254.3.131
Last change time: Tue Mar 15 15:39:42 2016
Last change reason: Device initialization

Monitor status
System Harddisk: pass
Link Up: port1
Down: port2
Remote IP
Up:
Down:

Sync statistics: Sent Received
L4 session and persistence sync pkts: 0 0
L7 persistence sync pkts: 0 0
Device management errors:
Duplicate node id: 0
Version mismatch: 0

Peer count: 1
State: Slave(working)
Serial-number: FADV010000039890
Node-id: 2
IP address: 169.254.122.212
```

get system performance

Use this command to display CPU usage, memory usage, average system load, and up time.

Normal idle load varies by hardware platform, firmware, and configured features. To determine your specific baseline for idle, configure your system completely, reboot, then view the system load. After at least 1 week of uptime with typical traffic volume, view the system load again to determine the normal non-idle baseline.

System load is the average of percentages relative to the maximum possible capability of this hardware/system platform. It includes:

- Average system load
- Number of HTTP daemon/proxy processes or children
- Memory usage
- Disk swap usage

Syntax

```
get system performance
```

Example

```
FortiADC-VM # get system performance
CPU usage: 2% used, 98% idle
Memory usage: 40% used
System Load: 0
Uptime: 12 days 23 hours 32 minutes
```

get system status

Use this command to display system status information including:

- Firmware version, build number and date
- License and registration status
- Serial number
- WAF database version
- IP Reputation database version
- Log disk availability
- Hostname
- Current HA mode
- Uptime
- System time

Syntax

```
get system status
```

Example

```
FortiADC-docs # get system status
Version: FortiADC-VM v4.4.0,build0468,151218 VM
Registration:
Valid: License has been successfully authenticated with registration servers.
VM License File: License file and resources are valid.
VM Resources: 1 CPU/1 allowed, 1620 MB RAM/2048 MB allowed, 59 GB Disk/1024 GB allowed
Serial-Number: FADV010000047341
WAF Signature DB: 00001.00001 IP Reputation DB: 00001.00094
Bootloader version: n/a
Log disk: Capacity 58 GB, Used 7 GB (12.78%), Free 51 GB
Hostname: FortiADC-docs
HA configured mode: standalone
HA effective mode: Standalone
Distribution: International
Uptime: 1 days 4 hours 14 minutes
Last reboot: Mon Dec 21 09:30:19 PST 2015
System time: Tue Dec 22 13:44:41 PST 2015
Statistics table: No synced with config
```

get system traffic-group

Use this command to display a traffic group.

Syntax

```
get system traffic-group <traffic-group name>
```

Example

```
down2000D (global) # get system traffic-group default
failover-order : 0 1 2 3 4 5 6 7
preempt : disable
network-failover : disable
```

get system traffic-group status

Use this command to display traffic-group status.

Syntax

```
get system traffic-group-status detail/brief
```

Example

Use the following command to get detailed status information about the traffic group.

```
down2000D (global) # get system traffic-group-status detail
Traffic group: default
   Current device node: 0
   Next device node: 1
   Preempt: no
   Floating IP addresses:
      vlan1101InDris 10.76.12.110

Traffic group: trafficGrp1
   Current device node: 0
   Next device node: 1
   Preempt: yes
   Floating IP addresses:
      port5 10.76.76.76
```

Use the following command to get brief status information about the traffic group.

```
down2000D (global) # get system traffic-group-status brief
Traffic group: default
   Current device node: 0
   Next device node: 1

Traffic group: trafficGrp1
   Current device node: 0
   Next device node: 1
```

get router info bgp all

Use this command to display all BGP information.

Syntax

```
get router info bgp all
```

Example

```
FortiADC-VM # get router info bgp all
BGP table version is 0, local router ID is 10.0.6.217
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
r RIB-failure, S Stale, R Removed
Origin codes: i - IGP, e - EGP, ? - incomplete
Network Next Hop Metric LocPrf Weight Path
*> 2.1.0.0/16 10.0.0.1 0 32768 ?
*>i38.0.0.0/24 172.15.2.29 0 100 0 102 i
* i172.15.1.0/24 172.15.1.218 0 100 0 i
*> 0.0.0.0 0 32768 i
*>i172.15.2.0/24 172.15.1.218 0 100 0 i
*> 192.168.11.0 0.0.0.0 0 32768 i
Total number of prefixes 5
```

get router info bgp ip

Use this command to display BGP information related to a specified IPv4 address.

Syntax

