BROCADE

CONFIGURATION GUIDE

Brocade Vyatta Network OS Firewall Configuration Guide, 5.2R1

Supporting Brocade 5600 vRouter, VNF Platform, and Distributed Services Platform

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Document conventions

The document conventions describe text formatting conventions, command syntax conventions, and important notice formats used in Brocade technical documentation.

Notes, cautions, and warnings

Notes, cautions, and warning statements may be used in this document. They are listed in the order of increasing severity of potential hazards.

NOTE
A Note provides a tip, guidance, or advice, emphasizes important information, or provides a reference to related information.

ATTENTION
An Attention statement indicates a stronger note, for example, to alert you when traffic might be interrupted or the device might reboot.

CAUTION
A Caution statement alerts you to situations that can be potentially hazardous to you or cause damage to hardware, firmware, software, or data.

DANGER
A Danger statement indicates conditions or situations that can be potentially lethal or extremely hazardous to you. Safety labels are also attached directly to products to warn of these conditions or situations.

Text formatting conventions

Text formatting conventions such as boldface, italic, or Courier font may be used to highlight specific words or phrases.

Format	Description
bold text	Identifies command names.
	Identifies keywords and operands.
	Identifies the names of GUI elements.
	Identifies text to enter in the GUI.
italic text	Identifies emphasis.
	Identifies variables.
	Identifies document titles.
`Courier font`	Identifies CLI output.

Format	Description
	Identifies command syntax examples.

Command syntax conventions

Bold and italic text identify command syntax components. Delimiters and operators define groupings of parameters and their logical relationships.

Convention	Description
bold text	Identifies command names, keywords, and command options.
italic text	Identifies a variable.
value	In Fibre Channel products, a fixed value provided as input to a command option is printed in plain text, for example, **--show** WWN.
[ ]	Syntax components displayed within square brackets are optional. Default responses to system prompts are enclosed in square brackets.
{ **x** | **y** | **z** }	A choice of required parameters is enclosed in curly brackets separated by vertical bars. You must select one of the options. In Fibre Channel products, square brackets may be used instead for this purpose.
x | **y**	A vertical bar separates mutually exclusive elements.
< >	Nonprinting characters, for example, passwords, are enclosed in angle brackets.
...	Repeat the previous element, for example, *member*[*member*...].
\	Indicates a "soft" line break in command examples. If a backslash separates two lines of a command input, enter the entire command at the prompt without the backslash.

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Release notes are bundled with software downloads on MyBrocade. Links to software downloads are available on the MyBrocade landing page and in the Document Library.

Document feedback

Quality is our first concern at Brocade, and we have made every effort to ensure the accuracy and completeness of this document. However, if you find an error or an omission, or you think that a topic needs further development, we want to hear from you. You can provide feedback in two ways:

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Provide the publication title, part number, and as much detail as possible, including the topic heading and page number if applicable, as well as your suggestions for improvement.

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Preferred method of contact for non-urgent issues: • Case management through the MyBrocade portal. • Quick Access links to Knowledge Base, Community, Document Library, Software Downloads and Licensing tools	Required for Sev 1-Critical and Sev 2-High issues: • Continental US: 1-800-752-8061 • Europe, Middle East, Africa, and Asia Pacific: +800-AT FIBREE (+800 28 34 27 33) • Toll-free numbers are available in many countries. • For areas unable to access a toll-free number: +1-408-333-6061	support@brocade.com Please include: • Problem summary • Serial number • Installation details • Environment description

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- Brocade provides backline support for issues that cannot be resolved by the OEM/solution provider.
- Brocade Supplemental Support augments your existing OEM support contract, providing direct access to Brocade expertise. For more information, contact Brocade or your OEM.
- For questions regarding service levels and response times, contact your OEM/solution provider.

About This Guide

This guide describes firewall functionality on the Brocade 5600 vRouter (referred to as a virtual router, vRouter, or router in the guide).

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Brocade firewall functionality

Firewall functionality analyzes and filters IP packets between network interfaces. The most common application of functionality is to protect traffic between an internal network and the Internet. It allows you to filter packets based on their characteristics and perform actions on packets that match the rule. The Brocade vRouter firewall functionality provides the following features:

- Packet filtering for traffic that traverses the router by using the **in** and **out** keywords on an interface
- Definable criteria for packet-matching rules, including source IP address, destination IP address, source port, destination port, IP protocol, and Internet Control Message Protocol (ICMP) type
- General detection on IP options, such as source routing and broadcast packets
- Ability to set the firewall globally for stateful or stateless operation

The vRouter firewall offers both IPv4 and IPv6 stateful packet inspection to intercept and inspect network activity and to allow or deny the attempt. The advanced firewall capabilities from the vRouter include stateful failover.

Firewall cannot be applied to outbound local traffic. It can only be applied to inbound interface traffic and forwarded outbound traffic.

Firewall and fragmented packets

As per RFC 6192, fragments destined to the local CPU are dropped by the data plane. To avoid having allowed CPU-bound fragments from being dropped, a firewall rule must be configured to allow them through the interface so that the fragments can be reassembled.

If neither firewall nor NAT is configured, packet fragments are not inspected and are forwarded unchanged. However, in accordance with RFC 6192, any fragments that are destined to a router local address are dropped.

An input firewall allows fragments to be reassembled. For both IPv4 and IPv6, if the packets arrive on an interface for which firewall is configured, the fragments are reassembled at input before passing to the firewall. If all the fragments of a packet are not received, then the packet is dropped. The reassembled packet passes through the remainder of the forwarding path and firewall does not recognize fragments at either input or output. At output, the packet is refragmented, if necessary. This behavior also applies to a packet arriving on an interface that is assigned to a firewall zone.

When fragmented packets arrive on an interface without a firewall configured and exits on an interface with an output firewall configured, the fragmented packets are not inspected for L4 (TCP, UDP, ICMP, or GRE) information; however, the firewall rules recognize them as fragments. Because the system does not process L4 information, a session for this packet is not found or created. Therefore, any return packets that are associated with this fragment flow cannot match a session and, when in the stateful state, might be dropped.

RSVP packets are sent hop-by-hop and since they can be large, they would benefit from being fragmented. The following commands can ensure that an RSVP is responded to.

```
vyatta@R1# set security firewall name RSVP rule 10 action accept
vyatta@R1# set security firewall name RSVP rule 10 protocol rsvp
```

Defining firewall instances

Firewalls filter packets on interfaces. Use of the firewall feature has two steps:

1. Define a firewall instance and save it under a name. A firewall instance is also called a firewall rule set, where a rule set is just a series of firewall rules. You define the firewall instance and configure the rules in its rule set in the **firewall** configuration node.
2. Apply the instance to an interface or a zone by configuring the **interface** configuration node for the interface or zone. After the instance is applied to the interface or zone, the rules in the instance begin filtering packets on that location.

Firewall rules

Firewall rules specify the match conditions for traffic and the action to be taken if the match conditions are satisfied. Traffic can be matched on a number of characteristics, including source IP address, destination IP address, source port, destination port, IP protocol, and ICMP type.

Rules are executed in numeric sequence, according to the rule number, from lowest to highest. If the traffic matches the characteristics specified by a rule, the action of the rule is executed; if not, the system "falls through" to the next rule.

> NOTE
> You can configure rules to match IPv4 ICMP, IPv6 ICMP, IPv6 routing header, or TCP without specifying the respective protocol, provided that a protocol specific match option is present. For example TCP flags, ICMP type.

The action can be one of the following:

- **Accept**: Traffic is allowed and forwarded.
- **Drop**: Traffic is silently discarded.

To avoid having to renumber firewall rules, a good practice is to number rules in increments of 10. This increment allows room for the insertion of new rules within the rule set.

Implicit Action

All firewall rule sets on the vRouter have, by default, an implicit final action of "pass all"; that is, traffic not matching any rule in the rule set is passed. When firewall rules are present the implicit action can be automatically modified so as to allow the 'return traffic' to PASS rather than DROP. The firewall rules have no effect on the implicit action as the firewall rules are ineffective in those instances. This default action can be changed by using security firewall name <name> default-action <action> on page 55, it appends a hidden explicit rule to a named group of rules, and prevents any implicit action from being performed.

Exclusion rules

Note that you should take care in employing more than one "exclusion" rule, that is, a rule that uses the negation operator (exclamation mark [!]) to exclude a rule from treatment. Rules are evaluated sequentially, and a sequence of exclusion rules could result in unexpected behavior.

Stateful firewall and connection tracking

The vRouter CLI interacts with the Connection Tracking System, a module that provides connection tracking for various system functions, such as firewall and Network Address Translation (NAT). On the firewall, connection tracking allows for stateful packet inspection.

Stateless firewalls filter packets in isolation, is based on static source and destination information. In contrast, stateful firewalls track the state of network connections and traffic flows and allow or restrict traffic based on whether its connection state is known and authorized. For example, when an initiation flow is allowed in one direction, the responder flow is automatically and implicitly allowed in the return direction. While typically slower under heavy load than stateless firewalls, stateful firewalls are better at blocking unauthorized communication.

By default, the vRouter firewall is stateless. If you want the firewall to operate stateless in general, you can configure state rules within a specific rule set. Alternatively, you can configure the firewall globally to operate statefully.

Global state policies that are configured apply to all IPv4 and IPv6 traffic that is destined for, originating from, or traversing the router. In addition, after they have been configured, global state policies override any state rules configured within the rule set.

TCP strict tracking

The TCP strict tracking of stateful firewall rules for traffic can be enabled by using security firewall tcp-strict on page 90. This command also enables the user to toggle between loose or strict stateful behaviors for TCP.

Stateful tracking must be enabled through either a state rule or global rule. When firewall is globally stateful, policies for established, related, and invalid traffic must be defined.

Under the stateful policy, firewall tracks the state of network connections and traffic flows, and allows or restricts traffic based on whether the connection state is known and authorized. For example, when an initiation flow is allowed in one direction, stateful firewall automatically allows responder flows in the return direction.

The statefulness policy applies to all IPv4 and IPv6 traffic that is destined for, originating from, or traversing the router. In firewall, global statefulness overrides any state rules configured within rule sets.

TCP strict tracking disabled—The firewall is stateless and the rules governing statefulness must be configured through the rule set.

TCP connections are validated by the following criteria:

Perform SEQ/ACK numbers check against boundaries. (Reference: Rooij G., “Real stateful TCP packet filtering in IP Filter,” 10th USENIX Security Symposium invited talk, Aug. 2001.)

The four boundaries are defined as follows:

- I) SEQ + LEN <= MAX {SND.ACK + MAX(SND.WIN, 1)}\
- II) SEQ >= MAX {SND.SEQ + SND.LEN - MAX(RCV.WIN, 1)}
- III) ACK <= MAX {RCV.SEQ + RCV.LEN}
- IV) ACK >= MAX {RCV.SEQ + RCV.LEN} - MAXACKWIN

TCP strict tracking enabled—The above validation is performed. In addition, the validation against the correct TCP sequencing of flags (or validation of TCP stateful transitions) is also performed.

The following stateful transitions are invalid when a packet is received with the following flag pattern:

Forward flow:

SYN-ACK FLAG to SS, ES, FW, CW, LA, TW, CL FIN FLAG to SS, SR, S2 ACK FLAG to SS, S2

NOTE
S2 is an identical SYN sent from either side of the connection.

Reverse flow:

SYN FLAG to SR, ES, FW, CW, LA, TW, CL

FIN FLAG to SS, SR

Keys to the codes above are as follows:

```
vyatta@vyatta:~$ show session-table
    TCP state codes: SS - SYN SENT, SR - SYN RECEIVED, ES - ESTABLISHED,
     FW - FIN WAIT, CW - CLOSE WAIT, LA - LAST ACK,
     TW - TIME WAIT, CL - CLOSE, LI - LISTEN
```

Applying firewall instances to interfaces

After defining firewall instances, you can apply them to interfaces, where the instances act as packet filters. Firewall instances filter packets in one of the following ways, depending on what direction you specify when you apply the firewall instance:

in: If you apply firewall instances with the **in** direction, the firewall filters packets entering the interface. These packets can be traversing the vRouter or be destined for the router.

out: If you apply instances with the **out** direction, the firewall filters packets leaving the interface. These packets can be traversing the vRouter or originating on the vRouter.

local: If you apply instances with the **local**, the firewall filters packets destined for the vRouter. The special interface "lo" can be used to affect packets received on any interface. Note that these instances are run after any "in" instances that may be on the interface.

You can apply many firewall instances to an interface on each direction. They are applied in the order that they are configured on the interface and direction.

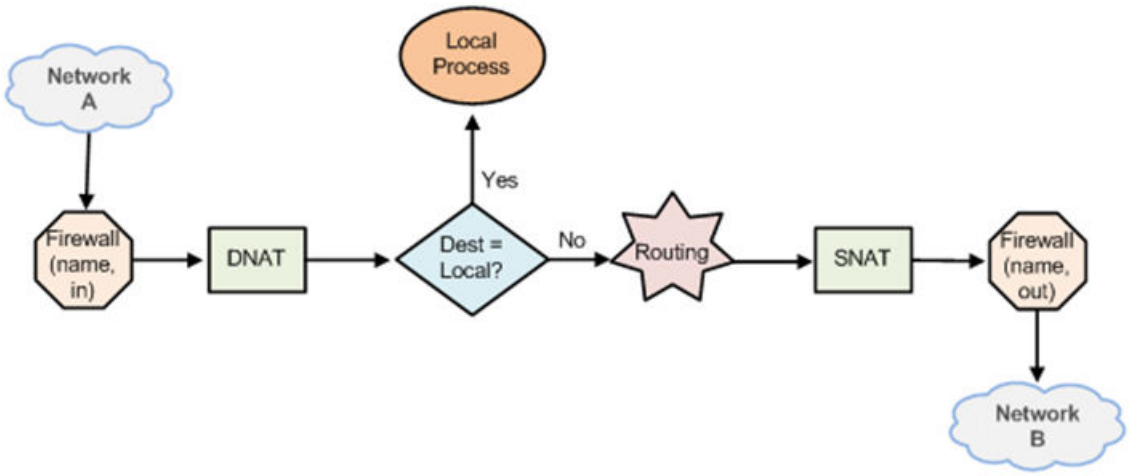
Interaction between firewall, NAT, and routing

The processing order of the various services that might be configured within the vRouter is one of the most important concepts to understand when working with firewall functionality. If the processing order of the services is not carefully configured, the results achieved might not be what you expect.

Traffic flow through firewall, NAT, and routing

The following figure shows how traffic flows through the firewall, NAT, and routing services within the vRouter. Notice the order of firewall instances, destination Network Address Translation (DNAT), routing decisions, and source Network Address Translation (SNAT).

FIGURE 1 Traffic flow through firewall, NAT, and routing components



Scenario 1: firewall instances applied to inbound traffic

In this scenario, firewall instances are applied to inbound (in) traffic on an interface. Notice that firewall instances are evaluated before DNAT and routing decisions, and after SNAT.

Scenario 2: firewall instances applied to outbound traffic

In this scenario, firewall instances are applied to outbound (**out**) traffic on an interface. Notice that firewall is evaluated after DNAT and routing decisions, and after SNAT.

