VYATTA, INC. | Vyatta System

IP Services

Reference Guide

SSH
Telnet
DHCP
DNS
NAT
Web Caching

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Table of Contents

Quick Reference to Commands viii

Quick List of Examples xi

Preface xiii

Intended Audience xiv

Organization of This Guide xiv

Document Conventions xv

Advisory Paragraphs xv

Typographic Conventions xvi

Vyatta Publications xvii

Chapter 1 SSH 1

SSH Configuration 2

SSH Commands 3

service ssh 4

service ssh allow-root <state> 5

service ssh port <port> 6

service ssh protocol-version <version> 7

Chapter 2 Telnet 9

Telnet Configuration 10

Telnet Commands 11

service telnet 12

service telnet allow-root <state> 13

service telnet port <port> 14

telnet <address> 15

Chapter 3 DHCP 17

DHCP Commands 18

clear dhcp client process 20
clear dhcp lease ip <ipv4> 21
clear dhcp leases 22
service dhcp-relay 23
service dhcp-relay interface <interface> 25
service dhcp-relay relay-options 27
service dhcp-relay server <ipv4> 29
service dhcp-server 31
service dhcp-server disabled <state> 32
service dhcp-server shared-network-name <name> 33
service dhcp-server shared-network-name <name> subnet <ipv4net> 34
service dhcp-server shared-network-name <name> subnet <ipv4net> authoritative <state> 36
service dhcp-server shared-network-name <name> subnet <ipv4net> bootfile-name <bootfile> 38
service dhcp-server shared-network-name <name> subnet <ipv4net> client-prefix-length <prefix> 40
service dhcp-server shared-network-name <name> subnet <ipv4net> default-router <ipv4> 42
service dhcp-server shared-network-name <name> subnet <ipv4net> dns-server <ipv4> 44
service dhcp-server shared-network-name <name> subnet <ipv4net> domain-name <domain-name> 46
service dhcp-server shared-network-name <name> subnet <ipv4net> exclude <ipv4> 48
service dhcp-server shared-network-name <name> subnet <ipv4net> failover 50
service dhcp-server shared-network-name <name> subnet <ipv4net> failover local-address <ipv4> 52
service dhcp-server shared-network-name <name> subnet <ipv4net> failover name <peer-name> 54
service dhcp-server shared-network-name <name> subnet <ipv4net> failover peer-address <ipv4> 56
service dhcp-server shared-network-name <name> subnet <ipv4net> failover status <status> 58
service dhcp-server shared-network-name <name> subnet <ipv4net> ip-forwarding enable <state> 60
service dhcp-server shared-network-name <name> subnet <ipv4net> lease <seconds> 62
service dhcp-server shared-network-name <name> subnet <ipv4net> ntp-server <ipv4> 64
service dhcp-server shared-network-name <name> subnet <ipv4net> pop-server <ipv4> 66
service dhcp-server shared-network-name <name> subnet <ipv4net> server-identifier <ipv4> 68
service dhcp-server shared-network-name <name> subnet <ipv4net> smtp-server <ipv4> 70
service dhcp-server shared-network-name <name> subnet <ipv4net> start <ipv4> stop <ipv4> 72
service dhcp-server shared-network-name <name> subnet <ipv4net> static-mapping 74
service dhcp-server shared-network-name <name> subnet <ipv4net> static-route destination-subnet <ipv4net> . . 76
service dhcp-server shared-network-name <name> subnet <ipv4net> static-route router <ipv4> 78
service dhcp-server shared-network-name <name> subnet <ipv4net> tftp-server-name <servername> 80
service dhcp-server shared-network-name <name> subnet <ipv4net> time-offset <seconds> 82
service dhcp-server shared-network-name <name> subnet <ipv4net> time-server <ipv4> 84
service dhcp-server shared-network-name <name> subnet <ipv4net> wins-server <ipv4> 86
service dhcp-server shared-network-name <name> subnet <ipv4net> wpad-url <url> 88
show dhcp client leases 90
show dhcp leases 91
show dhcp statistics 92