```
get router info bgp ip <ipv4 address>
```

Example

```
FortiADC-VM # get router info bgp ip 38.0.0.10
BGP routing table entry for 38.0.0.0/24
Paths: (1 available, best #1, table Default-IP-Routing-Table)
Not advertised to any peer
102
172.15.22.29 from 172.15.1.218 (10.0.6.238)
, metric 0, localpref 100, valid, internal, best
Last update: Mon Jan 2 22:50:53 2017
```

get router info bgp neighbors

Use this command to display BGP neighbor information.

Syntax

```
get router info bgp neighbors
```

Example

```
FortiADC-VM (root) # get router info bgp neighbors
BGP neighbor is 172.15.1.218, remote AS 101, local AS 101, internal link
BGP version 4, remote router ID 10.0.6.238
BGP state = Established, up for 03:34:16
Last read 00:00:15, hold time is 180, keepalive interval is 60 seconds
Configured hold time is 180, keepalive interval is 60 seconds
Neighbor capabilities:
4 Byte AS: advertised and received
Route refresh: advertised and received(old & new)
Address family IPv4 Unicast: advertised and received
Message statistics:
Inq depth is 0
Outq depth is 0
Sent Rcvd
Opens: 2 0
Notifications: 0 0
Updates: 3 4
Keepalives: 216 215
Route Refresh: 0 0
Capability: 0 0
Total: 221 219
```

```
Minimum time between advertisement runs is 5 seconds
For address family: IPv4 Unicast
Community attribute sent to this neighbor(both)
3 accepted prefixes
Connections established 1; dropped 0
Last reset never
Local host: 172.15.1.217, Local port: 179
Foreign host: 172.15.1.218, Foreign port: 27671
Nexthop: 172.15.1.217
Nexthop global: ::
Nexthop local: ::
BGP connection: non shared network
Read thread: on Write thread: off
```

get router info bgp regexp

Use this command to display BGP information by a regular expression.

Syntax

```
get router info bgp regexp <name line>
```

Example

```
FortiADC-VM (root) # get router info bgp regexp .*
BGP table version is 0, local router ID is 10.0.6.217
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
r RIB-failure, S Stale, R Removed
Origin codes: i - IGP, e - EGP, ? - incomplete
Network Next Hop Metric LocPrf Weight Path
*> 2.1.0.0/16 10.0.0.1 0 32768 ?
*>i38.0.0.0/24 172.15.2.29 0 100 0 102 i
* i172.15.1.0/24 172.15.1.218 0 100 0 i
*> 0.0.0.0 0 32768 i
*>i172.15.2.0/24 172.15.1.218 0 100 0 i
*> 192.168.11.0 0.0.0.0 0 32768 i
Total number of prefixes 5
```

get router info bgp summary

Use this command to display BGP summary information.

Syntax

```
get router info bgp summary
```

Example

```
FortiADC-VM (root) # get router info bgp summary
BGP router identifier 10.0.6.217, local AS number 101
```

```
RIB entries 9, using 1008 bytes of memory
Peers 1, using 4560 bytes of memory
Neighbor V AS MsgRcvd MsgSent TblVer InQ OutQ Up/Down State/PfxRcd
172.15.1.218 4 101 222 224 0 0 0 03:37:33 3
Total number of neighbors 1
```

get router info6 bgp all

Use this command to display all IPv6 BGP information.

Syntax