Zone-based firewall

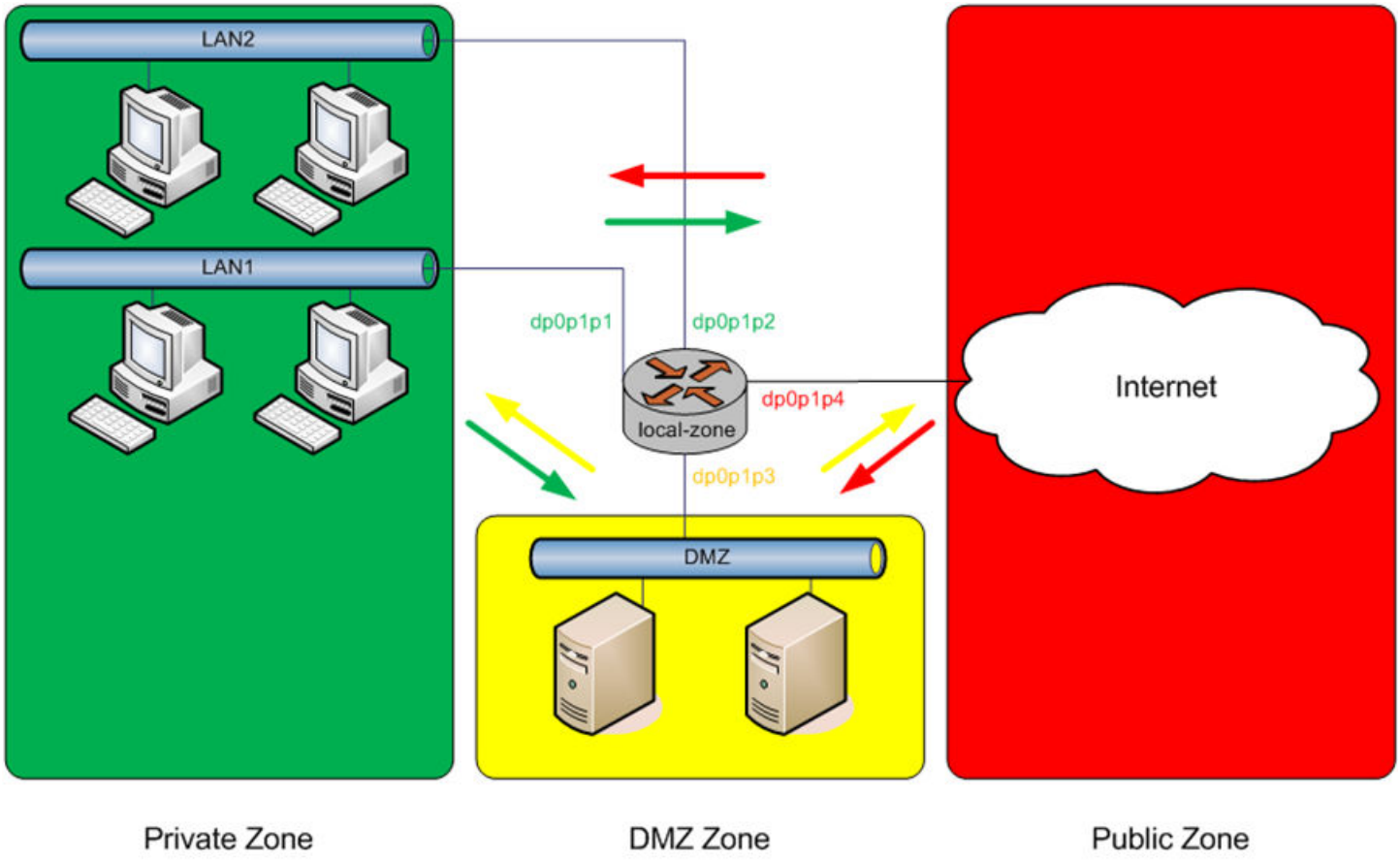
Ordinary firewall rule sets are applied on a per-interface basis to act as a packet filter for the interface. In a zone-based firewall, interfaces are grouped into security "zones," where each interface in a zone has the same security level.

Packet-filtering policies are applied to traffic flowing between zones. Traffic flowing between interfaces that lie in the same zone is not filtered and flows freely because the interfaces share the same security level.

The following figure shows an example of a zone-based firewall implementation. This example has these characteristics:

- Three transit zones exist (that is, points where traffic transits the router): the private zone, the demilitarized zone (DMZ), and the public zone.
- The dp0p1p4 interface lies in the public zone; the dp0p1p1 and dp0p1p2 interfaces lie in the private zone; and the dp0p1p3 interface lies in the DMZ.
- The arrows from one zone to another zone represent traffic-filtering policies that are applied to traffic flowing between zones.
- Traffic flowing between LAN 1 and LAN 2 remains within a single security zone. Thus, traffic from LAN1 to LAN2, and conversely, flows unfiltered.

FIGURE 2 Zone-based firewall overview



By default, all traffic coming into the router and originating from the router is allowed.

Note the following additional points about zone-based firewalls:

- An interface can be associated with only one zone.
- An interface that belongs to a zone cannot have a per-interface firewall rule set applied to it, and conversely.
- Traffic between interfaces that do not belong to any zone flows unfiltered, and per-interface firewall rule sets can be applied to those interfaces.
- By default, all traffic to a zone is dropped unless explicitly allowed by a filtering policy for a source zone (**from_zone)** .
- Filtering policies are unidirectional; they are defined as a "zone pair" that identifies the zone from which traffic is sourced (**from_zone**) and the zone to which traffic is destined (**to_zone**). In the preceding figure, these unidirectional policies can be seen as follows:
  - From private to DMZ
  - From public to DMZ
  - From private to public
  - From DMZ to public
  - From public to private
  - From DMZ to private

Control plane policing

Control plane policing (CPP) provides protection against attacks on the Brocade 5600 vRouter by allowing you to configure firewall policies that are assigned to desired interfaces and applying these policies to packets both entering and leaving the vRouter.

For the vRouter, CPP supports the addition of **local** keyword that can be applied to firewall policies for specific firewall interface types.

CPP is implemented when the **local** keyword is used in firewall policies that are assigned to any type of vRouter interface type supporting firewall functionality (an interface type that currently supports **in** and **out** directions) except for an administrator-defined loopback interface. The system loopback interface, **lo**, has the **local** keyword assigned to it by default, and any attempt to assign a local firewall to a user-defined loopback interface causes an error. A local firewall policy with CPP runs on packets that are destined for the vRouter.

To configure CPP, define firewall policies or rule sets and assign them to the desired interfaces by using the **local** keyword. For the **lo** interface, assign firewall policies to control the flow of packets from the control plane. Assign firewall policies to other data plane interfaces to control the flow of packets to the control plane.

A few explicit differences exist between firewall policies that are assigned to the **local** keyword and all other firewall policies:

- Sessions are not created on a stateful rule match.
- Strict protocol tracking is silently ignored.
- Packets that do not match a firewall rule are allowed to pass into and out of the control plane.

For the first two explicit differences, regardless of whether a matched rule implies stateful or strict protocol tracking, these attributes of the rule are silently ignored. This behavior is required because packets entering or leaving the control plane also pass through an input or output interface and the possibility of performing duplicate state tracking can result in false-positive state transitions, which lead to packet drop. To enforce stateful behavior, strict protocol tracking, or both, add appropriate rules to the input or output interfaces as desired.

The third difference enables packets that are unmatched by a policy or rule set to pass. This behavior is the direct opposite of all other firewall behavior. Other firewalls have an implicit drop rule for all packets that do not match an existing rule in the rule set. This behavior is implemented as a convenience for the administrator to allow various control plane packets, such as DHCP, IPv6 ND, BGP, and so forth, to pass without requiring the administrator to create specific rules for these packets. Administrators can have full control over this behavior and can add an explicit drop rule to the firewall group, if desired.

CPP is described in RFC 6192, and a suggested configuration for filtering rules is included in that document. Administrators are encouraged to review RFC 6192 for a list of suggested ACLs and configuration filtering rules for control plane policing.

The Brocade 5600 vRouter also includes a template of suggested filtering rules that you can incorporate into your CPP configuration. This rule set excludes various routing protocol packets from filtering and provides a default policing rule to rate-limit all other packets entering the control plane. The template CPP configuration also assigns the rule set to the **lo** system loopback interface.

The template rule set is located on the vRouter in: /opt/vyatta/etc/cpp.conf. After reviewing the template configuration, you can add this rule set to your existing configuration by using the **merge** command in configuration mode:

```
vyatta@R1# merge /opt/vyatta/etc/cpp.conf
vyatta@R1# commit
vyatta@R1# save
```

Administrators may also choose to modify the template rules to meet their particular needs.

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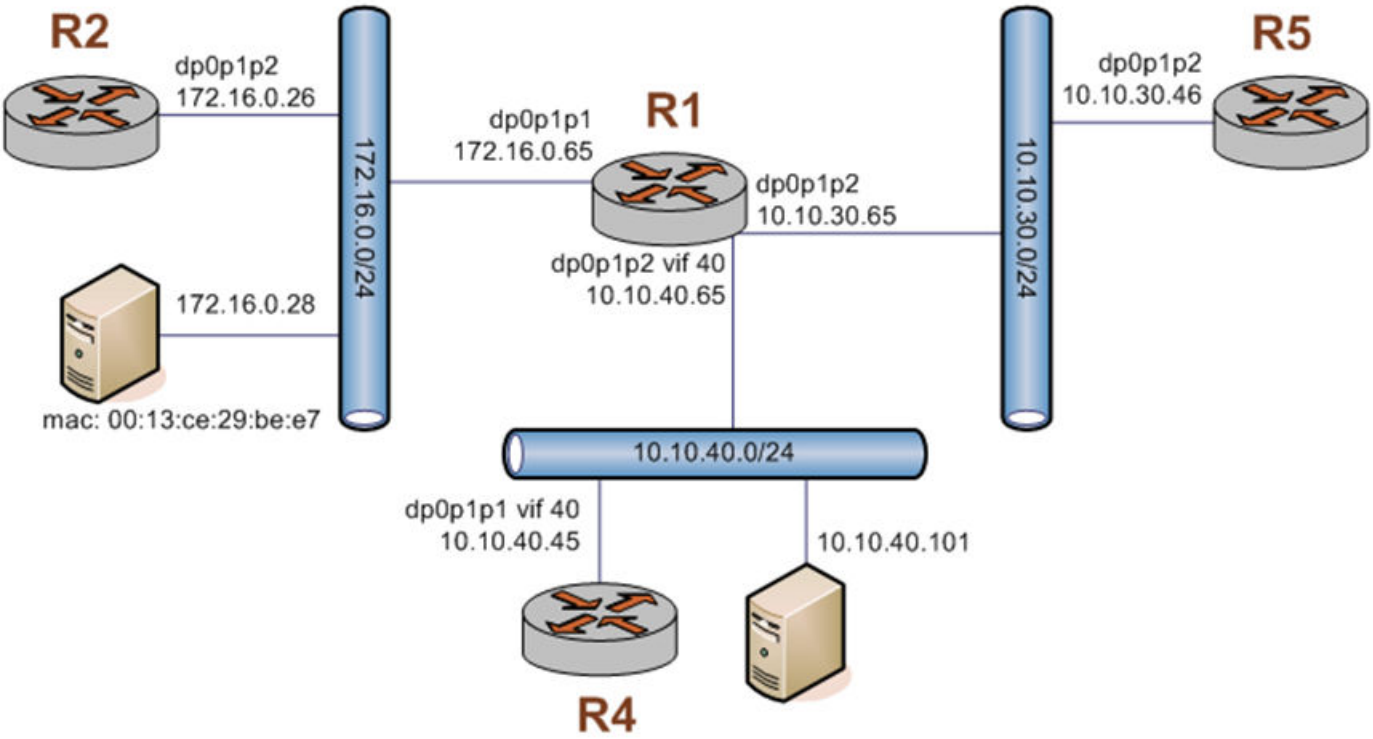
Packet-filtering

This section describes a sample configuration for firewall. When you have finished, the firewall is configured on the R1 router, as shown in the following figure.

FIGURE 3 Firewall: sample configuration



This section includes the following examples:

- Filtering on source IP address on page 22
- Filtering on source and destination IP addresses on page 22
- Filtering on source IP address and destination protocol on page 23
- Defining a network-to-network filter on page 24
- Filtering on source MAC address on page 25

- Excluding an address on page 26
- Matching TCP flags on page 27
- Matching ICMP type names on page 28
- Matching groups on page 28
- Configuring stateful behavior per rule set on page 30

Filtering on source IP address

The following figure shows how to define a firewall instance that contains one rule, which filters packets only on source IP address. This rule denies packets coming from the R2 router. It then applies the firewall instance to packets inbound on the dp0p1p1 interface.

To create an instance that filters on source IP address, perform the following steps in configuration mode.

TABLE 1 Filtering on source IP

Step	Command
Create the configuration node for the FWTEST-1 firewall instance and its rule 1. This rule matches fragmented packets.	`vyatta@R1# set security firewall name FWTEST-1 rule 1 fragment`
Define the action of this rule.	`vyatta@R1# set security firewall name FWTEST-1 rule 1 action accept`
Define a rule that filters traffic on the 176.16.0.26 source IP address.	`vyatta@R1# set security firewall name FWTEST-1 rule 1 source address 172.16.0.26`
Apply FWTEST-1 to inbound packets on dp0p1p1.	`vyatta@R1# set interfaces dataplane dp0p1p1 firewall in FWTEST-1`
Commit the configuration.	`vyatta@R1# commit`

Show the configuration.	`vyatta@R1# show security firewall name FWTEST-1`
	` rule 1 {`
	`  action accept`
	`  source {`
	`  address 172.16.0.26`
	`  }`
	` }`
	`vyatta@R1# show interfaces dataplane dp0p1p1`
	
	`address 172.16.1.1/24`
	` firewall FWTEST-1 {`
	`  in {`
	`  }`
	` }`

Filtering on source and destination IP addresses

The following example shows how to define another firewall instance. This instance contains one rule, which filters packets on both source and destination IP addresses. The rule accepts packets leaving R5 through dp0p1p2 using 10.10.30.46 and destined for 10.10.40.101. It then applies the firewall instance to packets outbound from the 1 virtual interface (vif 1) on the dp0p1p2 interface.

To create an instance that filters on source and destination IP addresses, perform the following steps in configuration mode.

TABLE 2 Filtering on source and destination IP

Step	Command
Create the configuration node for the FWTEST-2 firewall instance and its rule 1. This rule accepts traffic matching the specified criteria.	`vyatta@R1# set security firewall name FWTEST-2 rule 1 action accept`
Define a rule that filters traffic on the 10.10.30.46 source IP address.	`vyatta@R1# set security firewall name FWTEST-2 rule 1 source address 10.10.30.46`
Define a rule that filters traffic on the 10.10.40.101 destination IP address.	`vyatta@R1# set security firewall name FWTEST-2 rule 1 destination address 10.10.40.101`
Apply FWTEST-2 to outbound packets on dp0p1p2 vif 40.	`vyatta@R1# set interfaces dataplane dp0p1p2 vif 40 firewall out FWTEST-2`
Commit the configuration.	`vyatta@R1# commit`

Show the configuration.	`vyatta@R1# show security firewall name FWTEST-2`
	
	`rule 1 {`
	`  action accept`
	`  destination {`
	`  address 10.10.40.101`
	`  }`
	`  source {`
	`  address 10.10.30.46`
	`  }`
	`}`
	`vyatta@R1# show interfaces dataplane dp0p1p2`
	
	`vif 40 {`
	`  firewall {`
	`  out FWTEST-2`
	`  }`
	`}`

Filtering on source IP address and destination protocol

The following example shows how to define a firewall rule that filters on source IP address and destination protocol. This rule allows TCP packets originating from address 10.10.30.46 (that is, R5), and destined for the Telnet port of R1. The instance is applied to local packets (that is, packets destined for this router, R1) through the dp0p1p2 interface.

To create an instance that filters on source IP address and destination protocol, perform the following steps in configuration mode.

TABLE 3 Filtering on source IP and destination protocol

Step	Command
Create the configuration node for the FWTEST-3 firewall instance and its rule 1. This rule accepts traffic matching the specified criteria.	`vyatta@R1# set security firewall name FWTEST-3 rule 1 action accept`
Define a rule that filters traffic on the 10.10.30.46 source IP address.	`vyatta@R1# set security firewall name FWTEST-3 rule 1 source address 10.10.30.46`
Define a rule that filters TCP traffic.	`vyatta@R1# set security firewall name FWTEST-3 rule 1 protocol tcp`

TABLE 3 Filtering on source IP and destination protocol (continued)

Step	Command
Define a rule that filters traffic destined for the Telnet service.	`vyatta@R1# set security firewall name FWTEST-3 rule 1 destination port telnet`
Apply FWTEST-3 to packets bound for this router arriving on dp0p1p2.	`vyatta@R1# set interfaces dataplane dp0p1p2 firewall in FWTEST-3`
Commit the configuration.	`vyatta@R1# commit`

Show the configuration.	`vyatta@R1# show security firewall name FWTEST-3`
	
	`rule 1 {`
	`  action accept`
	`  destination {`
	`  port telnet`
	`  }`
	`  protocol tcp`
	`  source {`
	`  address 10.10.30.46`
	`  }`
	`}`
	`vyatta@R1# show interfaces dataplane dp0p1p2`
	
	`firewall {`
	`  in FWTEST-3`
	
	`}`

Defining a network-to-network filter

The following example shows how to define a network-to-network packet filter, allowing packets originating from 10.10.40.0/24 and destined for 172.16.0.0/24. It then applies the firewall instance to packets inbound through the 40 virtual interface (vif 40) and the dp0p1p2 interface.

To create a network-to-network filter, perform the following steps in configuration mode.