Chapter 4 DNS 94

DNS Configuration 95

DNS Overview . . . 95

System DNS . . . 95

Dynamic DNS . . . 95

DNS Forwarding . . . 96

DNS Configuration Examples . . . 96

Configuring Access to a Name Server . . . 97

Configuring Dynamic DNS . . . 97

Configuring DNS Forwarding . . . 100

Statically Configured Entries and DNS Forwarding . . . 103

DNS Commands . . . 105

clear dns forwarding all . . . 107

clear dns forwarding cache . . . 108

service dns dynamic interface <interface> . . . 109

service dns dynamic interface <interface> service <service> . . . 111

service dns dynamic interface <interface> service <service> host-name <hostname> . . . 113

service dns dynamic interface <interface> service <service> login <service-login> . . . 115

service dns dynamic interface <interface> service <service> password <service-password> . . . 117

service dns forwarding cache-size <size> . . . 119

service dns forwarding dhcp <interface> . . . 121

service dns forwarding listen-on <interface> . . . 123

service dns forwarding name-server <ipv4> . . . 125

service dns forwarding system . . . 127

show dns dynamic status . . . 129

show dns forwarding nameservers . . . 131

show dns forwarding statistics . . . 132

update dns dynamic interface <interface> . . . 134

Chapter 5 NAT . . . 135

NAT Configuration . . . 136

NAT Overview . . . 136

Benefits of NAT . . . 137

Types of NAT . . . 138

Interaction Between NAT, Routing, Firewall, and DNS . . . 140

Interaction between NAT and Firewall . . . 143

Concepts for Configuring NAT . . . 146

NAT Rules . . . 147

NAT Type . . . 147

Filters: Protocols, Source, and Destination . . . 147

Address Conversion: “Inside” and “Outside” Addresses . . . 149

“Inbound” and “Outbound” Interfaces 150
NAT Configuration Examples 151
Source NAT (One-to-One) 151
Source NAT (Many-to-One) 153
Source NAT (Many-to-Many) 154
Source NAT (One-to-Many) 156
Masquerade 157
Destination NAT (One-to-One) 159
Destination NAT (One-to-Many) 162
Bi-Directional NAT 164
Masquerade NAT and VPN 165
NAT Commands 171
clear nat counters 172
clear nat translations 173
service nat 174
service nat rule <rule-num> 175
service nat rule <rule-num> destination 177
service nat rule <rule-num> exclude 179
service nat rule <rule-num> inbound-interface <interface> 181
service nat rule <rule-num> inside-address 183
service nat rule <rule-num> outbound-interface <interface> 185
service nat rule <rule-num> outside-address 187
service nat rule <rule-num> protocol <protocol> 189
service nat rule <rule-num> source 191
service nat rule <rule-num> type <type> 193
show nat rules 195
show nat statistics 196
Chapter 6 Web Caching 197
Web Caching Configuration 198
Web Caching Overview 198
Web Caching Configuration Example 198
Configuring Web Caching 199
Web Caching Commands 200
service webproxy cache-size <size> 201
service webproxy default-port <port> 202
service webproxy disable-access-log 203
service webproxy listen-address <ipv4> 204
service webproxy listen-address <ipv4> disable-transparent 206
service webproxy listen-address <ipv4> port <port> 208

Glossary of Acronyms 210

Quick Reference to Commands

Use this section to help you quickly locate a command.

clear dhcp client process 20
clear dhcp lease ip <ipv4> 21
clear dhcp leases 22
clear dns forwarding all 107
clear dns forwarding cache 108
clear nat counters 172
clear nat translations 173
service dhcp-relay 23
service dhcp-relay interface <interface> 25
service dhcp-relay relay-options 27
service dhcp-relay server <ipv4> 29
service dhcp-server 31
service dhcp-server disabled <state> 32
service dhcp-server shared-network-name <name> 33
service dhcp-server shared-network-name <name> subnet <ipv4net> 34
service dhcp-server shared-network-name <name> subnet <ipv4net> authoritative <state> 36
service dhcp-server shared-network-name <name> subnet <ipv4net> bootfile-name <bootfile> 38
service dhcp-server shared-network-name <name> subnet <ipv4net> client-prefix-length <prefix> 40
service dhcp-server shared-network-name <name> subnet <ipv4net> default-router <ipv4> 42
service dhcp-server shared-network-name <name> subnet <ipv4net> dns-server <ipv4> 44
service dhcp-server shared-network-name <name> subnet <ipv4net> domain-name <domain-name> 46
service dhcp-server shared-network-name <name> subnet <ipv4net> exclude <ipv4> 48
service dhcp-server shared-network-name <name> subnet <ipv4net> failover 50
service dhcp-server shared-network-name <name> subnet <ipv4net> failover local-address <ipv4> 52
service dhcp-server shared-network-name <name> subnet <ipv4net> failover name <peer-name> 54
service dhcp-server shared-network-name <name> subnet <ipv4net> failover peer-address <ipv4> 56
service dhcp-server shared-network-name <name> subnet <ipv4net> failover status <status> 58
service dhcp-server shared-network-name <name> subnet <ipv4net> ip-forwarding enable <state> 60
service dhcp-server shared-network-name <name> subnet <ipv4net> lease <seconds> 62
service dhcp-server shared-network-name <name> subnet <ipv4net> ntp-server <ipv4> 64
service dhcp-server shared-network-name <name> subnet <ipv4net> pop-server <ipv4> 66
service dhcp-server shared-network-name <name> subnet <ipv4net> server-identifier <ipv4> 68