```
get router info6 bgp all
```

Example

```
FortiADC-VM (bgp) # get router info6 bgp all
BGP table version is 0, local router ID is 10.0.6.217
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
r RIB-failure, S Stale, R Removed
Origin codes: i - IGP, e - EGP, ? - incomplete
Network Next Hop Metric LocPrf Weight Path
*> 2015::/64 :: 0 32768 i
* i2016::/64 2016::2 0 100 0 i
*> :: 0 32768 i
*>i2017::/64 2016::2 0 100 0 i
* i2020::/64 2017::2 0 100 0 102 i
Total number of prefixes 4
```

get router info6 bgp ip

Use this command to display BGP information related to a specified IPv6 address.

Syntax

```
get router info6 bgp ip <ipv6 address>
```

Example

```
FortiADC-VM (bgp) # get router info6 bgp ip6 2017::0103
BGP routing table entry for 2017::/64
Paths: (1 available, best #1, table Default-IP-Routing-Table)
Not advertised to any peer
Local
2016::2 (metric 1) from 2016::2 (10.0.6.238)
, metric 0, localpref 100, valid, internal, best
Last update: Tue Jan 3 02:45:25 2017
```

get router info6 bgp neighbors

Using this command to display BGP IPv6 neighbor information.

Syntax

```
get router info6 bgp neighbors
```

Example

```
FortiADC-VM (bgp) # get router info6 bgp neighbors
BGP neighbor is 2016::2, remote AS 101, local AS 101, internal link
BGP version 4, remote router ID 10.0.6.238
BGP state = Established, up for 00:14:57
Last read 00:00:57, hold time is 180, keepalive interval is 60 seconds
Configured hold time is 180, keepalive interval is 60 seconds
Neighbor capabilities:
4 Byte AS: advertised and received
Route refresh: advertised and received(old & new)
Address family IPv4 Unicast: advertised and received
Address family IPv6 Unicast: advertised and received
Message statistics:
Inq depth is 0
Outq depth is 0
Sent Rcvd
Opens: 14 1
Notifications: 0 2
Updates: 12 9
Keepalives: 20 17
Route Refresh: 0 0
Capability: 0 0
Total: 46 29
Minimum time between advertisement runs is 5 seconds
For address family: IPv4 Unicast
Community attribute sent to this neighbor(both)
3 accepted prefixes
For address family: IPv6 Unicast
Community attribute sent to this neighbor(both)
2 accepted prefixes
Connections established 3; dropped 2
Last reset 00:15:08, due to BGP Notification received
Local host: 2016::1, Local port: 179
Foreign host: 2016::2, Foreign port: 57424
Nexthop: 10.0.6.217
Nexthop global: 2016::1
Nexthop local: ::
BGP connection: shared network
Read thread: on Write thread: off
```

get router info6 bgp regexp

Use this command to display IPv6 BGP information by a regular expression.

Syntax

```
get router info6 bgp regexp <name line>
```

Example

```
FortiADC-VM (bgp) # get router info6 bgp regexp .*
BGP table version is 0, local router ID is 10.0.6.217
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
r RIB-failure, S Stale, R Removed
Origin codes: i - IGP, e - EGP, ? - incomplete
Network Next Hop Metric LocPrf Weight Path
*> 2015::/64 :: 0 32768 i
* i2016::/64 2016::2 0 100 0 i
*> :: 0 32768 i
*>i2017::/64 2016::2 0 100 0 i
* i2020::/64 2017::2 0 100 0 102 i
Total number of prefixes 4
```

get router info6 bgp summary

Use this command to display ipv6 BGP summary information.

Syntax

```
get router info6 bgp summary
```

Example

```
FortiADC-VM (bgp) # get router info6 bgp summary
BGP router identifier 10.0.6.217, local AS number 101
RIB entries 7, using 784 bytes of memory
Peers 2, using 9120 bytes of memory
Neighbor V AS MsgRcvd MsgSent TblVer InQ OutQ Up/Down State/PfxRcd
2016::2 4 101 23 40 0 0 0 00:08:07 2
Total number of neighbors 1
```

show

Use `show` commands to display configuration settings and values. You must have read permission for the configuration object you want to display.

`show` commands display user-configured setings but not default settings; `get` commands display all settings, including both user-configured settings and defaults.

For example, you might show the current DNS settings:

```
FortiADC-VM # show system dns
config system dns
   set primary 8.8.8.8
end
```

Notice that the command does not display the setting for the secondary DNS server. This indicates that it has not been configured, or has reverted to its default value.

Like `get`, depending on whether or not you have specified an object, `show` displays one of two different outputs:

- The configuration you have just entered but not yet saved
- The configuration as it currently exists on the flash disk

For example, immediately after configuring the secondary DNS server setting but before saving it, `show` displays two different outputs. In the following example, the first output from `show` indicates the value that you have configured but not yet saved; the second output from `show` indicates the value that was last saved to disk.