TABLE 4 Defining a network-to-network filter

Step	Command
Create the configuration node for the FWTEST-4 firewall instance and its rule 1. This rule accepts traffic matching the specified criteria.	`vyatta@R1# set security firewall name FWTEST-4 rule 1 action accept`
Define a rule that filters traffic coming from the 10.10.40.0/24 network.	`vyatta@R1# set security firewall name FWTEST-4 rule 1 source address 10.10.40.0/24`
Define a rule that filters traffic destined for the 172.16.0.0/24 network.	`vyatta@R1# set security firewall name FWTEST-4 rule 1 destination address 172.16.0.0/24`
Apply FWTEST-4 to packets bound for this router arriving through vif 40 on dp0p1p2.	`vyatta@R1# set interfaces dataplane dp0p1p2 vif 40 firewall in FWTEST-4`
Commit the configuration.	`vyatta@R1# commit`
Show the configuration.	`vyatta@R1# show security firewall name FWTEST-4`

TABLE 4 Defining a network-to-network filter (continued)

Step	Command

	rule 1 {
	action accept
	destination {
	address 172.16.0.0/24
	}
	source {
	address 10.10.40.0/24
	}
	}
	vyatta@R1# show interfaces dataplane dp0p1p2
	
	vif 40 {
	firewall {
	in FWTEST-4
	
	}
	}

Filtering on source MAC address

The following example shows how to define a firewall instance that contains one rule, which filters packets only on source medium access control (MAC) address. This rule allows packets coming from a specific computer, identified by its MAC address rather than its IP address. The instance is applied to packets inbound on the dp0p1p1 interface.

To create an instance that filters on source MAC address, perform the following steps in configuration mode.

TABLE 5 Filtering on source MAC address

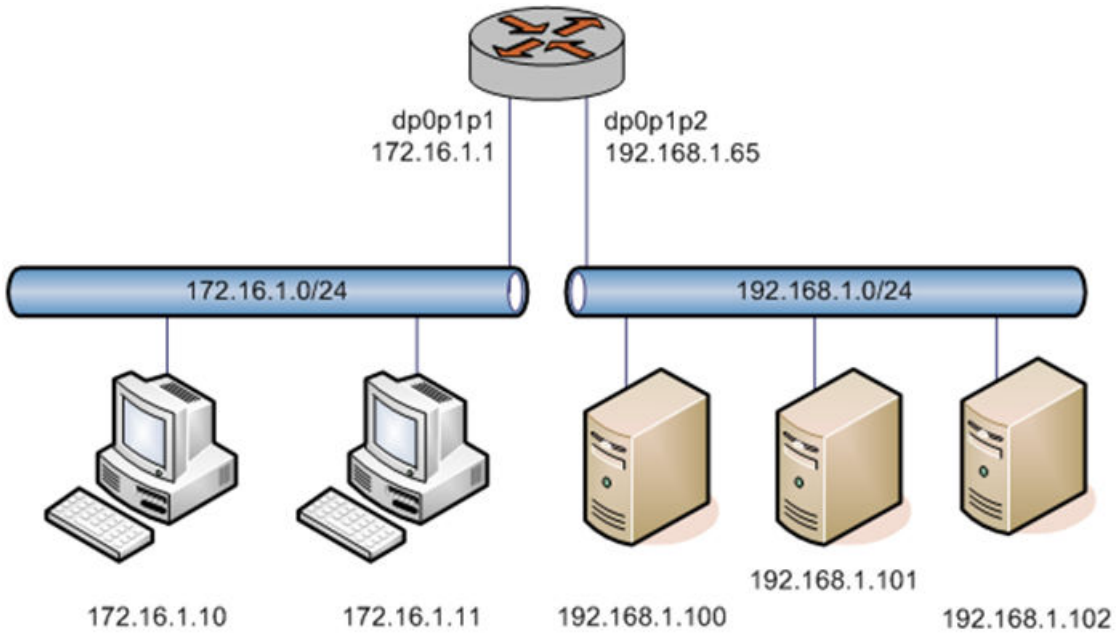
Step	Command
Create the configuration node for the FWTEST-5 firewall instance and its rule 1. This rule accepts traffic matching the specified criteria.	vyatta@R1# set security firewall name FWTEST-5 rule 1 action accept
Define a rule that filters traffic with the 00:13:ce:29:be:e7 source MAC address.	vyatta@R1# set security firewall name FWTEST-5 rule 1 source mac-address 00:13:ce:29:be:e7
Apply FWTEST-5 to inbound packets on dp0p1p1.	vyatta@R1# set interfaces dataplane dp0p1p1 firewall in FWTEST-5
Commit the configuration.	vyatta@R1# commit

Show the configuration.	vyatta@R1# show security firewall name FWTEST-5
	
	rule 1 {
	action accept
	source {
	mac-address 0:13:ce:29:be:e7
	}
	}
	vyatta@R1# show interfaces dataplane dp0p1p1
	
	address 172.16.1.1/24
	firewall {
	in FWTEST-5
	}

Excluding an address

The firewall rule shown in the following example allows all traffic from the 172.16.1.0/24 network except traffic to the 192.168.1.100 server.

FIGURE 4 Excluding an address



To create an instance that excludes an address, perform the following steps in configuration mode.

TABLE 6 Excluding an address

Step	Command
Create the configuration node for the FWTEST-5 firewall instance and its rule 10. Give a description for the rule.	`vyatta@R1# set security firewall name NEGATED-EXAMPLE rule 10 description "Allow all traffic from LAN except to server 192.168.1.100"`
Allow all traffic that matches the rule to be accepted.	`vyatta@R1# set security firewall name NEGATED-EXAMPLE rule 10 action accept`
Allow any traffic from the 172.16.1.0/24 network that matches the rule to be accepted.	`vyatta@R1# set security firewall name NEGATED-EXAMPLE rule 10 source address 172.16.1.0/24`
Allow traffic destined anywhere except the 192.168.1.100 destination address that matches the rule to be accepted.	`vyatta@R1# set security firewall name NEGATED-EXAMPLE rule 10 destination address !192.168.1.100`
Apply the NEGATED-EXAMPLE instance to inbound packets on dp0p1p1.	`vyatta@R1#` `set interfaces dataplane dp0p1p1 firewall in NEGATED-EXAMPLE`
Commit the configuration.	`vyatta@R1# commit`

TABLE 6 Excluding an address (continued)

Step	Command

Show the configuration.	`vyatta@R1# show security firewall`
	
	`name NEGATED-EXAMPLE {`
	`  rule 10 {`
	`  action accept`
	`  description "Allow all traffic from LAN except to server 192.168.1.100"`
	`  destination {`
	`  address !192.168.1.100`
	`  }`
	`  source {`
	`  address 172.16.1.0/24`
	`  }`
	`  }`
	`}`
	
	`vyatta@R1# show interfaces dataplane dp0p1p1`
	
	`address 172.16.1.1/24`
	`firewall {`
	`  in NEGATED-EXAMPLE`
	`}`

Matching TCP flags

The vRouter supports filtering on the TCP flags within TCP packets. For example, to create a rule to accept packets with the SYN flag set and the ACK, FIN, and RST flags unset, perform the following steps in configuration mode.

TABLE 7 Accepting packets with specific TCP flags set

Step	Command
Set the protocol to match to TCP.	`vyatta@R1# set security firewall name TCP-FLAGS rule 30 protocol tcp`
Set the TCP flags to match.	`vyatta@R1# set security firewall name TCP-FLAGS rule 30 tcp flags SYN,!ACK,!FIN,!RST`
Set the action to accept.	`vyatta@R1# set security firewall name TCP-FLAGS rule 30 action accept`
Commit the configuration.	`vyatta@R1# commit`

Show the configuration.	`vyatta@R1# show security firewall name TCP-FLAGS`
	
	`rule 30 {`
	`  action accept`
	`  protocol tcp`
	`  tcp {`
	`  flags SYN,!ACK,!FIN,!RST`
	`  }`
	`}`
	`vyatta@R1#`

Matching ICMP type names

Packets can be filtered for ICMP type names. For example, to create a rule that allows only ICMP echo request packets, perform the following steps in configuration mode.

NOTE
You can configure rules to match IPv4 ICMP, IPv6 ICMP, IPv6 routing header, or TCP without specifying the respective protocol, provided that a protocol specific match option is present. For example, ICMP type and TCP flags.

TABLE 8 Accepting ICMP packets with specific type names

Step	Command
Set the protocol to match to ICMP.	`vyatta@R1# set security firewall name ICMP-NAME rule 40 protocol icmp`
Set the ICMP packet type to match.	`vyatta@R1# set security firewall name ICMP-NAME rule 40 icmp type-name echo-request`
Set the action to accept.	`vyatta@R1# set security firewall name ICMP-NAME rule 40 action accept`
Commit the configuration.	`vyatta@R1# commit`

Show the configuration.	`vyatta@R1# show security firewall name ICMP-NAME`
	
	`rule 40 {`
	`  action accept`
	`  protocol icmp`
	`  icmp {`
	`  type-name echo-request`
	`  }`
	`}`
	`vyatta@R1#`

Matching groups

Groups of addresses, ports, and networks can be defined for similar filtering. For example, to create a rule that rejects traffic to a group of addresses and ports and from a group of networks, perform the following steps in configuration mode.

TABLE 9 Rejecting traffic based on groups of addresses, networks, and ports

Step	Command
Add an address to an address group.	`vyatta@R1# set resources group address-group SERVERS address 1.1.1.7`
Add a network to a address group.	`vyatta@R1# set resources group address-group SERVERS address 10.0.10.0/24`
Add a port to a port group.	`vyatta@R1# set resources group port-group PORTS port 22`
Add a port name to a port group.	`vyatta@R1# set resources group port-group PORTS port http`

TABLE 9 Rejecting traffic based on groups of addresses, networks, and ports (continued)

Step	Command
Commit the configuration.	`vyatta@R1# commit`

Show the configuration.	`vyatta@R1# show resources`
	
	`group {`
	`  address-group SERVERS {`
	`  address 10.0.10.0/24`
	`  address 1.1.1.7`
	`  }`
	`  port-group PORTS {`
	`  port 22`
	`  port http`
	`  }`
	`}`
	`vyatta@R1#`

Specify a reject action within a firewall instance.	`vyatta@R1# set security firewall name REJECT-GROUPS rule 10 action drop`
Specify an address group to match as a destination.	`vyatta@R1# set security firewall name REJECT-GROUPS rule 10 destination address SERVERS`
Specify a port group to match as a destination.	`vyatta@R1# set security firewall name REJECT-GROUPS rule 10 destination port PORTS`
Commit the configuration.	`vyatta@R1# commit`

Show the configuration.	`vyatta@R1# show security firewall name REJECT-GROUPS`
	
	`rule 10{`
	`  action drop`
	`  destination {`
	`  address SERVERS`
	`  port PORTS`
	`  }`
	`  source {`
	`  address SERVERS`
	`  }`
	`}`
	`vyatta@R1#`

Stateful behavior

Stateless firewalls filter packets in isolation, based on static source and destination information. In contrast, stateful firewalls track the state of network connections and traffic flows and allow or restrict traffic based on whether its connection state is known and authorized. For example, when an initiation flow is allowed in one direction, the responder flow is automatically and implicitly allowed in the return direction.

By default, the vRouter firewall is stateless. If you want the firewall to operate statefully, you have two choices:

- You can leave the firewall operating statelessly in general and specify stateful behavior per rule set by configuring state rules within the rule set. This configuration is described in Configuring stateful behavior per rule set on page 30.
- You can enable global stateful behavior by configuring global state policies. This configuration is described in Configuring global state policies on page 30.

Configuring stateful behavior per rule set

Even if you want the firewall to operate statelessly in general, you can still configure state rules within a specific rule set.

The following example shows how to configure a rule in the TEST1 firewall rule set. Rule 1 accepts stateful traffic flows and flows related to existing connections for all protocols.

To configure per-rule set state rules, perform the following steps in configuration mode.

TABLE 10 Creating a per-rule set state rule

Step	Command
Create the configuration node for the TEST1 rule set and give a description for the rule set.	`vyatta@R1# set security firewall name TEST1 description "Filter traffic statefully"`

Create a state rule.	`vyatta@R1# set security firewall name TEST1 rule 1 action accept`
	
	`vyatta@R1# set security firewall name TEST1 rule 1 state enable`

Commit the configuration.	`vyatta@R1# commit`

Show the firewall configuration.	`vyatta@R1# show security firewall name TEST1`
	`description "Filter traffic statefully"`
	`rule 1 {`
	`  action accept`
	`  state enable`
	`}`

Configuring global state policies

You can change behavior to be globally stateful by setting a global state policy with security firewall global-state-policy <protocol> on page 52. When state policies are defined, state rules for return traffic of that type need not be explicitly mentioned within the rule sets.

The global state policy that is configured applies to all IPv4 and IPv6 traffic destined for, originating from, or traversing the router. Note that after the firewall is configured to be globally stateful, this setting overrides any state rules configured within the rule set.

The following example shows how to configure the firewall globally to allow all return traffic.

This behavior is the same as that configured in the TEST1 rule set in Configuring stateful behavior per rule set on page 30, except that it is applied globally instead of being restricted to the one rule set.

To configure this global stateful behavior, perform the following steps in configuration mode.

TABLE 11 Setting a global state policy

Step	Command

Configure global state policy.	`vyatta@R1# set security firewall global-state-policy icmp`
	
	`vyatta@R1# set security firewall global-state-policy tcp`
	
	`vyatta@R1# set security firewall global-state-policy udp`

Commit the configuration.	`vyatta@R1# commit`

TABLE 11 Setting a global state policy (continued)

Step	Command

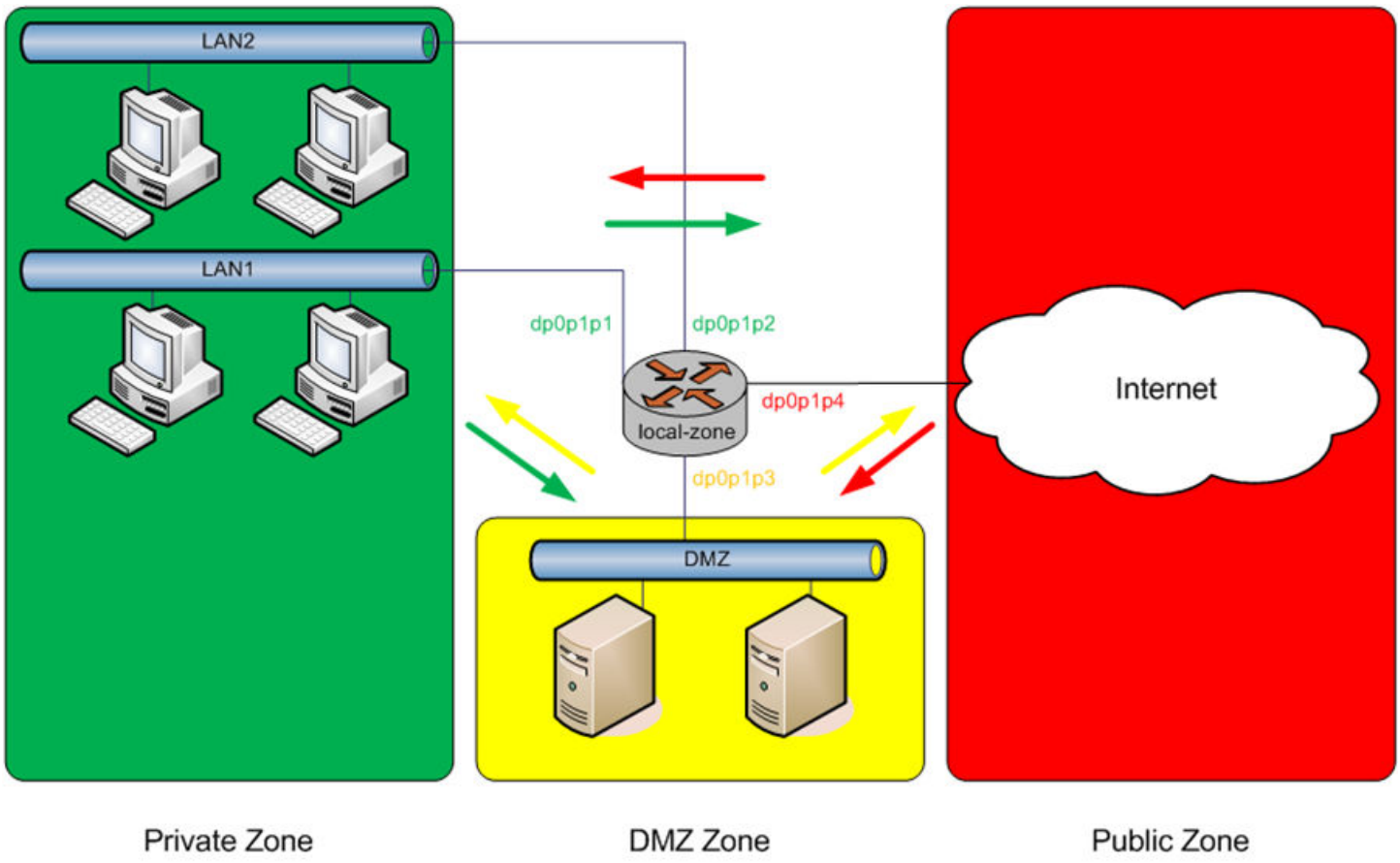
Show the state policy configuration.	`vyatta@R1# show security firewall global-state-policy`
	`security {`
	`  firewall {`
	`  global-state-policy {`
	`  icmp`
	`  tcp`
	`  udp`
	`  }`
	`  }`
	`}`

Zone-based firewall

The vRouter also supports a zone-based model. The following figure shows a zone-based configuration with three user-defined zones.