service dhcp-server shared-network-name <name> subnet <ipv4net> smtp-server <ipv4> 70
service dhcp-server shared-network-name <name> subnet <ipv4net> start <ipv4> stop <ipv4> 72
service dhcp-server shared-network-name <name> subnet <ipv4net> static-mapping 74
service dhcp-server shared-network-name <name> subnet <ipv4net> static-route destination-subnet <ipv4net> 76
service dhcp-server shared-network-name <name> subnet <ipv4net> static-route router <ipv4> 78
service dhcp-server shared-network-name <name> subnet <ipv4net> tftp-server-name <servername> 80
service dhcp-server shared-network-name <name> subnet <ipv4net> time-offset <seconds> 82
service dhcp-server shared-network-name <name> subnet <ipv4net> time-server <ipv4> 84
service dhcp-server shared-network-name <name> subnet <ipv4net> wins-server <ipv4> 86
service dhcp-server shared-network-name <name> subnet <ipv4net> wpad-url <url> 88
service dns dynamic interface <interface> 109
service dns dynamic interface <interface> service <service> 111
service dns dynamic interface <interface> service <service> host-name <hostname> 113
service dns dynamic interface <interface> service <service> login <service-login> 115
service dns dynamic interface <interface> service <service> password <service-password> 117
service dns forwarding cache-size <size> 119
service dns forwarding dhcp <interface> 121
service dns forwarding listen-on <interface> 123
service dns forwarding name-server <ipv4> 125
service dns forwarding system 127
service nat 174
service nat rule <rule-num> 175
service nat rule <rule-num> destination 177
service nat rule <rule-num> exclude 179
service nat rule <rule-num> inbound-interface <interface> 181
service nat rule <rule-num> inside-address 183
service nat rule <rule-num> outbound-interface <interface> 185
service nat rule <rule-num> outside-address 187
service nat rule <rule-num> protocol <protocol> 189
service nat rule <rule-num> source 191
service nat rule <rule-num> type <type> 193
service ssh 4
service ssh allow-root <state> 5
service ssh port <port> 6
service ssh protocol-version <version> 7
service telnet 12
service telnet allow-root <state> 13
service telnet port <port> 14
service webproxy cache-size <size> 201
service webproxy default-port <port> 202
service webproxy disable-access-log 203
service webproxy listen-address <ipv4> 204
service webproxy listen-address <ipv4> disable-transparent 206
service webproxy listen-address <ipv4> port <port> 208

show dhcp client leases 90
show dhcp leases 91
show dhcp statistics 92
show dns dynamic status 129
show dns forwarding nameservers 131
show dns forwarding statistics 132
show nat rules 195
show nat statistics 196
telnet <address> 15
update dns dynamic interface <interface> 134

Quick List of Examples

Use this list to help you locate examples you’d like to try or look at.