```
FortiADC-VM # config system dns

FortiADC-VM (dns) # set secondary 192.168.1.10

FortiADC-VM (dns) # show
config system dns
   set primary 8.8.8.8
   set secondary 192.168.1.10
end

FortiADC-VM (dns) # show system dns
config system dns
   set primary 8.8.8.8
end
```

If you have entered settings but cannot remember how they differ from the existing configuration, the two different forms of `show`, with and without the object name, can be a useful way to remind yourself.

If you were to now enter `end`, saving your setting to disk, `show` output for both syntactical forms would again match. However, if you were to enter `abort` at this point and discard your recently entered secondary DNS setting instead of saving it to disk, the FortiADC appliance's configuration would therefore match the second output, not the first.

When VDOMs are enabled, and if you log in as `admin`, the top level of the shell changes: the two top level items are `show global`and `show vdom`.

`show global` displays settings that only `admin` or other accounts with the **super_admin_prof** access profile can change.

`show vdom` displays each VDOM and its respective settings.

This menu and CLI structure change is not visible to non-global accounts; VDOM administrators' navigation menus continue to appear similar to when VDOMs are disabled, except that global settings such as network interfaces, HA, and other global settings do not appear.

Appendix A: Virtual domains

This appendix describes CLI commands when you use the virtual domains feature. It includes the following topcis:

- Overview
- Enabling VDOMs
- Creating VDOMs
- Editing a VDOM
- Assigning interfaces to a VDOM
- Assigning administrators to a VDOM
- Disabling VDOMs
- Viewing VDOMs

Overview

You can use virtual domains (VDOMs) to delegate administration for tenant deployments. This can be useful for large enterprises and multi-tenant deployments such as web hosting.

Virtual domains are not enabled by default. Enabling and configuring VDOMs can only be performed by the `admin` administrator.

VDOMs alter the structure and available functions in the GUI and CLI, according to whether or not you are logging in as the `admin` administrator, and, if you are *not* logging in as the `admin` administrator, the administrator account's assigned access profile.

Table 23: Differences between administrator accounts when VDOMs are enabled

	admin account	Other administrators
Access to config global	Yes	No
Can create administator accounts	Yes	No
Can create and enter all VDOMs	Yes	No

If VDOMs are enabled and you log in as `admin`, the complete set of CLI commands appear, allowing unrestricted access and VDOM configuration. The `admin` administrator account cannot be restricted to a VDOM. Other administrators are restricted to their VDOM, and cannot configure VDOMs or global settings.

If VDOMs are enabled and you log in as any other administrator, you enter the VDOM assigned to your account. By default, administrator accounts other than the `admin` account are assigned to the `root` VDOM. A subset of the typical menus or CLI commands appear, allowing access only to only feature configuration, logs and reports specific to your VDOM. You cannot access global configuration settings or enter other VDOMs.

Enabling VDOMs

Before you begin:

- Save a backup of the configuration. Enabling VDOMs changes the structure of your configuration, so you want to be able to easily revert to the system state before VDOMs were enabled.

To enable VDOMs

1. Log in with the `admin` account.
   Other administrators do not have permissions to configure VDOMs.
2. Enter the following commands:
   ```
   config system global
   set vdom-admin enable
   end
   ```
   FortiADC terminates your administrative session.
3. Log in again.
   When VDOMs are enabled, and if you log in as `admin`, the top level of the shell changes: the two top level items are `config global` and `config vdom`.
   - `config global` contains settings that only `admin` or other accounts with the **prof_admin** access profile can change.
   - `config vdom` contains each VDOM and its respective settings.

   This menu and CLI structure change is not visible to non-global accounts; VDOM administrators' navigation menus continue to appear similar to when VDOMs are disabled, except that global settings such as network interfaces, HA, and other global settings do not appear.
4. Continue by defining VDOMs.

Creating VDOMs

Some settings can only be configured by the `admin` account — they are *global*. Global settings apply to the appliance overall regardless of VDOM, such as:

- network interfaces
- system time
- backups
- administrator accounts
- access profiles
- FortiGuard connectivity settings
- HA and configuration sync
- SNMP
- X.509 certificates
- TCP `SYN` flood anti-DoS setting
- `exec ping` and other global operations that exist only in the CLI

Only the `admin` account can configure global settings.

Other settings can be configured separately for each VDOM. They essentially define each VDOM. For example, the policies of VDOM-A are separate from VDOM-B.

Initially, only the `root` VDOM exists, and it contains settings such as policies that were global before VDOMs were enabled. Typically, you will create additional VDOMs, and few if any administrators will be assigned to the `root` VDOM. After VDOMs are created, the `admin` account usually assigns other administrator accounts to configure their VDOM-specific settings. However, as the root account, the `admin` administrator does have permission to configure all settings, including those within VDOMs.

To create a VDOM:

1. Log in with the `admin` account.
   Other administrators do not have permissions to configure VDOMs.
2. Enter the following commands:
   ```
   config vdom
   edit <VDOM_name>
   ```
   where `<VDOM_name>` is the name of your new VDOM. (Alternatively, to configure the default `root` VDOM, type `root`.

   The new VDOM exists, but its settings are not yet configured.

Editing a VDOM

You can modify the dynamic and static parameters of each VDOM by following the instructions below. Dynamic parameters determine how much of a dynamic resource, such as connections per second, a VDOM can use. Static parameters determine how much of a static resource, such as real servers, a VDOM can use.

To edit a VDOM:

1. Enable vdom
2. Execute the following commands. A value of 0 means the parameter has no limit.