The examples that follow show the configuration for this diagram.

FIGURE 5 Zone-based firewall configuration



Filtering traffic between zones

The following example shows how to filter traffic between zones by attaching rule sets to zone.

TABLE 12 Creating the zone policies

Step	Command

Create a zone named **private** and attach interfaces to it.	`vyatta@R1# set security zone-policy zone private description PRIVATE`
	
	`vyatta@R1# set security zone-policy zone private interface dp0p1p1`
	
	`vyatta@R1# set security zone-policy zone private interface dp0p1p2`

Create a zone named **dmz** and attach an interface to it.	`vyatta@R1# set security zone-policy zone dmz description DMZ`
	
	`vyatta@R1# set security zone-policy zone dmz interface dp0p1p3`

Create a zone named **public** and attach an interface to it.	`vyatta@R1# set security zone-policy zone public description PUBLIC`
	
	`vyatta@R1# set security zone-policy zone public interface dp0p1p4`

Create rule sets named **to_private** , **to_dmz** , and **to_public** .	`vyatta@R1# set security firewall name to_private rule 1 action accept`
	
	`vyatta@R1# set security firewall name to_dmz rule 1 action accept`
	
	`vyatta@R1# set security firewall name to_public rule 1 action accept`

Attach the rule sets to each zone.	`vyatta@R1# set security zone-policy zone private to dmz firewall to_dmz`
	
	`vyatta@R1# set security zone-policy zone private to public firewall to_public`
	
	`vyatta@R1# set security zone-policy zone dmz to private firewall to_private`
	
	`vyatta@R1# set security zone-policy zone dmz to public firewall to_public`
	
	`vyatta@R1# set security zone-policy zone public to dmz firewall to_dmz`
	
	`vyatta@R1# set security zone-policy zone public to private firewall to_private`

Commit the changes.	`vyatta@R1# commit`

NOTE

Before committing changes to a zone, firewall requires that you should have an interface and a rule set attached to the zone.

The following example shows how to view the configuration.

```
vyatta@R1# show security zone-policy

zone dmz {
     description DMZ
     interface dp0p1p3
     to private {
         firewall to_private
     }
     to public {
         firewall to_public
     }
}
zone private {
     description PRIVATE
     interface dp0p1p1
     interface dp0p1p2
     to dmz {
         firewall to_dmz
     }
     to public {
         firewall to_public
     }
}
zone public {
     description PUBLIC
     interface dp0p1p4
     to dmz{
         firewall to_dmz
     }
     to private {
         firewall to_private
     }
}
```

Filtering traffic between the transit zones

The first step in setting up zone-based traffic filtering is to create zone policies, as shown in the following example. To create the zone policies, perform the following steps in configuration mode.

TABLE 13 Creating the zone policies

Step	Command
Create the configuration node for the DMZ and give a description for the zone.	`vyatta@R1# set security zone-policy zone dmz description “DMZ ZONE”`
Add the interface contained in the DMZ.	`vyatta@R1# set security zone-policy zone dmz interface dp0p1p3`
Create the configuration node for the private zone and give a description for the zone.	`vyatta@R1# set security zone-policy zone private description “PRIVATE ZONE”`
Add one of the interfaces contained in the private zone.	`vyatta@R1# set security zone-policy zone private interface dp0p1p1`
Add the other interface contained in the private zone.	`vyatta@R1# set security zone-policy zone private interface dp0p1p2`
Create the configuration node for the public zone and give a description for the zone.	`vyatta@R1# set security zone-policy zone public description “PUBLIC ZONE”`

TABLE 13 Creating the zone policies (continued)

Step	Command
Add the interface contained in the public zone.	`vyatta@R1# set security zone-policy zone public interface dp0p1p4`
Commit the configuration.	`vyatta@R1# commit`

Show the configuration.	`vyatta@R1# show security zone-policy`
	
	`zone dmz {`
	`  description "DMZ ZONE"`
	`  interface dp0p1p3`
	`}`
	`zone private {`
	`  description "PRIVATE ZONE"`
	`  interface dp0p1p1`
	`  interface dp0p1p2`
	`}`
	`zone public {`
	`  description "PUBLIC ZONE"`
	`  interface dp0p1p4`
	`}`

At this point, while traffic can flow freely within a zone, no traffic flows between zones. All traffic flowing from one zone to another is dropped. For example, because the dp0p1p1 and dp0p1p2 interfaces lie in the same zone (private), traffic between these interfaces flows freely. However, traffic from dp0p1p2 to dp0p1p3 (which lies in the DMZ) is dropped.

The next step, shown in the following example, is to create firewall rule sets to allow traffic between zones. The first rule set allows all traffic to the public zone. To configure this rule set, perform the following steps in configuration mode.

TABLE 14 Creating the rule set for traffic to the public zone

Step	Command
Create the configuration node for the to_public rule set and give a description for the rule set.	`vyatta@R1# set security firewall name to_public description "allow all traffic to PUBLIC zone"`
Create a rule to accept all traffic sent to the public zone.	`vyatta@R1# set security firewall name to_public rule 1 action accept`
Commit the configuration.	`vyatta@R1# commit`

Show the firewall configuration.	`vyatta@R1# show security firewall name to_public`
	
	`description "allow all traffic to PUBLIC zone"`
	`rule 1 {`
	`  action accept`
	`}`

Using firewall with VRRP interfaces

A Virtual Router Redundancy Protocol (VRRP) interface is a logical abstraction that allows the system to implement RFC 3768-compliant MAC address behavior. VRRP can be configured with or without VRRP interfaces. To achieve the expected results when filtering traffic, it is important to understand how traffic flows on systems that use VRRP.

- If no VRRP interface is designed, traffic flows in and out through a physical interface or virtual interface.

- If a VRRP interface is designed, traffic flows in through the VRRP interface and out through the physical interface or virtual interface.

This traffic flow affects how you design and attach firewall rule sets.

Applying a rule set to a VRRP interface

When a host sends a packet to the router, the packet ingresses through the VRRP interface. But when the router sends traffic to the host, traffic egresses through the parent interface or virtual interface.

The firewall rule sets for the VRRP interface and the physical interface are independent. Specifically, packet-filtering rules applied to incoming traffic on the parent interface are not applied to traffic arriving on the VRRP interface. When designing firewall rule sets for incoming traffic, make sure you apply an appropriate rule set for your VRRP interface; otherwise, all incoming traffic is unfiltered.

The example in Filtering on source IP address on page 22 shows how to define a simple firewall rule set, FWTEST-1, which filters on source IP address. The following example shows how to apply the same rule set to inbound traffic on the VRRP interface. In this example, the dp0p1p3 interface is already configured. Specifically:

- It is a member of VRRP group 15.
- It has rule set FWTEST-1 applied for inbound traffic.

To apply the rule set to the VRRP interface, perform the following steps in configuration mode.

TABLE 15 Applying a firewall rule set to a VRRP interface

Step	Command

View the initial configuration for the interfaces.	`vyatta@R1# show interfaces`
	
	`dataplane dp0p160p1 {`
	`  address 10.1.32.73/24`
	`  mtu 1500`
	`}`
	`dataplane dp0p192p1 {`
	`  address 10.10.10.3/24`
	`  address 2014:14::3/64`
	`  mtu 1500`
	`  vrrp {`
	`  vrrp-group 10 {`
	`  virtual-address 10.10.10.50`
	`  }`
	`  }`
	`}`
	`dataplane dp0p224p1 {`
	`  address 192.168.1.1/24`
	`  ip {`
	`  }`
	`  mtu 1500`
	`}`
	`dataplane dp0p256p1 {`
	`  address 20.20.20.3/24`
	`  address 2020:20::3/64`
	`  mtu 1500`
	`}`
	`loopback lo {`
	`  ipv6 {`
	`  }`
	`}`

Attach the same FW-TEST1 rule set for inbound traffic on the VRRP interface.	`vyatta@R1# set interfaces dataplane dp0p192p1 firewall in NEGATED-EXAMPLE`

TABLE 15 Applying a firewall rule set to a VRRP interface (continued)

Step	Command
Commit the configuration.	`vyatta@R1# commit`

Show the configuration.	`vyatta@R1# show interfaces dataplane dp0p192p1`
	
	`address 172.16.1.20/24`
	`firewall {`
	`in FWTEST-1`
	`}`
	`mtu 1500`
	`vrrp {`
	`vrrp-group 15 {`
	`advertise-interval 1`
	`preempt true`
	`sync-group test`
	`virtual-address 172.16.1.25`
	`}`
	`}`

Using VRRP with a zone-based firewall

When a physical interface or virtual interface has a VRRP interface defined, all incoming traffic arrives through the VRRP interface. Zone-based firewalls drop all traffic in and out unless explicitly allowed. Therefore, if you are using VRRP interfaces with a zone-based firewall, you must make sure you include the VRRP interfaces in your zone.

To use VRRP interface in a zone you must attach the physical interface on which VRRP is enabled. The configuration is the same as zone configuration on a physical interface, the only difference is that VRRP is running on this interface.

Enabling control plane policing

This section provides configuration examples on how to enable or disable CPP on Brocade 5600 vRouter data plane and loopback interfaces.

To enable or disable CPP on a data plane interface, perform the following steps in configuration mode.

TABLE 16 Enabling and disabling CPP on a data plane interface

Step	Command
Enable CPP on a data plane interface by applying a firewall instance or rule set with the **local** keyword.	`vyatta@R1# set interfaces dataplane dp0s4 firewall local cpp_group`
Commit the configuration.	`vyatta@R1# commit`

Show the CPP configuration.	`vyatta@R1# show interfaces dataplane dp0s4 firewall local cpp_group`
	
	`interfaces {`
	`dataplane dp0s4 {`
	`firewall {`
	`local cpp_group`
	`}`
	`}`
	`}`

TABLE 16 Enabling and disabling CPP on a data plane interface (continued)

Step	Command
Disable CPP by deleting a data plane interface that is applied with a firewall instance or rule set with **local** keyword.	`vyatta@R1# delete interfaces dataplane dp0s4 firewall local cpp_group`
Commit the configuration.	`vyatta@R1# commit`

To enable or disable CPP on the **lo** loopback interface, perform the following steps in configuration mode.

TABLE 17 Enabling and disabling CPP on the **lo**loopback interface

Step	Command
Enable CPP on the loopback interface**lo**, by applying a firewall instance or rule set with the **local** keyword.	`vyatta@R1# set interfaces loopback lo firewall local cpp_group`
Commit the configuration.	`vyatta@R1# commit`

Show the CPP configuration.	`vyatta@R1# show interfaces loopback lo firewall local cpp_group`
	
	`interfaces  {`
	`  loopback lo {`
	`  firewall {`
	`  cpp_group`
	`  }`
	`  }`
	`}`

Disable CPP by deleting the loopback interface**lo**, that is applied to a firewall instance or rule set with the **local** keyword.	`vyatta@R1# delete interfaces loopback lo firewall local cpp_group`
Commit the configuration.	`vyatta@R1# commit`

Example of rate limiting for CPP

The configuration steps in this example show how to create a rate limit for all traffic that enters the vRouter by first creating the rule set and applying it to the system loopback interface, **lo**.

TABLE 18 Example of rate limiting for CPP

Step	Command
Create the configuration node for the CPP firewall instance and its rule 10 to accept traffic that matches the specified criteria.	`vyatta@R1# set security firewall name CPP rule 10 action accept`
Define the rule set to rate-limit all traffic that enters the vRouter by adding a police action to rate limit all traffic to 500kpps.	`vyatta@R1# set security firewall name CPP rule 10 police ratelimit 500kpps`
Apply CPP to the system loopback interface, **lo**.	`vyatta@R1# set interfaces loopback lo firewall local CPP`
Commit the configuration.	`vyatta@R1# commit`
Save the configuration.	`vyatta@R1# save`

Show the CPP configuration.	`vyatta@R1# show`
	
	`security  {`
	`  firewall {`
	`  name CPP {`
	`  rule 10 {`
	`  action accept`
	`  police {`
	`  ratelimit 500kpps`
	`  }`
	`  }`
	`  }`
	`  }`
	`}`

Viewing firewall information

This section describes how to display firewall configuration information.

Showing firewall instance information

You can see how firewall instances are set up by using security firewall on page 43 in operational mode and specifying the name of the instance. If no instance is specified, then all defined instances are displayed.

The following example shows how to display configuration information for firewall instances.

```
vyatta@R1:~$ show security firewall

---------------------------------------
Rulesets Information: Firewall
---------------------------------------
--------------------------------------------------------------------------------
Firewall "fw_1":
Active on (dp0p192p1, in)
rule    action  proto   packets         bytes
----    ------  -----   -------         -----
1       allow   tcp     0               0
```

```
  condition - stateful proto tcp flags S/FSRA all

8       allow   any     0               0
  condition - stateful to { 20.20.20.0/24 }

--------------------------------------
Rulesets Information: Firewall
--------------------------------------
-------------------------------------------------------------------------------
Firewall "default_state_group":
Active on (dp0p192p1)
rule    action  proto   packets         bytes
----    ------  -----   -------         -----
100     allow   tcp     0               0
  condition - stateful proto tcp all

200     allow   udp     0               0
  condition - stateful proto udp all

300     allow   icmp    0               0
  condition - stateful proto icmp all
```

Showing firewall configuration on interfaces

The following example shows how to apply the FWTEST-1 firewall instance to the dp0p1p1 interface.

```
vyatta@R1# set interfaces dataplane dp0p1p1 firewall in FWTEST-1
```

Showing firewall configuration

You can view firewall information in configuration nodes by using the **show** command in configuration mode. The following example shows how to display firewall configuration in configuration mode with security firewall on page 43.

```
vyatta@R1# show security firewall

    name FWTEST-1 {
        rule 1 {
            action accept
            source {
                address 172.16.0.26
            }
        }
    }
    name FWTEST-2 {
        rule 1 {
            action accept
            destination {
                address 10.10.40.101
            }
            source {
                address 10.10.30.46
            }
        }
    }
    name FWTEST-3 {
        rule 1 {
            action accept
            destination {
                port telnet
            }
            protocol tcp
            source {
                address 10.10.30.46
            }
        }
    }
    name FWTEST-4 {
```

```
        rule 1 {
            action accept
            destination {
                address 172.16.0.0/24
            }
            source {
                address 10.10.40.0/24
            }
        }
    }
    vyatta@R1#
```

Global Firewall Commands

- clear firewall 42
- security firewall 43
- show security firewall <interface> 44

clear firewall

Clears firewall statistics.

Syntax

clear firewall [**bridge**]

Parameters

bridge

Specifies clearing firewall bridge statistics only.

Modes

Operational mode

Usage Guidelines

Use this command to clear firewall statistics.

security firewall

Enables or disables firewall on the vRouter.

Syntax

set security firewall

delete security firewall

show security firewall

Modes

Configuration mode

Configuration Statement

```
security {
    firewall {
    }
}
```

Usage Guidelines

Use this command to define firewall configuration settings and rule sets, using other **firewall** commands. After a firewall rule set has been defined, it must be applied to an interface as a packet filter by using firewall-related **interface** commands. Until a firewall rule set has been applied to an interface, it has no effect on traffic destined for or traversing the system.

Note that after the final user-defined rule in a rule set is issued, an implicit rule of "**reject all"** takes effect.

Use the **set** form of this command to create a firewall configuration.

Use the **delete** form of this command to delete a firewall configuration.