Example 2-2 “telnet 192.168.1.77”: Displaying the Telnet session being established 16

Example 3-1 ”show dhcp leases” 91

Example 3-2 ”show dhcp statistics” 92

Example 4-5 Displaying information for hosts configured for DDNS 129

Example 4-6 Displaying DNS forwarding name server information 131

Example 4-7 Displaying DNS forwarding statistics 132

Example 5-1 Creating a NAT rule 147

Example 5-2 Creating a source NAT (SNAT) rule 147

Example 5-3 Filtering packets by protocol 148

Example 5-4 Filtering packets by source address 148

Example 5-5 Filtering packets by source network address 148

Example 5-6 Filtering packets by destination address 148

Example 5-7 Setting an inside IP address 149

Example 5-8 Setting a range of inside addresses 149

Example 5-9 Setting an outside address 150

Example 5-10 Setting a range of outside addresses 150

Example 5-11 Setting the inbound interface 150

Example 5-12 Setting the outbound interface 150

Example 5-23 Single NAT exclusion rule: correct behavior 167

Example 5-24 Multiple NAT exclusion rules: unexpected behavior 167

Example 5-25 Single NAT exclusion rule: correct behavior - using exclude 168

Example 5-26 Multiple NAT exclusion rules: expected behavior - using exclude 169

Preface

This guide explains how to deploy IP services on the Vyatta system. It describes the available commands and provides configuration examples.

This preface provides information about using this guide. The following topics are covered:

- Intended Audience
- Organization of This Guide
- Document Conventions
- Vyatta Publications

Intended Audience

This guide is intended for experienced system and network administrators. Depending on the functionality to be used, readers should have specific knowledge in the following areas:

- Networking and data communications
- TCP/IP protocols
- General router configuration
- Routing protocols
- Network administration
- Network security

Organization of This Guide

This guide has the following aid to help you find the information you are looking for:

- **Quick Reference to Commands**

  Use this section to help you quickly locate a command.

- **Quick List of Examples**

  Use this list to help you locate examples you'd like to try or look at.

This guide has the following chapters and appendixes:

Chapter	Description	Page
Chapter 1: SSH	This chapter explains how to set up Secure Shell (SSH) access on the Vyatta system.	1
Chapter 2: Telnet	This chapter explains how to set up Telnet access on the Vyatta system.	9
Chapter 3: DHCP	This chapter describes how to implement DHCP on the Vyatta system.	17
Chapter 4: DNS	This chapter explains how to use Domain Name System (DNS) on the Vyatta system.	94
Chapter 5: NAT	This chapter explains how to set up network address translation (NAT) on the Vyatta system.	135
Chapter 6: Web Caching	This chapter explains how to set up web caching on the Vyatta system.	197

Glossary of Acronyms 210

Document Conventions

This guide contains advisory paragraphs and uses typographic conventions.

Advisory Paragraphs

This guide uses the following advisory paragraphs:

Warnings alert you to situations that may pose a threat to personal safety, as in the following example:

WARNING *Risk of injury. Switch off power at the main breaker before attempting to connect the remote cable to the service power at the utility box.*

Cautions alert you to situations that might cause harm to your system or damage to equipment, or that may affect service, as in the following example:

CAUTION *Risk of loss of service. Restarting a running system will interrupt service.*

Notes provide information you might need to avoid problems or configuration errors:

NOTE *You must create and configure network interfaces before enabling them for routing protocols.*

Typographic Conventions

This document uses the following typographic conventions:

`Courier`	Examples, command-line output, and representations of configuration nodes.
`boldface Courier`	In an example, your input: something you type at a command line.
boldface	In-line commands, keywords, and file names .
italics	Arguments and variables, where you supply a value.
<key>	A key on your keyboard. Combinations of keys are joined by plus signs (“+”). An example is <Ctrl>+<Alt>+<Del>.
[*arg1* | *arg2*]	Enumerated options for completing a syntax. An example is [enable | disable].
num1–*numN*	A inclusive range of numbers. An example is 1–65535, which means 1 through 65535.
arg1..*argN*	A range of enumerated values. An example is eth0..eth3, which means eth0, eth1, eth2, and eth3.
arg [*arg* ...] *arg*,[*arg*,...]	A value that can optionally represent a list of elements (a space-separated list in the first case, and a comma-separated list in the second case).

Vyatta Publications

More information about the Vyatta system is available in the Vyatta technical library, and on www.vyatta.com and www.vyatta.org.

Full product documentation is provided in the Vyatta technical library. To see what documentation is available for your release, see the *Vyatta Documentation Map*. This guide is posted with every release of Vyatta software and provides a great starting point for finding what you need.

Chapter 1: SSH

This chapter explains how to set up Secure Shell (SSH) access on the Vyatta system.