```
config global
   config system vdom
      edit <VDOM_name>
         L4CPS : 0
         L7CPS : 0
         L7RPS : 0
         SSLCPS : 0
         SSLTHROUGHPUT : 0
         CONCURRENTSESSION : 0
         virtualserver : 0
         realserver : 0
         healthcheck : 0
         sourcepool : 0
         errorpage : 0
         localuser : 0
         usergroup : 0
         INBOUND : 0
         OUTBOUND : 0
```

Dynamic parameters

L4CPS	The number of layer 4 connections created per second. When the creation speed exceeds this value, only this number of connections will be created per second. The rest will be dropped.
L7CPS	The number of layer 7 TCP connections created by the httproxy frontend per second. When the creation speed exceeds this value, only this number of connections will be created per second. Additional TCP syn requests will be dropped on the client side.
L7RPS	The number of HTTP GET requests handled by the httproxy from the client side per second. When the number of requests per second exceeds this value, only this number of requests will be handled. Additional HTTP GET requests will be dropped.
SSLCPS	The number of SSL connections created by the httproxy frontend per second. When the creation speed of new SSL connections exceeds this value, only this number of connections will be created per second. Additional connections will not be allowed and additional syn packets will be dropped during that second.
SSLTHROUGHPUT	The volume of SSL encrypted TCP traffic from both the incoming and outgoing side. When the traffic throughput exceeds this value, additional packets from the client will be dropped and new connections will not be allowed.
CONCURRENTSESSION	The total number of living connections for ADC traffic. Living connections include L4, L7, and L7 SSL. When the number of living connections exceeds this number, additional connections will not be allowed.
INBOUND	The maximum volume of inbound traffic allowed. Only L4 and L7 SLB TCP traffic will be counted.
OUTBOUND	The maximum volume of outbound traffic allowed. Only L4 and L7 SLB TCP traffic will be counted.

Static parameters

virtualserver	The maximum number of virtual servers that can be configured using "config load-balance virtual-server" in the chosen VDOM.
realserver	The maximum number of real servers that can be configured using "config load-balance real-server" in the chosen VDOM.
healthcheck	The maximum number of healthcheck members that can be configured using "config system health-check" in the chosen VDOM.

sourcepool	The maximum number of IP pools that can be configured using "config load-balance ippool" in the chosen VDOM.
errorpage	The maximum number of error page files that can be configured using "config load-balance error-page" in the chosen VDOM.
localuser	The maximum number of local users that can be configured using "config user local" in the chosen VDOM.
usergroup	The maximum number of user groups that can be configured using "config user user-group" in the chosen VDOM.

Assigning interfaces to a VDOM

The following commands assign a network interface to a VDOM:

```
FortiADC-VM # config global

FortiADC-VM (global) # config system interface

FortiADC-VM (interface) # edit port10

FortiADC-VM (port10) # set vdom docs-vdom
FortiADC-VM (port10) # end
Changing interface(port10) vdom from root(1) to docs-vdom(233):
change vdom success.
```

Assigning administrators to a VDOM

The following commands create an administrator account and assign the administrator to a vdom:

```
FortiADC-VM # config global

FortiADC-VM (global) # config system admin

FortiADC-VM (admin) # edit docs-vdom-admin
Add new entry 'docs-vdom-admin' for node 78

FortiADC-VM (docs-vdom-admin) # set access-profile admin_prof
FortiADC-VM (docs-vdom-admin) # set vdom docs-vdom
FortiADC-VM (docs-vdom-admin) # end
```

Disabling VDOMs

Before you begin:

- Save a backup of the configuration. Disabling VDOMs changes the structure of your configuration, and deletes most VDOM-related settings. It keeps settings from the `root` VDOM only.

To disable VDOMs

1. Assign interfaces to the root VDOM. For example:

```
FortiADC-VM # config global
FortiADC-VM (global) # config system interface
FortiADC-VM (interface) # edit port10
FortiADC-VM (port10) # set vdom root
FortiADC-VM (port10) # end
Changing interface(port10) vdom from docs-vdom(233) to root(1):
change vdom success.
```

2. Assign admin accounts to the root VDOM or delete them. For example:

```
FortiADC-VM (global) # config system admin
FortiADC-VM (admin) # delete docs-vdom-admin
FortiADC-VM (admin) # end
```

3. Delete non-root VDOMs:

```
FortiADC-VM # config vdom
FortiADC-VM (vdom) # delete docs-vdom
FortiADC-VM (vdom) # end
```

4. Disable VDOMs:

```
FortiADC-VM # config global
FortiADC-VM (global) # config system global
FortiADC-VM (global) # set vdom-admin disable
FortiADC-VM (global) # end
```

The system disables VDOMs and terminates your administrative session.

Viewing VDOMs

Use the following command to show the usage and settings for all VDOMS on the system:

```
get system vdom-status
```

The following example shows the system with two VDOMs set.

```
FortiADC-300D # get system vdom-status
root:
   l4cps: 4.87/-
   l7cps: 90.2/-
   l7rps: 0.0/-
   SSLcps: 3.7/-
   SSLThroughput(KB/S): 1550.0/-
   ConcurrentSession: 47.0/-
   Inbound(KB/S): 255.6/-
   Outbound(KB/S): 104669.0/-
   VirtualServer: 21/-
   RealServer: 33/33
   Health Check: 5/-
   Source Pool: 0/-
   Error-Page: 1/-
   LocalUser: 0/-
   UserGroup: 2/-
   vdom1:
```

```
l4cps: 0.0/-
l7cps: 0.0/-
l7rps: 0.0/-
SSLcps: 0.0/-
SSLThroughput(KB/S): 0.0/-
ConcurrentSession: 0.0/-
Inbound(KB/S): 0.0/-
Outbound(KB/S): 0.0/-
VirtualServer: 0/-
RealServer: 0/-
Health Check: 4/-
Source Pool: 0/-
Error-Page: 0/-
LocalUser: 0/-
UserGroup: 0/-
```

The first number represents the current usage. The second number represents the limit set. A dashed line means no limit has been set.

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