Use the **show** form of this command to display a firewall configuration.

show security firewall <interface>

Displays statistics for a firewall rule set of an interface.

Syntax

show security firewall *interface*

Command Default

When used with no option, the command shows information for all configured firewall rule sets.

Parameters

interface

A type of interface. For more information about the supported interface name formats, refer to Supported Interface Types on page 111.

Modes

Operational mode

Usage Guidelines

Use this command to display statistics about configured firewall rule sets.

Examples

The following example shows how to display statistics for firewall rule sets. The output includes statistics for the configured global state and configured firewall rule sets.

```
vyatta@R1# show security firewall
--------------------------------------
Rulesets Information: Firewall
--------------------------------------
------------------------------------------------------------------------------
Firewall "fw_1":
Active on (dp0p192p1, in)
rule    action  proto   packets         bytes
----    ------  -----   -------         -----
1       allow   tcp     0               0
  condition - stateful proto tcp flags S/FSRA all
8       allow   any     0               0
  condition - stateful to { 20.20.20.0/24 }
--------------------------------------
Rulesets Information: Firewall
--------------------------------------
------------------------------------------------------------------------------
Firewall "default_state_group":
Active on (dp0p192p1)
rule    action  proto   packets         bytes
----    ------  -----   -------         -----
100     allow   tcp     0               0
  condition - stateful proto tcp all
200     allow   udp     0               0
  condition - stateful proto udp all
300     allow   icmp    0               0
  condition - stateful proto icmp all
```

Firewall Commands

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- security firewall name <name> description <description> 59
- security firewall name <name> rule <rule-number> 60
- security firewall name <name> rule <rule-number> action <action> 61
- security firewall name <name> rule <rule-number> description <description> 63
- security firewall name <name> rule <rule-number> destination <destination> 64
- security firewall name <name> rule <rule-number> disable 66
- security firewall name <name> rule <rule-number> dscp <value> 67
- security firewall name <name> rule <rule-number> ethertype <type> 69
- security firewall name <name> rule <rule-number> fragment 71
- security firewall name <name> rule <rule-number> icmp 72
- security firewall name <name> rule <rule-number> icmpv6 74
- security firewall name <name> rule <rule-number> ipv6-route type <number> 76
- security firewall name <name> rule <rule-number> log 77
- security firewall name <name> rule <rule-number> mark <action> 78
- security firewall name <name> rule <rule-number> pcp <number> 80
- security firewall name <name> rule <rule-number> police <limiting-method> 81
- security firewall name <name> rule <rule-number> protocol 83
- security firewall name <name> rule <rule-number> source <source> 84
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- security firewall name <name> rule <rule-number> tcp flags <flags> 87
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- interfaces dataplane <interface> firewall local <ruleset> 91
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security firewall all-ping <state>

Enables or disables responses to all ICMP echo request (ping) messages.

Syntax

set security firewall all-ping { **disable** | **enable** }

delete security firewall all-ping [**disable** | **enable**]

show security firewall all-ping

Command Default

Responses to ICMP echo request messages are enabled.

Parameters

disable

Disables responses to ICMP echo request messages.

enable

Enables responses to ICMP echo request messages.

Modes

Configuration mode

Configuration Statement

```
security {
    firewall {
        all-ping
            disable
            enable
    }
}
```

Usage Guidelines

Use this command to specify whether the system responds to ICMP echo request messages (pings). These messages include all ping messages: unicast, broadcast, or multicast.

Pings are a network tool that help establish the reachability of a device from the local system. Pings are often disallowed because they are a potential means of denial of service (DoS) attacks.

Use the **set** form of this command to enable or disable responses to pings.

Use the **delete** form of this command to restore the default behavior of responding to pings.

Use the **show** form of this command to display the state of responding to pings.

security firewall broadcast-ping <state>

Enables or disables response to broadcast ICMP echo request and time-stamp request messages.

Syntax

set security firewall broadcast-ping { **disable** | **enable** }

delete security firewall broadcast-ping [**disable** | **enable**]

show security firewall broadcast-ping

Command Default

ICMP echo and time-stamp request messages do not receive responses.

Parameters

disable

Disables responses to broadcast ICMP echo and time-stamp request messages.

enable

Enables responses to broadcast ICMP echo and time-stamp request messages.

Modes

Configuration mode

Configuration Statement

```
security {
    firewall {
        broadcast-ping
            disable
            enable
    }
}
```

Usage Guidelines

Use this command to specify whether the system responds to broadcast ICMP echo request and broadcast ICMP time-stamp request messages.

Pings are a network tool that help establish the reachability of a device from the local system. Pings, particularly broadcast pings, are often disallowed because they are a potential means for denial of service (DoS) attacks. Time-stamp requests are used to query another device for the current date and time. Time-stamp requests are also often disallowed both because they are a potential means for a DoS attack and because the query allows an attacker to learn the date set on the queried machine.

Use the **set** form of this command to specify whether the system responds to broadcast ICMP ICMP echo and time-stamp request messages.

Use the **delete** form of this command to restore the default behavior of not responding to broadcast ICMP ICMP echo and time-stamp request messages.

Use the **show** form of this command to display the behavior to broadcast ICMP ICMP echo and time-stamp request messages.

security firewall config-trap <state>

Enables the generation of Simple Network Message Protocol (SNMP) traps regarding firewall configuration changes.

Syntax

set security firewall config-trap { **disable** | **enable** }

delete security firewall config-trap [**disable** | **enable**]

show security firewall config-trap

Command Default

Disabled.

Parameters

disable

Disables the generation of SNMP traps regarding a firewall configuration change.

enable

Enables the generation of SNMP traps regarding a firewall configuration change.

Modes

Configuration mode

Configuration Statement

```
security {
    firewall {
        config-trap
            disable
            enable
    }
}
```

Usage Guidelines

A device uses SNMP traps to notify, without solicitation, the manager of the device about significant events, such as firewall configuration changes.

Use the **set** form of this command to enable the generation of SNMP traps when a firewall configuration change is made.

Use the **delete** form of this command to restore the default behavior.

Use the **show** form of this command to display the state regarding the generation of SNMP traps on firewall configuration changes.

security firewall global-state-policy <protocol>

Configures the global state parameters for firewall.

Syntax

set security firewall global-state-policy { **icmp** | **tcp** | **udp** }

delete security firewall global-state-policy [**icmp** | **tcp** | **udp**]

show security firewall global-state-policy

Command Default

If this statement is not configured, the firewall is stateless. In this case, specific rules governing statefulness can be configured within the rule set.

Parameters

icmp

Enable ICMP state monitoring for firewall.

tcp

Enable TCP state monitoring for firewall.

udp

Enable UDP state monitoring for firewall.

Modes

Configuration mode

Configuration Statement

```
security {
    firewall {
        global-state-policy {
            icmp
            tcp
            udp
        }
    }
}
```

Usage Guidelines

Setting this configuration node makes the firewall globally stateful. You then define policies for established traffic, related traffic, and invalid traffic.

When configured to be stateful, the firewall tracks the state of network connections and traffic flows and allows or restricts traffic based on whether its connection state is known and authorized. For example, when an initiation flow is allowed in one direction, the stateful firewall automatically allows responder flows in the return direction.

The statefulness policy that is configured applies to all IPv4 and IPv6 traffic destined for, originating from, or traversing the router. After the firewall is configured to be globally stateful, this setting overrides any state rules configured within rule sets.

Use the **set** form of this command to configure a global statefulness policy for firewall.

Use the **delete** form of this command to delete a global statefulness policy for firewall.

Use the **show** form of this command to display a global statefulness policy for firewall.

security firewall name <name>

Creates and names a firewall rule.

Syntax

set security firewall name *name*

delete security firewall name [*name*]

show security firewall name

Parameters

name

Multi-node. The name of a firewall rule set. The name must not contain a space or any other of the following special characters: |, ;, &, $, <, or >. The name can be as many as 28 characters long.
You can define more than one firewall rule set by creating more than one **name** configuration node.

Modes

Configuration mode

Configuration Statement

```
security {
    firewall {
        name name
    }
}
```

Usage Guidelines

Use this command to create and name a firewall rule set. A firewall rule set is a named collection of as many as 9,999 packet-filtering rules. Following the configurable rules is an implicit rule, rule 10000, which denies all traffic.

Use the **set** form of this command to create and name a firewall rule set.

Use the **delete** form of this command to delete to a firewall rule set.

Use the **show** form of this command to display a firewall rule set.

security firewall name <name> default-action <action>

Defines the default action for a firewall rule.

Syntax

set security firewall name *name* **default-action** { **accept** | **drop** }

delete security firewall name *name* **default-action** [**accept** | **drop**]

show security firewall name *name* **default-action**

Parameters

name

Multi-node. The name of a firewall rule set. The name must not contain a space or any other of the following special characters: |, ;, &, $, <, or >. The name can be as many as 28 characters long.
You can define more than one firewall rule set by creating more than one **name** configuration node.

accept

Accepts the default action for the specified rule set.

drop

Denies the default action for the specified rule set.

Modes

Configuration mode

Configuration Statement

```
security {
    firewall {
        name name {
            default-action
                accept
                drop
        }
    }
}
```

Usage Guidelines

A firewall rule set is a named collection of as many as 9,999 packet-filtering rules. Following the configurable rules is an implicit rule, rule 10000, which denies all traffic.

NOTE
The “deny all” rule stays in effect until every reference to the rule set is removed; that is, until every packet filter that references the rule set has been removed from all interfaces.

Use the **set** form of this command to define an IP firewall rule.

Use the **delete** form of this command to delete a firewall rule.

Use the **show** form of this command to display a firewall rule.

security firewall name <name> default-log <action>

Defines an IP firewall rule set to log packets that reach the default action.

Syntax

set security firewall name *name* **default-log** { **accept** | **drop** }

delete security firewall name *name* **default-log** [**accept** | **drop**]

show security firewall name *name* **default-log**

Parameters

name

Multi-node. The name of a firewall rule set. The name must not contain a space or any other of the following special characters: |, ;, &, $, <, or >. The name can be as many as 28 characters long.
You can define more than one firewall rule set by creating more than one **name** configuration node.

accept

Accept packet if no pior rules are matched.

drop

Drop packet if no prior rules are matched.

Modes

Configuration mode

Configuration Statement

```
security {
    firewall {
        name name {
            default-log
                action
                drop
        }
    }
}
```

Usage Guidelines

Use this command to define an IP firewall rule set.

A firewall rule set is a named collection of as many as 9999 packet-filtering rules. Following the configurable rules is an implicit rule, rule 10000, which denies all traffic.

NOTE
The “deny all” rule stays in effect until every reference to the rule set is removed; that is, until every packet filter that references the rule set has been removed from all interfaces.

Use the **set** form of this command to define a firewall rule set.

Use the **delete** form of this command to delete a firewall rule set.

Use the **show** form of this command to display a firewall rule set.

security firewall name <name> description <description>

Provides a brief description for an IP firewall group.

Syntax

set security firewall name *name* **description** *description*

delete security firewall name *name*

show security firewall name *name*

Parameters

name
The name of a firewall group.

description
A brief description of the rule. If the description contains spaces, it must be enclosed in double quotation marks.

Modes

Configuration mode

Configuration Statement

```
security {
    firewall {
        name name {
            description description
        }
    }
}
```

Usage Guidelines

Providing a description for an firewall group can help you to quickly determine the purpose of the rule when viewing the configuration.

Use the **set** form of this command to provide brief description of a firewall group.

Use the **delete** form of this command to delete a description.

Use the **show** form of this command to display a description.

security firewall name <name> rule <rule-number>

Defines a rule for a firewall rule set.

Syntax

set security firewall name *name* **rule** *rule-number*

delete security firewall name *name* **rule** *rule-number*

show security firewall name *name* **rule**

Parameters

name

The name of a firewall rule set.

rule-number

The numeric identifier of a rule. The identifier ranges from 1 through 9999.

Modes

Configuration mode

Configuration Statement

```
security {
    firewall {
        name name {
            rule rule-number
        }
    }
}
```

Usage Guidelines

Use this command to define a rule within a firewall rule set.

A firewall rule set consists as many as 9,999 configurable rules. Following the last configured rule, a system rule (rule 10000) with an action of “deny all” is applied.

To avoid having to renumber firewall rules, a good practice is to number rules in increments of 10. This increment allows room for the insertion of new rules within the rule set.

Use the **set** form of this command to define a firewall rule within a firewall rule set.

Use the **delete** form of this command to delete a rule from a firewall rule set.

Use the **show** form of this command to display a rule from a firewall rule set.

security firewall name <name> rule <rule-number> action <action>

Defines the actions for a firewall rule set.

Syntax

set security firewall name *name* **rule** *rule-number* **action** { **accept** | **drop** }

delete security firewall name *name* **rule** *rule-number* **action**

show security firewall name *name* **rule** *rule-number* **action**

Parameters

name

The name of a firewall rule set.

rule-number

The numeric identifier of a rule. The identifier ranges from 1 through 9999.

accept

Accepts the packet. To be performed when a packet satisfies the match criteria specified in the rule. Exactly one action must be specified. The system does not enforce this one-action limit at commit time, but the configuration does not function unless only one action is specified.

drop

Drops the packet silently. To be performed when a packet satisfies the match criteria specified in the rule. Exactly one action must be specified. The system does not enforce this one-action limit at commit time, but the configuration does not function unless only one action is specified.

Modes

Configuration mode

Configuration Statement

```
security {
    firewall {
        name name {
            rule rule-number
                action
            {
                    accept
                    drop
            }
        }
    }
}
```

Usage Guidelines

Use the **set** form of this command to define a firewall rule within a firewall rule set.

Use the **delete** form of this command to delete a rule from a firewall rule set.

Use the **show** form of this command to display a rule from a firewall rule set.

security firewall name <name> rule <rule-number> description <description>

Provides a brief description for an IP firewall rule.

Syntax

set security firewall name *name* **rule** *rule-number* **description** *description*

delete security firewall name *name* **rule** *rule-number* **description**

show security firewall name *name* **rule** *rule-number* **description**

Parameters

name
The name of a firewall rule set.

rule-number
The numeric identifier of a rule. The identifier ranges from 1 through 9999.

description
A brief description of the rule. If the description contains spaces, it must be enclosed in double quotation marks.

Modes

Configuration mode

Configuration Statement

```
security {
    firewall {
        name name {
            rule rule-number {
                description description
            }
        }
    }
}
```

Usage Guidelines

Providing a description for a firewall rule can help you to quickly determine the purpose of the rule when viewing the configuration.

Use the **set** form of this command to provide a brief description of a firewall rule.

Use the **delete** form of this command to delete the description of a firewall rule.

Use the **show** form of this command to display the description of a firewall rule.

security firewall name <name> rule <rule-number> destination <destination>

Defines the destination address, MAC address, or destination port for a firewall rule set.

Syntax

set security firewall name *name* **rule** *rule-number* **destination** { **address** *address* | **mac-address** *address* | **port** *port* }

delete security firewall name *name* **rule** *rule-number* **destination** [**address** | **mac-address** | **port**]

show security firewall name *name* **rule** *rule-number* **destination**

Parameters

name

The name of a firewall rule set.

rule-number

The numeric identifier of a rule. The identifier ranges from 1 through 9999.

address *address*

Specifies a destination address to match. Address formats are as follows:
ip-address: An IPv4 address.
ip-address/prefix: A network address, where 0.0.0.0/0 matches any network.
!*ip-address*: All IP addresses except the one specified.
!*ip-address/prefix*: All network addresses except the one specified.
ipv6-address: An IPv6 address; for example, fe80::20c:29fe:fe47:f89.
ip-address/prefix: A network address, where ::/0 matches any network; for example, fe80::20c:29fe:fe47:f88/64.
!*ipv6-address*: All IP addresses except the one specified.
!*ip-address/prefix*: All network addresses except the one specified.
When both an address and a port are specified, the packet is considered a match only if both the address and the port match.

mac-address *address*

Matches the media access control (MAC) address in the source address. The address format is six 8-bit numbers, separated by colons, in hexadecimal; for example, 00:0a:59:9a:f2:ba.

port *port*

Specifies a destination port to match; this criterion applies only when the protocol is TCP or UDP. Port formats are as follows:
port-name: The name of an IP service; for example, **http**. You can specify any service name in the **/etc/services** file.
port-number: A port number. The number ranges from 1 through 65535.
start-end: A range of ports; for example, 1001-1005.
When both an address and a port are specified, the packet is considered a match only if both the address and the port match.