This chapter presents the following topics:

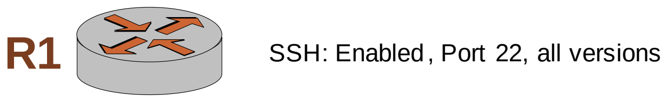
- SSH Configuration
- SSH Commands

SSH Configuration

Configuring SSH is optional, but creating the SSH service will provide secure remote access to the Vyatta system.

Example 1-1 enables SSH on the default port (port 22), as shown in Figure 1-1. By default, only SSH version 2 is enabled, but Example 1-1 enables SSH for all versions of SSH.

Figure 1-1 Enabling SSH access



To enable the SSH service on the Vyatta system, perform the following steps in configuration mode:

Example 1-1 Enabling SSH access

Step	Command

Create the configuration node for the SSH service.	`vyatta@R1#` **`set service ssh protocol-version all`**
	`[edit]`

Commit the information	`vyatta@R1#` **`commit`**
	`OK`
	`[edit]`

Show the configuration.	`vyatta@R1#` **`show service ssh`**
	`   protocol-version: "all"`
	
	`[edit]`

SSH Commands

This chapter contains the following commands.

Configuration Commands	
service ssh	Enables SSH as an access protocol on the Vyatta system.
service ssh allow-root <state>	Specifies whether or not to allow root logins on SSH connections.
service ssh port <port>	Specifies the port the system will use for the SSH service.
service ssh protocol-version <version>	Specifies which versions of SSH are enabled.
Operational Commands	
None	

service ssh

Enables SSH as an access protocol on the Vyatta system.

Syntax

set service ssh

delete service ssh

show service ssh

Command Mode

Configuration mode.

Configuration Statement

```
service {
   ssh {
   }
}
```

Parameters

None.

Default

None.

Usage Guidelines

Use this command to configure the system to allow SSH requests from remote systems to the local system.

Creating the SSH configuration node enables SSH as an access protocol. By default, the router uses port 22 for the SSH service, and SSH version 2 alone is used.

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

Use the **delete** form of this command to remove the SSH configuration. If you delete the SSH configuration node you will disable SSH access to the system.

Use the **show** form of this command to view the SSH configuration.

service ssh allow-root <state>

Specifies whether or not to allow root logins on SSH connections.

Syntax

set service ssh allow-root *state*

delete service ssh allow-root

show service ssh allow-root

Command Mode

Configuration mode.

Configuration Statement

```
service {
    ssh {
        allow-root: [true|false]
    }
}
```

Parameters

state	Specifies whether or not root logins are allowed on connections to SSH. Supported values are as follows: **true**: Root logins are allowed on SSH. **false**: Root logins are not allowed on SSH.

Default

Root logins are not allowed on SSH connections.

Usage Guidelines

Use this command to specify whether or not root logins are allowed on SSH connections.

Use the **set** form of this command to specify whether or not root logins are allowed on SSH connections.

Use the **delete** form of this command to restore the default allow-root configuration.

Use the **show** form of this command to view the allow-root configuration.

service ssh port <port>

Specifies the port the system will use for the SSH service.

Syntax

set service ssh port *port*

delete service ssh port

show service ssh port

Command Mode

Configuration mode.

Configuration Statement

```
service {
   ssh {
      port: 1-65534
   }
}
```

Parameters

port	The port the system will use for the SSH service. The range is 1 to 65534. The default is 22

Default

The SSH service runs on port 22.

Usage Guidelines

Use this command to specify the port the system will use for the SSH service.

Use the **set** form of this command to specify the port the system will use for the SSH service.

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

Use the **show** form of this command to view the port configuration.

service ssh protocol-version <version>

Specifies which versions of SSH are enabled.

Syntax

set service ssh protocol-version *version*

delete service ssh protocol-version

show service ssh protocol-version

Command Mode

Configuration mode.

Configuration Statement

```
service {
   ssh {
      protocol-version: [v1|v2|all]
   }
}
```

Parameters

version	Specifies which versions of SSH are enabled. Supported values are as follows: **v1**: SSH version 1 alone is enabled. **v2**: SSH version 2 alone is enabled. **all**: Both SSH version 1 and SSH version 2 are both enabled.