Modes

Configuration mode

Configuration Statement

```
security {
    firewall {
        name name {
            rule rule-number
                destination {
                    address address
                    mac-address address
                    port port
                }
        }
    }
}
```

Usage Guidelines

Use the **set** form of this command to define a destination address, MAC address, or destination port within a firewall rule set.

Use the **delete** form of this command to delete a destination address, MAC address, or destination port from a firewall rule set.

Use the **show** form of this command to display a destination address, MAC address, or destination port from a firewall rule set.

security firewall name <name> rule <rule-number> disable

Disables the specified IP firewall rule.

Syntax

set security firewall name *name* **rule** *rule-number* **disable**

delete security firewall name *name* **rule** *rule-number* **disable**

show security firewall name *name* **rule** *rule-number*

Command Default

The rule is enabled.

Parameters

name

The name of a firewall rule set.

rule-number

The numeric identifier of a rule. The identifier ranges from 1 through 9999.

Modes

Configuration mode

Configuration Statement

```
security {
    firewall {
        name name {
            rule rule-number {
                disable
            }
        }
    }
}
```

Usage Guidelines

Use this command to disable an IP firewall rule. Disabling a firewall rule is a useful way to test how the firewall performs minus a specific rule without having to delete and then re-enter the rule.

Use the **set** form of this command to disable a firewall rule

Use the **delete** form of this command to delete a firewall rule.

Use the **show** form of this command to display a firewall rule.

security firewall name <name> rule <rule-number> dscp <value>

Specifies the Differentiated Services Code Point (DSCP) value for a firewall rule set.

Syntax

set security firewall name *name* **rule** *rule-number* **dscp** *value*

delete security firewall name *name* **rule** *rule-number* **dscp**

show security firewall name *name* **rule** *rule-number* **dscp**

Parameters

dscp *value*

Specifies the DSCP value to match in the incoming IP header. For the value, enter one of the following:
number: A DSCP number ranges from 0 through 63. DSCP matches packets with headers that include this DSCP value. If this option is not set, the DSCP field retains its original value.
classifier: The traffic classifier for the per-hop behavior defined by the DS field in the IP header.

- **default**: The Default Class (00000) for best-effort traffic.
- **af***number*: The Assured Forwarding Class for assurance of delivery as defined in RFC 2597. Depending on the forwarding class and the drop precedence, the class can be one of the following values: **af11** through **af13**, **af21** through **af23**, **af31** through **af33**, or **af41** through **af43**.
- **cs***number*: Class Selector for network devices that use the Precedence field in the IPv4 header. The number ranges from 1 to 7 and indicates the precedence, for example cs1.
- **ef**: Expedited Forwarding, per-hop behavior.
- **va**: Voice Admit, Capacity-Admitted Traffic.

Modes

Configuration mode

Configuration Statement

```
security {
    firewall {
        name name {
            rule rule-number {
                dscp value
            }
        }
    }
}
```

Usage Guidelines

Use the **set** form of this command to define the DSCP value to match.

Use the **delete** form of this command to delete the DSCP value.

Use the **show** form of this command to display the DSCP value for a firewall rule set.

security firewall name <name> rule <rule-number> ethertype <type>

Specifies the Ethernet type for a firewall rule set.

Syntax

set security firewall name *name* **rule** *rule-number* **ethertype** *type*

delete security firewall name *name* **rule** *rule-number* **ethertype**

show security firewall name *name* **rule** *rule-number* **ethertype**

Command Default

By default, the network firewall allows the transmission of known Ethernet-type packets in the network.

Parameters

ethertype *type*

Specifies matching for the Ethernet type.

type: The Ethernet type; for example, IPv4. You can specify any Ethernet name listed in the **/etc/ethertypes** file. You can also enter the hexadecimal or decimal value for the Ethernet type.

Modes

Configuration mode

Configuration Statement

```
security {
    firewall {
        name name {
            rule rule-number {
                ethertype type
            }
        }
    }
}
```

Usage Guidelines

Use this command to configure the firewall to accept or drop specified types of Ethernet packets.

After you define a firewall rule set with the Ethernet type, you must apply it to an interface as a packet filter by using the firewall-related interface commands. Until you apply a firewall rule set to an interface, the set has no effect on traffic destined for or traversing the system.

Use the **set** form of this command to define the Ethernet type to match.

Use the **delete** form of this command to delete the Ethernet type.

Use the **show** form of this command to display the Ethernet type for a firewall rule set.

security firewall name <name> rule <rule-number> fragment

Defines fragmented packets for a firewall rule set.

Syntax

set security firewall name *name* **rule** *rule-number* **fragment**

delete security firewall name *name* **rule** *rule-number* **fragment**

show security firewall name *name* **rule** *rule-number* [**fragment**]

Parameters

name

The name of a firewall rule set.

rule-number

The numeric identifier of a rule. The identifier ranges from 1 through 9999.

fragment

Specifies matching for fragmented packets.
IPv4 fragments are re-assembled before they reach the firewall, so this option will not match any IPv4 fragments.
IPv6 fragments are re-assembled before they reach the firewall, so this option will not match IPv6 fragments.

Modes

Configuration mode

Configuration Statement

```
security {
    firewall {
        name name {
            rule rule-number
                fragment
        }
    }
}
```

Usage Guidelines

Use the **set** form of this command to define the matching of fragmented packets within a firewall rule set.

Use the **delete** form of this command to delete the matching of fragmented packets from a firewall rule set.

Use the **show** form of this command to display the matching of fragmented packets from a firewall rule set.

security firewall name <name> rule <rule-number> icmp

Specifies an IPv4 ICMP type number, code number, name, or group for a firewall rule set.

Syntax

set security firewall name *name* **rule** *rule-number* **icmp** { **type** *number* [**code** *number*] | **name** *name* | **group** *group*}

delete security firewall name *name* **rule** *rule-number* **icmp** [**type** [*number* **code**] | **name** | **group**]

show security firewall name *name* **rule** *rule-number* **icmp** [**type** [*number* **code**] | **name** | **group**]

Parameters

name
The name of a firewall rule set.

rule-number
The numeric identifier of a rule. The identifier ranges from 1 through 9999.

type *number*
Specifies matching for numeric ICMP types. Types range from 0 through 255; for example, 8 (echo request) or **0** (echo Reply). For a list of ICMP codes and types, refer to ICMP Types on page 105.

code *number*
Specifies matching for numeric ICMP codes. Codes range from 0 through 255. For a list of ICMP codes and types, refer to ICMP Types on page 105.

name *name*
Specifies matching for ICMP type names. For a list of ICMP codes and types, refer to ICMP Types on page 105. The default name is **any**.

group *group*
Specifies an IPv4 ICMP group.

Modes

Configuration mode

Configuration Statement

```
security {
    firewall {
        name name {
            rule rule-number {
                icmp {
                    type number {
                        code number
                    }
                    name name
                    group group
                }
            }
```

```
            }
        }
}
```

Usage Guidelines

Use the **set** form of this command to define an ICMP firewall rule within a firewall rule set.

Use the **delete** form of this command to delete an ICMP firewall rule from a firewall rule set.

Use the **show** form of this command to display an ICMP firewall rule from a firewall rule set.

security firewall name <name> rule <rule-number> icmpv6

Specifies an IPv6 ICMP type number, code number, name, or group for a firewall rule set.

Syntax

set security firewall name *name* **rule** *rule-number* **icmpv6** { **type** *number* [**code** *number*] | **name** *name* | **group** *group* }

delete security firewall name *name* **rule** *rule-number* **icmpv6** [**type** [*number* **code**] | **name** | **group**]

show security firewall name *name* **rule** *rule-number* **icmpv6** [**type** [*number* **code**] | **name** | **group**]

Parameters

name
The name of a firewall rule set.

rule-number
The numeric identifier of a rule. The identifier ranges from 1 through 9999.

type *number*
Specifies matching for numeric ICMPv6 types. Types range from 0 through 255. For a list of ICMPv6 codes and types, refer to ICMPv6 Types on page 107.

code *number*
Specifies matching for numeric ICMPv6 codes. Codes range from 0 through 255. For a list of ICMPv6 codes and types, refer to ICMPv6 Types on page 107.

name *name*
Specifies matching for ICMPv6 type names. For a list of ICMPv6 codes and types, refer to ICMPv6 Types on page 107. The default name is **any**.

group *group*
Specifies an IPv6 ICMP group.

Modes

Configuration mode

Configuration Statement

```
security {
    firewall {
        name name {
            rule rule-number {
                icmpv6 {
                    type number {
                        code number
                    }
                    name name
                    group group
                }
            }
```

```
            }
        }
}
```

Usage Guidelines

Use this command to specify the IPv6 ICMP type within a firewall rule set.

Use the **set** form of this command to define an IPv6 ICMP firewall rule within a firewall rule set.

Use the **delete** form of this command to delete an IPv6 ICMP firewall rule from a firewall rule set.

Use the **show** form of this command to display an IPv6 ICMP firewall rule from a firewall rule set.

security firewall name <name> rule <rule-number> ipv6-route type <number>

Specifies the IPv6 route type number for a firewall rule set.

Syntax

set security firewall name *name* **rule** *rule-number* **ipv6-route type** *number*

delete security firewall name *name* **rule** *rule-number* **ipv6-route type**

show security firewall name *name* **rule** *rule-number* **ipv6-route type**

Parameters

type *number*
Specifies matching for numeric IPv6 route types. Route types range from 0 through 255.

Modes

Configuration mode

Configuration Statement

```
security {
    firewall {
        name name {
            rule rule-number {
                ipv6-route {
                    type number
                }
            }
        }
    }
}
```

Usage Guidelines

NOTE
This command can be used to block Type 0 Routing Headers in IPv6. RFC 5095 deprecates the use of Type 0 Routing Headers in IPv6 because they are a security risk.

Use the **set** form of this command to define the IPv6 route type for a firewall rule set. After you run the **set** form of this command, you must configure the protocol to match:

```
vyatta@vyatta# security firewall name name rule rule-number protocol ipv6-route
```

Use the **delete** form of this command to delete the IPv6 route type for a firewall rule set.

Use the **show** form of this command to display the IPv6 route type for a firewall rule set.

security firewall name <name> rule <rule-number> log

Enables or disables logging of IP firewall rule actions.

Syntax

set security firewall name *name* **rule** *rule-number* **log**

delete security firewall name *name* **rule** *rule-number* **log**

show security firewall name *name* **rule** *rule-number*

Command Default

Actions are not logged.

Parameters

name

The name of a firewall rule set.

rule-number

The numeric identifier of a rule. The identifier ranges from 1 through 9999.

Modes

Configuration mode

Configuration Statement

```
security {
    firewall {
        name name {
            rule rule-number {
                log
            }
        }
    }
}
```

Usage Guidelines

Use the **set** form of this command to enable or disable logging of firewall rule actions.

Use the **delete** form of this command to delete the logging value for a rule.

Use the **show** form of this command to display the logging value for a rule.

security firewall name <name> rule <rule-number> mark <action>

Specifies the DSCP or Priority Code Point (PCP) packet marking action for a firewall rule set.

Syntax

set security firewall name *name* **rule** *rule-number* **mark** { **dscp** *dscp-value* | **pcp** *pcp-number* }

delete security firewall name *name* **rule** *rule-number* **mark** [**dscp** | **pcp**]

show security firewall name *name* **rule** *rule-number* [**mark**]

Parameters

name
The name of a firewall rule set.

rule-number
The numeric identifier of a rule. The identifier ranges from 1 through 9999.

dscp *dscp-value*
Specifies the DSCP value. For the value, enter one of the following:
number: A DSCP number ranges from 0 through 63. DSCP matches packets with headers that include this DSCP value. If this option is not set, the DSCP field retains its original value.
classifier: The traffic classifier for the per-hop behavior defined by the DS field in the IP header.

- **default**: The Default Class (00000) for best-effort traffic.
- **af***number*: the Assured Forwarding Class for assurance of delivery as defined in RFC 2597. Depending on the forwarding class and the drop precedence, the class can be one of the following values: **af11** through **af13**, **af21** through **af23**, **af31** through **af33**, or **af41** through **af43**.
- **cs***number*: Class Selector for network devices that use the Precedence field in the IPv4 header. The number ranges from 1 to 7 and indicates the precedence, for example cs1.
- **ef**: Expedited Forwarding, Per-Hop Behavior.
- **va**: Voice Admit, Capacity-Admitted Traffic.

pcp *pcp-number*
The 802.1 priority-code point number. The number can range from 0 through 7.

Modes

Configuration mode

Configuration Statement

```
security {
    firewall {
        name name {
            rule rule-number {
                mark {
                    dscp dscp-value
```

```
                    pcp pcp-number
                }
            }
        }
    }
}
```

Usage Guidelines

Use the **set** form of this command to define the packet marking action within a firewall rule set.

Use the **delete** form of this command to delete the packet marking action within a firewall rule set.

Use the **show** form of this command to display the packet marking action within a firewall rule set.

security firewall name <name> rule <rule-number> pcp <number>

Specifies the 802.1 Priority Code Point (PCP) to match for a firewall rule set.

Syntax

set security firewall name *name* **rule** *rule-number* **pcp** *pcp-number*

delete security firewall name *name* **rule** *rule-number* **pcp**

show security firewall name *name* **rule** *rule-number* **pcp**

Parameters

name
The name of a firewall rule set.

rule-number
The numeric identifier of a rule. The identifier ranges from 1 through 9999.

pcp *pcp-number*
The 802.1 priority-code point number. The number can range from 0 through 7.

Modes

Configuration mode

Configuration Statement

```
security {
    firewall {
        name name {
            rule rule-number {
                pcp pcp-number
            }
        }
    }
}
```

Usage Guidelines

Use the **set** form of this command to define the PCP within a firewall rule set.

Use the **delete** form of this command to delete the PCP within a firewall rule set.

Use the **show** form of this command to display the PCP within a firewall rule set.

security firewall name <name> rule <rule-number> police <limiting-method>

Specifies the type of packet rate limiting method.

Syntax

set security firewall name *name* **rule** *rule-number* **police** { **bandwidth** *limit* | **burst** *size* | **ratelimit** *limit* | **then** { **action** { **accept** | **drop** } | **mark** { **dscp** *dscp-value* | **pcp** *pcp-number* } } }

delete security firewall name *name* **rule** *rule-number* **police** [{ **bandwidth** *limit* | **burst** *size* | **ratelimit** | **then** { **action** { **accept** | **drop** } | **mark** { **dscp** | **pcp** } } }]

show security firewall name *name* **rule** *rule-number* **police** [{ **bandwidth** | **burst** | **ratelimit** | **then** { **action** | **mark** }]

Command Default

The action is to drop packets when rule is matched.

Parameters

name

The name of a firewall rule set.

rule-number

The numeric identifier of a rule. The identifier ranges from 1 through 9999.

bandwidth *limit*

The bandwidth rate as a number followed by no space and a scaling suffix representing the rate (for example, 10mbit).
The following suffixes are supported:
No suffix: Kilobits per second.
mbit: Megabits per second.
mbps: Megabytes per second.
gbit: Gigabits per second.
kbps: Kilobytes per second.
gbps: Gigabytes per second.

burst *limit*

The burst size limit in number of bytes. The number can range from 1 through 312500000.

ratelimit *limit*

The number of packets that can be sent in a second.
n: Number of packets per second.
*n***kpps**: Thousands of packets per second.
*n***mpps**: Millions packets per second.

dscp *dscp-value*

Specifies the DSCP number. The supported values are **af11** through **af13**, **af21** through **af23**, **af31** through **af33**, **af41** through **af43**, **cs1** through **cs7**, **default**, **ef**, and **va**.
Packets are marked with the given value if policing is exceeded.

pcp *pcp-number*

The 802.1 priority-code point number. The number can range from 0 through 7. Packets are marked with the given value if policing is exceeded.

Modes

Configuration mode

Configuration Statement

```
security {
    firewall {
        name name {
            rule rule-number {
                police {
                    bandwidth limit
                    burst size
                    then {
                        action accept
                        action drop
                        mark {
                            dscp dscp-value
                            pcp pcp-number
                        }
                    }
                }
            }
        }
    }
}
```

Usage Guidelines

If no **then** action is specified, then the default action is to drop the packet if police limits are exceeded.

Use the **set** form of this command to enable or disable policing of firewall rule actions.

Use the **delete** form of this command to delete the policing value for a rule.

Use the **show** form of this command to display the policing value for a rule.

security firewall name <name> rule <rule-number> protocol

Specifies the protocol to match for a firewall rule set.

Syntax

set security firewall name *name* **rule** *rule-number* **protocol** *protocol*

delete security firewall name *name* **rule** *rule-number* **protocol**

show security firewall name *name* **rule** *rule-number* **protocol**

Parameters

protocol *protocol*

Matches packets by protocol. Any protocol literals or numbers listed in the `/etc/protocols` file can be specified.

Modes

Configuration mode

Configuration Statement

```
security {
    firewall {
        name name {
            rule rule-number {
                protocol protocol {
                }
            }
        }
    }
}
```

Usage Guidelines

Use the **set** form of this command to define the protocol type to match for a firewall rule.

Use the **delete** form of this command to delete the protocol type to match for a firewall rule.

Use the **show** form of this command to display the protocol type to match for a firewall rule.

security firewall name <name> rule <rule-number> source <source>

Defines the source address, MAC address, or source port for a firewall rule set.

Syntax

set security firewall name *name* **rule** *rule-number* **source** { **address** *address* | **mac-address** *address* | **port** *port* }

delete security firewall name *name* **rule** *rule-number* **source** [**address** *address* | **mac-address** *address* | **port** *port*]

show security firewall name *name* **rule** *rule-number* **source**

Parameters

name
The name of a firewall rule set.

rule-number
The numeric identifier of a rule. The identifier ranges from 1 through 9999.

address *address*
Specifies a source address to match. Address formats are as follows:
ip-address: An IPv4 address.
ip-address/prefix: A network address, where 0.0.0.0/0 matches any network.
!*ip-address*: All IP addresses except the one specified.
!*ip-address/prefix*: All network addresses except the one specified.
ipv6-address: An IPv6 address; for example, fe80::20c:29fe:fe47:f89.
ipv6-address/prefix: A network address, where ::/0 matches any network; for example, fe80::20c:29fe:fe47:f88/64.
!*ipv6-address*: All IP addresses except the one specified.
!*ipv6-address/prefix*: All network addresses except the one specified.
When both an address and a port are specified, the packet is considered a match only if both the address and the port match.

mac-address *address*
Matches the media access control (MAC) address in the source address. The address format is six 8-bit numbers, separated by colons, in hexadecimal; for example, 00:0a:59:9a:f2:ba.

port *port*
Specifies a source port to match; this criterion applies only when the protocol is TCP or UDP. Port formats are as follows:
port-name: The name of an IP service; for example, http. You can specify any service name in the **/etc/services** file.
port-number: A port number. The number ranges from 1 through 65535.
start-end: A range of ports; for example, 1001-1005.
When both an address and a port are specified, the packet is considered a match only if both the address and the port match.

Modes

Configuration mode

Configuration Statement

```
security {
    firewall {
        name name {
            rule rule-number
                source {
                    address address
                    mac-address address
                    port port
                }
        }
    }
}
```

Usage Guidelines

Use the **set** form of this command to define a source address, MAC address, or source port within a firewall rule set.

Use the **delete** form of this command to delete a source address, MAC address, or source port from a firewall rule set.

Use the **show** form of this command to display a source address, MAC address, or source port from a firewall rule set.

security firewall name <name> rule <rule-number> state <state>

Defines whether to match packets related to existing connections for the firewall rule set.

Syntax

set security firewall name *name* **rule** *rule-number* **state** { **disable** | **enable** }

delete security firewall name *name* **rule** *rule-number* **state**

show security firewall name *name* **rule** *rule-number* **state**

Parameters

name

The name of a firewall rule set.

rule-number

The numeric identifier of a rule. The identifier ranges from 1 through 9999.

state

Matches or fails to match related packets, depending on the value of *state* . Related packets are packets related to existing connections.
Values for *state* are as follows:
enable: Matches related flows.
disable: Does not match related flows.

Modes

Configuration mode

Configuration Statement

```
security {
    firewall {
        name name {
            rule rule-number {
                state state
            }
        }
    }
}
```

Usage Guidelines

Use the **set** form of this command to enable or disable the state for the firewall rule.

Use the **delete** form of this command to delete the state of a firewall rule.

Use the **show** form of this command to display the state of a firewall rule.

security firewall name <name> rule <rule-number> tcp flags <flags>

Defines the TCP flag in a packet for an IP firewall rule.

Syntax

set security firewall name *name* **rule** *rule-number* **tcp flags** *flags*

delete security firewall name *name* **rule** *rule-number* **tcp** [**flags** *flags*]

show security firewall name *name* **rule** *rule-number* **tcp**

Parameters

name

The name of a firewall rule set.

rule-number

The numeric identifier of a rule. The identifier ranges from 1 through 9999.

flags

Matches the specified TCP flags in a packet. The keywords are SYN, ACK, FIN, RST, URG, and PSH.
When specifying more than one flag, flags should be comma-separated. For example, the value of SYN,!ACK,!FIN,!RST matches packets with the SYN flag set, and the ACK, FIN and RST flags unset.

Modes

Configuration mode

Configuration Statement

```
security {
    firewall {
        name name {
            rule rule-number {
                tcp {
                    flags flags
                }
            }
        }
    }
}
```

Usage Guidelines

Use the **set** form of this command to define the TCP flag in a packet of a firewall rule.

Use the **delete** form of this command to delete the TCP flag in a packet of a firewall rule.

Use the **show** form of this command to display the TCP flag in a packet of a firewall rule.

security firewall session-log <protocol>

Specifies the protocol to be used for logging session events.

Syntax

set security firewall session-log { icmp { **closed** | **established** | **new** | **timeout** } | **other** | **tcp** | **udp** }

delete security firewall session-log [icmp | other | tcp | udp]

show security firewall session-log

Command Default

Session logging is disabled.

Parameters

icmp

Enables Internet Control Message Protocol (ICMP) for messaging for the session log.

- **closed**: In a closed state.
- **established**: In an established state.
- **new**: In a new state.
- **timeout**: In a timeout state.

other

To use protocols other than TCP, UDP, or ICMP for session logging.

tcp

To use Transmission Control Protocol (TCP) for session logging.

udp

To use User Datagram Protocol (UDP) for session logging.

Modes

Configuration mode

Configuration Statement

```
security {
    firewall {
        session-log {
            icmp
               {
                closed
                established
                new
                timeout
                }
            other
            tcp
            udp
```

```
                }
            }
        }
```

Usage Guidelines

Use the **set** form of this command to log packets that are in the state matching what was configured. This command configures a global ICMP strict stateful firewall rule policy for traffic associated with established connections, traffic related to established connections, and invalid traffic.

Setting this configuration node makes the firewall globally stateful. You then define policies for established traffic, related traffic, and invalid traffic.

When configured to be stateful, the firewall tracks the state of network connections and traffic flows and allows or restricts traffic based on whether its connection state is known and authorized. For example, when an initiation flow is allowed in one direction, the stateful firewall automatically allows responder flows in the return direction.

The statefulness policy that is configured applies to all IPv4 and IPv6 traffic destined for, originating from, or traversing the router. After the firewall is configured to be globally stateful, this setting overrides any state rules configured within rule sets.

Use the **delete** form of this command to delete the protocol used for logging session events.

Use the **show** form of this command to display the protocol used for logging session events.

security firewall tcp-strict

Configures global TCP strict stateful firewall rule.

Syntax

set security firewall tcp-strict

delete security firewall tcp-strict

show security firewall tcp-strict

Command Default

If this statement is not configured, the firewall is stateless. In this case, specific rules governing statefulness can be configured within the rule set.

Parameters

tcp-strict

Enables the TCP strict stateful firewall rule

Modes

Configuration mode

Configuration Statement

```
security {
    firewall {
        tcp-strict
    }
}
```

Usage Guidelines

Use the **set** form of this command to enable TCP strict tracking of stateful firewall rules for traffic associated with established connections, traffic related to established connections, and invalid traffic. This command enables the user to toggle between loose or strict stateful behaviors for TCP. To do so, stateful tracking must be enabled through either a state rule or global rule.

When firewall is globally stateful, policies for established, related, and invalid traffic must be defined.

Use the **delete** form of this command to disable TCP strict tracking of stateful firewall rules for traffic associated with established connections, traffic related to established connections, and invalid traffic.

Use the **show** form of this command to display the configuration of TCP strict tracking of stateful firewall rules for traffic associated with established connections, traffic related to established connections, and invalid traffic.

interfaces dataplane <interface> firewall local <ruleset>

Enables control plane policing (CPP) on a data plane interface by applying a firewall instance or rule set.

Syntax

set interfaces dataplane *interface* **firewall local** *ruleset*

delete interfaces dataplane *interface* **firewall local** *ruleset*

show interfaces dataplane *interface* **firewall local** *ruleset*

Parameters

interface

The name of a data plane interface.

ruleset

A firewall instance or rule set.

Modes

Configuration mode

Configuration Statement

```
interfaces {
    dataplane interface {
        firewall {
            local ruleset
        }
    }
}
```

Usage Guidelines

Use this command to enable CPP on a data plane interface by applying a firewall instance or rule set.

CPP has no effect on traffic that is traversing the vRouter or destined to the vRouter until the firewall rule set has been applied to the data plane by using this command.

To use CPP, you must first define a firewall rule set as a named firewall instance and then apply the firewall instance to a data plane interface by using this command. After the firewall instance or rule set is applied to the **local** keyword, the firewall is enabled to filter packets that are destined for the system itself.

Use the **set** form of this command to enable CPP on a data plane interface.

Use the **delete** form of this command to disable CPP on a data plane interface.

Use the **show** form of this command to display CPP configuration on a data place interface.

interfaces loopback <interface> firewall local <ruleset>

Applies a firewall instance, or rule set, to a loopback interface.

Syntax

set interfaces loopback *interface* **firewall local** *ruleset*

delete interfaces loopback *interface* **firewall local** *ruleset*

show interfaces loopback *interface* **firewall local**

Parameters

interface
The name of the dataplane interface.

local *ruleset*
Applies the ruleset to forwarded packets on the inbound interface.

Modes

Configuration mode

Configuration Statement

```
interfaces {
    loopback interface {
        firewall {
            local ruleset
        }
    }
}
```

Usage Guidelines

Use this command to apply a firewall instance, or rule set, to an interface.

A firewall has no effect on traffic traversing the system or destined to the system until a firewall rule set has been applied to an interface or a virtual interface by using this command.

To use the firewall feature, you must define a firewall rule set as a named firewall instance by using security firewall name <name> on page 54. You then apply the firewall instance to interfaces, virtual interfaces, or both by using this command. After the instance is applied, it acts as a packet filter.

For each interface, you can apply up to three firewall instances: one firewall **in** instance, one firewall **out** instance, and one firewall **local** instance.

Make sure the firewall instance you apply to an interface is already defined, or you may experience unintended results. If you apply a firewall instance that does not exist to an interface, an implicit firewall rule of **allow all** is applied.

Use the **set** form of this command to apply a firewall instance, or rule set, to an interface.

Use the **delete** form of this command to delete a firewall instance, or rule set, from an interface.

Use the **show** form of this command to display the configuration of a firewall instance, or rule set, for an interface.

Related commands

The following table lists related commands that are documented elsewhere.

Related commands documented elsewhere	
resources group address-group	Defines a group of IP addresses that are referenced in firewall rules. (Refer to *Brocade Vyatta Network OS Basic Routing Configuration Guide*.)
resources group port-group	Defines a group of ports that are referenced in firewall rules. (Refer to *Brocade Vyatta Network OS Basic Routing Configuration Guide*.)

Zone-Based Firewall Commands

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- show zone-policy 97
- security zone-policy zone <zone> 98
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- security zone-policy zone <from-zone> to <to-zone> firewall <name> 103
- security zone-policy zone <zone> interface <interface-name> 104

clear zone-policy

Clears firewall zone statistics.

Syntax

clear zone-policy

Command Default

Statistics are cleared on all firewall zones.

Modes

Operational mode

Usage Guidelines

Use this command to clear statistics for firewall rules that are applied to zones.

show zone-policy

Displays the security zone policy for a security zone or security zone policies for all security zones.

Syntax

show zone-policy [**zone** *zone*]

Command Default

Security zone policies for all security zones are displayed.

Parameters

zone *zone*

The name of a security zone.

Modes

Operational mode

Usage Guidelines

Use this command to display the security zone policy for a security zone or security policies for all security zones.

Examples

The following example shows how to display security zone policies for all security zones on the R1 router.

```
vyatta@R1:~$ show zone-policy
--------------------
Name: LAN1
Interfaces: dp0p256p1
To Zone:
  name                                  firewall
  ----                                  --------
  LAN2                                  fw_1
--------------------
Name: LAN2
Interfaces: dp0p192p1
To Zone:
  name                                  firewall
  ----                                  --------
  LAN1                                  fw_2
```

security zone-policy zone <zone>

Defines a security zone policy.

Syntax

set security zone-policy zone *zone*

delete security zone-policy zone [*zone*]

show security zone-policy

Parameters

zone

Multimode. The name of a security zone. The name can be as many as 18 characters long.
You can define more than one security zone by creating more than one **zone-policy zone** configuration node.

Modes

Configuration mode

Configuration Statement

```
security {
    zone-policy {
        zone zone {
        }
    }
}
```

Usage Guidelines

In the vRouter, a zone is defined as a group of interfaces that have the same security level. After a zone is defined, a filtering policy can be applied to traffic flowing between zones.

By default, traffic to a zone is dropped unless a policy has been defined for the zone sending the traffic. Traffic flowing within a zone is not filtered.

When defining a zone, keep the following in mind:

- An interface can be a member of only one zone.
- An interface that is a member of a zone cannot have a firewall rule set directly applied to it.
- For interfaces not assigned to a zone, traffic is unfiltered by default. These interfaces can have rule sets directly applied to them.

Use the **set** form of this command to define a security zone.

Use the **delete** form of this command to delete a security zone.

Use the **show** form of this command to display the configuration of a security zone. See show zone-policy on page 97.

security zone-policy zone <zone> default-action <action>

Defines the default action for traffic arriving at a security zone.

Syntax

set security zone-policy zone *zone* **default-action** { **accept** | **drop** }

delete security zone-policy zone *zone* **default-action** [**accept** | **drop**]

show security zone-policy zone *zone* **default-action**

Command Default

Traffic is dropped silently.

Parameters

zone

The name of a security zone for which traffic is destined.

accept

Accepts traffic. The action to be taken for traffic arriving at a security zone.

drop

Drops traffic silently. The action to be taken for traffic arriving at a security zone.

Modes

Configuration mode

Configuration Statement

```
security {
    zone-policy {
        zone zone {
            default-action
                accept
                drop
        }
    }
}
```

Usage Guidelines

This action is taken for all traffic arriving from a zone for which a policy has not been defined. That is, for traffic from a given zone to be allowed, a policy must be explicitly defined that allows traffic from that zone.

Use the **set** form of this command to set the default action for traffic arriving at a security zone.

Use the **delete** form of this command to restore the default action, that is, traffic is dropped silently.

Use the **show** form of this command to display the configuration of the default action.

security zone-policy zone <zone> description <description>

Provides a description for a security zone.

Syntax

set security zone-policy zone *zone* **description** *description*

delete security zone-policy zone *zone* **description**

show security zone-policy zone *zone* **description**

Parameters

zone

The name of a security zone for which traffic is destined.

description

A brief description for the security zone. If the description contains spaces, it must be enclosed in double quotation marks.

Modes

Configuration mode

Configuration Statement

```
security {
    zone-policy {
        zone zone {
            description description
        }
    }
}
```

Usage Guidelines

Use the **set** form of this command to provide a description.

Use the **delete** form of this command to delete a description.

Use the **show** form of this command to display the description.

security zone-policy zone <from-zone> to <to-zone>

Specifies the source zone of traffic to which a policy applies.

Syntax

set security zone-policy zone *from-zone* **to** *to-zone*

delete security zone-policy zone *from-zone* **to** *to-zone*

show security zone-policy

Parameters

from-zone

The name of a security zone from which traffic is originating.

to-zone

The name of a security zone for which traffic is destined.

Modes

Configuration mode

Configuration Statement

```
security {
    zone-policy {
        zone from-zone {
            to to-zone
        }
    }
}
```

Usage Guidelines

Use this command to specify a source zone of traffic. The packet-filtering policy for this "from" zone is applied to all traffic arriving from the zone.

Use the **set** form of this command to specify a source zone.

Use the **delete** form of this command to delete a source zone.

Use the **show** form of this command to display the configuration of a source zone.

security zone-policy zone <from-zone> to <to-zone> firewall <name>

Applies packet filtering, as defined in a firewall rule set, to traffic sent to a security zone.

Syntax

set security zone-policy zone *from-zone* **to** *to-zone* **firewall name** *name*

delete security zone-policy zone *from-zone* **to** *to-zone* **firewall name**

show security zone-policy zone *from-zone* **to** *to-zone* **firewall name**

Parameters

from-zone
: The name of a security zone from which traffic is originating.

to-zone
: The name of a security zone for which traffic is destined.

name
: The name of a firewall rule set.

Modes

Configuration mode

Configuration Statement

```
security {
    zone-policy {
        zone from-zone {
            to to-zone {
                firewall name
            }
        }
    }
}
```

Usage Guidelines

You can apply a rule set as a packet filter for a *from-zone*.

Use the **set** form of this command to specify a rule set as a packet filter for a *from-zone*.

Use the **delete** form of this command to delete a rule set from the packet filters defined for a *from-zone*.

Use the **show** form of this command to display which packet filter, if any, has been applied to a *from-zone*.

security zone-policy zone <zone> interface <interface-name>

Adds an interface to a security zone.

Syntax

set security zone-policy zone *zone* **interface** *interface-name*

delete security zone-policy zone *zone* **interface** *interface-name*

show security zone-policy zone *zone* **interface** *interface-name*

Parameters

zone
The name of a security zone for which traffic is destined.

interface-name
Multi-node. The name of an interface; for example, dp0p1p1, wan1, or ppp1.

Modes

Configuration mode

Configuration Statement

```
security {
    zone-policy {
        zone zone {
            interface interface-name
        }
    }
}
```

Usage Guidelines

All interfaces in the zone have the same security level; traffic arriving to those interfaces from other zones is all treated in the same way. Traffic flowing between interfaces in the same security zone is not filtered.

Use the **set** form of this command to add an interface to a zone.

Use the **delete** form of this command to delete an interface from a zone.

Use the **show** form of this command to display which interfaces are members of a zone.

ICMP Types

This appendix lists the Internet Control Messaging Protocol (ICMP) types defined by the Internet Assigned Numbers Authority (IANA).

The IANA has developed a standard that maps a set of integers onto ICMP types. The following table lists the ICMP types and codes defined by the IANA and maps them to the literal strings that are available in the vRouter system.

TABLE 19 ICMP types

ICMP Type	Code	Literal	Description
0 - Echo reply	0	echo-reply	Echo reply (pong)
3 - Destination unreachable		destination- unreachable	Destination is unreachable
	0	network-unreachable	Destination network is unreachable
	1	host-unreachable	Destination host is unreachable
	2	protocol-unreachable	Destination protocol is unreachable
	3	port-unreachable	Destination port is unreachable
	4	fragmentation-needed	Fragmentation is required
	5	source-route-failed	Source route has failed
	6	network-unknown	Destination network is unknown
	7	host-unknown	Destination host is unknown
	9	network-prohibited	Network is administratively prohibited
	10	host-prohibited	Host is administratively is prohibited
	11	ToS-network-unreachable	Network is unreachable for ToS
	12	ToS-host-unreachable	Host is unreachable for ToS
	13	communication-prohibited	Communication is administratively prohibited
	14	host-precedence-violation	Requested precedence is not permitted.
	15	precedence-cutoff	Precedence is lower than the required minimum.
4 - Source quench	0	source-quench	Source is quenched (congestion control)
5 - Redirect message		redirect	Redirected message
	0	network-redirect	Datagram is redirected for the network
	1	host-redirect	Datagram is redirected for the host
	2	ToS-network-redirect	Datagram is redirected for the ToS and network
	3	ToS-host-redirect	Datagram is redirected for the ToS and host
8 - Echo request	0	echo-request	Echo request (ping)
9 - Router advertisement	0	router-advertisement	Router advertisement
10 - Router solicitation	0	router-solicitation	Router solicitation
11 - Time exceeded		time-exceeded	Time to live (TTL) has exceeded
	0	ttl-zero-during-transit	TTL has expired in transit

TABLE 19 ICMP types (continued)

ICMP Type	Code	Literal	Description
	1	ttl-zero-during-reassembly	Fragment reassembly time has exceeded
12 - Parameter problem: Bad IP header		parameter-problem	Bad IP header
	0	ip-header-bad	Pointer that indicates an error
	1	required-option-missing	Missing required option
13 - Timestamp	0	timestamp-request	Request for a timestamp
14 - Timestamp reply	0	timestamp-reply	Reply to a request for a timestamp
15 - Information request	0		Information request
16 - Information reply	0		Information reply
17 - Address mask request	0	address-mask-request	Address mask request
18 - Address mask reply	0	address-mask-reply	Address mask reply

ICMPv6 Types

This appendix lists the ICMPv6 types defined by the Internet Assigned Numbers Authority (IANA).

The Internet Assigned Numbers Authority (IANA) has developed a standard that maps a set of integers onto ICMPv6 types. The following table lists the ICMPv6 types and codes defined by the IANA and maps them to the strings literal strings available in the Brocade vRouter system.

TABLE 20 ICMPv6 types

ICMPv6 Type	Code	Literal	Description
1 - Destination unreachable		destination- unreachable	
	0	no-route	No route to destination
	1	communication-prohibited	Communication with destination administratively prohibited
	2		Beyond scope of source address
	3	address-unreachable	Address unreachable
	4	port-unreachable	Port unreachable
	5		Source address failed ingress/ egress policy
	6		Reject route to destination
2 - Packet too big	0	packet-too-big	
3 - Time exceeded		time-exceeded	
	0	ttl-zero-during-transit	Hop limit exceeded in transit
	1	ttl-zero-during-reassembly	Fragment reassembly time exceeded
4 - Parameter problem		parameter-problem	
	0	bad-header	Erroneous header field encountered
	1	unknown-header-type	Unrecognized Next Header type encountered
	2	unknown-option	Unrecognized IPv6 option encountered
128 - Echo request	0	echo-request (ping)	Echo request
129 - Echo reply	0	echo-reply (pong)	Echo reply
133 - Router solicitation	0	router-solicitation	Router solicitation
134 - Router advertisement	0	router-advertisement	Router advertisement
135 - Neighbor solicitation	0	neighbor-solicitation (neighbour-solicitation)	Neighbor solicitation
136 - Neighbor advertisement	0	neighbor-advertisement (neighbour-advertisement)	Neighbor advertisement

The IANA has developed a standard that maps a set of integers onto ICMP types. ICMPv6 Types lists the ICMP types and codes defined by the IANA and maps them to the literal strings that are available in the Brocade vRouter.

TABLE 21 ICMP types

ICMP Type	Code	Literal	Description
0 - Echo reply	0	echo-reply	Echo reply (pong)

TABLE 21 ICMP types (continued)

ICMP Type	Code	Literal	Description
3 - Destination unreachable		destination- unreachable	Destination is unreachable
	0	network-unreachable	Destination network is unreachable
	1	host-unreachable	Destination host is unreachable
	2	protocol-unreachable	Destination protocol is unreachable
	3	port-unreachable	Destination port is unreachable
	4	fragmentation-needed	Fragmentation is required
	5	source-route-failed	Source route has failed
	6	network-unknown	Destination network is unknown
	7	host-unknown	Destination host is unknown
	9	network-prohibited	Network is administratively prohibited
	10	host-prohibited	Host is administratively is prohibited
	11	ToS-network-unreachable	Network is unreachable for ToS
	12	ToS-host-unreachable	Host is unreachable for ToS
	13	communication-prohibited	Communication is administratively prohibited
	14	host-precedence-violation	Requested precedence is not permitted.
	15	precedence-cutoff	Precedence is lower than the required minimum.
4 - Source quench	0	source-quench	Source is quenched (congestion control)
5 - Redirect message		redirect	Redirected message
	0	network-redirect	Datagram is redirected for the network
	1	host-redirect	Datagram is redirected for the host
	2	ToS-network-redirect	Datagram is redirected for the ToS and network
	3	ToS-host-redirect	Datagram is redirected for the ToS and host
8 - Echo request	0	echo-request	Echo request (ping)
9 - Router advertisement	0	router-advertisement	Router advertisement
10 - Router solicitation	0	router-solicitation	Router solicitation
11 - Time exceeded		time-exceeded	Time to live (TTL) has exceeded
	0	ttl-zero-during-transit	TTL has expired in transit
	1	ttl-zero-during-reassembly	Fragment reassembly time has exceeded
12 - Parameter problem: Bad IP header		parameter-problem	Bad IP header
	0	ip-header-bad	Pointer that indicates an error
	1	required-option-missing	Missing required option
13 - Timestamp	0	timestamp-request	Request for a timestamp
14 - Timestamp reply	0	timestamp-reply	Reply to a request for a timestamp
15 - Information request	0		Information request

TABLE 21 ICMP types (continued)

ICMP Type	Code	Literal	Description
16 - Information reply	0		Information reply
17 - Address mask request	0	address-mask-request	Address mask request
18 - Address mask reply	0	address-mask-reply	Address mask reply
19 - Ping		ping	A ping message
20 - Pong		pong	A pong message

Supported Interface Types

The following table shows the syntax and parameters of supported interface types. Depending on the command, some of these types may not apply.

Interface Type	Syntax	Parameters
Bridge	**bridge** *brx*	*brx*: The name of a bridge group. The name ranges from br0 through br999.
Data plane	**dataplane** *interface-name*	*interface-name*: The name of a data plane interface. Following are the supported formats of the interface name: • **dp***x***p***y***p***z*—The name of a data plane interface, where — **dp***x* specifies the data plane identifier (ID). Currently, only dp0 is supported. — p*y* specifies a physical or virtual PCI slot index (for example, p129). — **p***z* specifies a port index (for example, p1). For example, dp0p1p2, dp0p160p1, and dp0p192p1. • **dp***x***em***y* —The name of a data plane interface on a LAN-on-motherboard (LOM) device that does not have a PCI slot, where **em***y* specifies an embedded network interface number (typically, a small number). For example, dp0em3. • **dp***x***s***y* —The name of a data plane interface on a device that is installed on a virtual PCI slot, where *x***s***y* specifies an embedded network interface number (typically, a small number). For example, dp0s2. • **dp***x***P***n***p***y***p***z* —The name of a data plane interface on a device that is installed on a secondary PCI bus, where **P***n* specifies the bus number. You can use this format to name data plane interfaces on large physical devices with multiple PCI buses. For these devices, it is possible to have network interface cards installed on different buses with these cards having the same slot ID. The value of *n* must be an integer greater than 0. For example, dp0P1p162p1 and dp0P2p162p1.
Data plane vif	**dataplane** *interface-name* **vif** *vif-id* [**vlan** *vlan-id*]	*interface-name*: Refer to the preceding description. *vif-id*: A virtual interface ID. The ID ranges from 1 through 4094. *vlan-id*: The VLAN ID of a virtual interface. The ID ranges from 1 through 4094.
Loopback	**loopback lo** or **loopback lo***n*	*n*: The name of a loopback interface, where *n* ranges from 1 through 99999.
OpenVPN	**openvpn** *vtunx*	*vtunx*: The identifier of an OpenVPN interface. The identifier ranges from vtun0 through vtun*x*, where *x* is a nonnegative integer.
Tunnel	**tunnel** *tunx* or **tunnel** *tunx* **parameters**	*tunx*: The identifier of a tunnel interface you are defining. The identifier ranges from tun0 through tun*x*, where *x* is a nonnegative integer.
Virtual tunnel	**vti** *vtix*	*vtix*: The identifier of a virtual tunnel interface you are defining. The identifier ranges from vti0 through vti*x*, where *x* is a nonnegative integer.

Interface Type	Syntax	Parameters
		Note: This interface does not support IPv6.
VRRP	*parent-interface* **vrrp vrrp-group** *group*	*parent-interface*: The type and identifier of a parent interface; for example, data plane dp0p1p2 or bridge br999. *group*: A VRRP group identifier. The name of a VRRP interface is not specified. The system internally constructs the interface name from the parent interface identifier plus the VRRP group number; for example, dp0p1p2v99. Note that VRRP interfaces support the same feature set as does the parent interface.

List of Acronyms

Acronym	Description
ACL	access control list
ADSL	Asymmetric Digital Subscriber Line
AH	Authentication Header
AMI	Amazon Machine Image
API	Application Programming Interface
AS	autonomous system
ARP	Address Resolution Protocol
AWS	Amazon Web Services
BGP	Border Gateway Protocol
BIOS	Basic Input Output System
BPDU	Bridge Protocol Data Unit
CA	certificate authority
CCMP	AES in counter mode with CBC-MAC
CHAP	Challenge Handshake Authentication Protocol
CLI	command-line interface
DDNS	dynamic DNS
DHCP	Dynamic Host Configuration Protocol
DHCPv6	Dynamic Host Configuration Protocol version 6
DLCI	data-link connection identifier
DMI	desktop management interface
DMVPN	dynamic multipoint VPN
DMZ	demilitarized zone
DN	distinguished name
DNS	Domain Name System
DSCP	Differentiated Services Code Point
DSL	Digital Subscriber Line
eBGP	external BGP
EBS	Amazon Elastic Block Storage
EC2	Amazon Elastic Compute Cloud
EGP	Exterior Gateway Protocol
ECMP	equal-cost multipath
ESP	Encapsulating Security Payload
FIB	Forwarding Information Base
FTP	File Transfer Protocol
GRE	Generic Routing Encapsulation
HDLC	High-Level Data Link Control
I/O	Input/Output
ICMP	Internet Control Message Protocol

Acronym	Description
IDS	Intrusion Detection System
IEEE	Institute of Electrical and Electronics Engineers
IGMP	Internet Group Management Protocol
IGP	Interior Gateway Protocol
IPS	Intrusion Protection System
IKE	Internet Key Exchange
IP	Internet Protocol
IPOA	IP over ATM
IPsec	IP Security
IPv4	IP Version 4
IPv6	IP Version 6
ISAKMP	Internet Security Association and Key Management Protocol
ISM	Internet Standard Multicast
ISP	Internet Service Provider
KVM	Kernel-Based Virtual Machine
L2TP	Layer 2 Tunneling Protocol
LACP	Link Aggregation Control Protocol
LAN	local area network
LDAP	Lightweight Directory Access Protocol
LLDP	Link Layer Discovery Protocol
MAC	medium access control
mGRE	multipoint GRE
MIB	Management Information Base
MLD	Multicast Listener Discovery
MLPPP	multilink PPP
MRRU	maximum received reconstructed unit
MTU	maximum transmission unit
NAT	Network Address Translation
NBMA	Non-Broadcast Multi-Access
ND	Neighbor Discovery
NHRP	Next Hop Resolution Protocol
NIC	network interface card
NTP	Network Time Protocol
OSPF	Open Shortest Path First
OSPFv2	OSPF Version 2
OSPFv3	OSPF Version 3
PAM	Pluggable Authentication Module
PAP	Password Authentication Protocol
PAT	Port Address Translation
PCI	peripheral component interconnect
PIM	Protocol Independent Multicast
PIM-DM	PIM Dense Mode

Acronym	Description
PIM-SM	PIM Sparse Mode
PKI	Public Key Infrastructure
PPP	Point-to-Point Protocol
PPPoA	PPP over ATM
PPPoE	PPP over Ethernet
PPTP	Point-to-Point Tunneling Protocol
PTMU	Path Maximum Transfer Unit
PVC	permanent virtual circuit
QoS	quality of service
RADIUS	Remote Authentication Dial-In User Service
RHEL	Red Hat Enterprise Linux
RIB	Routing Information Base
RIP	Routing Information Protocol
RIPng	RIP next generation
RP	Rendezvous Point
RPF	Reverse Path Forwarding
RSA	Rivest, Shamir, and Adleman
Rx	receive
S3	Amazon Simple Storage Service
SLAAC	Stateless Address Auto-Configuration
SNMP	Simple Network Management Protocol
SMTP	Simple Mail Transfer Protocol
SONET	Synchronous Optical Network
SPT	Shortest Path Tree
SSH	Secure Shell
SSID	Service Set Identifier
SSM	Source-Specific Multicast
STP	Spanning Tree Protocol
TACACS+	Terminal Access Controller Access Control System Plus
TBF	Token Bucket Filter
TCP	Transmission Control Protocol
TKIP	Temporal Key Integrity Protocol
ToS	Type of Service
TSS	TCP Maximum Segment Size
Tx	transmit
UDP	User Datagram Protocol
VHD	virtual hard disk
vif	virtual interface
VLAN	virtual LAN
VPC	Amazon virtual private cloud
VPN	virtual private network
VRRP	Virtual Router Redundancy Protocol

Acronym	Description
WAN	wide area network
WAP	wireless access point
WPA	Wired Protected Access