Default

SSH version 2 alone is enabled.

Usage Guidelines

Use this command to specify which versions of SSH are enabled.

Use the **set** form of this command to specify which versions of SSH are enabled.

Use the **delete** form of this command to restore the default protocol-version configuration.

Use the **show** form of this command to view the protocol-version configuration.

Chapter 2: Telnet

This chapter explains how to set up Telnet access on the Vyatta system.

This chapter presents the following topics:

- Telnet Configuration
- Telnet Commands

Telnet Configuration

Configuring Telnet is optional, but creating the Telnet service will allow you to access the Vyatta system remotely. Example 2-1 enables Telnet on the default port (port 23), as shown in Figure 2-1.

Figure 2-1 Enabling Telnet access

To enable the Telnet service on the Vyatta system, perform the following steps in configuration mode:

Example 2-1 Enabling Telnet access

Step	Command

Create the configuration node for the Telnet service.	`vyatta@R1#` **`set service telnet`**
	`[edit]`

Commit the information.	`vyatta@R1#` **`commit`**
	`OK`
	`[edit]`

Show the configuration.	`vyatta@R1#` **`show service`**
	`   telnet {`
	`   }`
	
	`[edit]`

Telnet Commands

This chapter contains the following commands.

Configuration Commands	
service telnet	Configures Telnet as an access protocol on the system.
service telnet allow-root <state>	Specifies whether or not root logins are allowed on Telnet connections.
service telnet port <port>	Specifies the port the system will use for the Telnet service.
Operational Commands	
telnet <address>	Creates a terminal session to a Telnet server.

service telnet

Configures Telnet as an access protocol on the system.

Syntax

set service telnet

delete service telnet

show service telnet

Command Mode

Configuration mode.

Configuration Statement

```
service {
   telnet {
   }
}
```

Parameters

None.

Default

None.

Usage Guidelines

Use this command to configure the system to accept Telnet as an access service to the system.

Creating the Telnet configuration node enables Telnet as an access protocol. By default, the system uses port 23 for the Telnet service.

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

Use the **delete** form of this command to remove the Telnet configuration. If you delete the Telnet configuration node you will disable Telnet access to the system.

Use the **show** form of this command to view the Telnet configuration.

service telnet allow-root <state>

Specifies whether or not root logins are allowed on Telnet connections.

Syntax

set service telnet allow-root *state*

delete service telnet allow-root

show service telnet allow-root

Command Mode

Configuration mode.

Configuration Statement

```
service {
   telnet {
      allow-root: [true|false]
   }
}
```

Parameters

state	Specifies whether or not root logins are allowed on connections to Telnet. Supported values are as follows: **true**: Root logins are allowed on Telnet. **false**: Root logins are not allowed on Telnet.

Default

Root logins are not allowed on Telnet connections.

Usage Guidelines

Use this command to specify whether or not root logins are allowed on Telnet connections.

Use the **set** form of this command to specify whether or not root logins are allowed on Telnet connections.

Use the **delete** form of this command to restore the default allow-root configuration.

Use the **show** form of this command to view the allow-root configuration.

service telnet port <port>

Specifies the port the system will use for the Telnet service.

Syntax

set service telnet port *port*

delete service telnet port

show service telnet port

Command Mode

Configuration mode.

Configuration Statement

```
service {
   telnet {
      port: 1-65534
   }
}
```

Parameters

port	The port the system will use for the Telnet service. The range is 1 to 65534.

Default

The default is port 23.

Usage Guidelines

Use this command to specify the port the system will use for the Telnet service.

Use the **set** form of this command to specify the port the system will use for the Telnet service.

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

Use the **show** form of this command to view the port configuration.

telnet <address>

Creates a terminal session to a Telnet server.

Syntax

telnet *address* [*service*]

Command Mode

Operational mode.

Parameters

address	Mandatory. The IP address or hostname of the Telnet server to connect to.
service	Optional. The port number or service name you wish to connect to. The range for ports is 65535. Any service name in the file **/etc/services** is permitted. The default is port 23.

Default

If no port is specified, the system connects through port 23 (the well-known port for the Telnet service).

Usage Guidelines

Use this command to create a terminal session to a remote machine running a Telnet service.

Examples

Example 2-2 shows a telnet session being established to 192.168.1.77.

Example 2-2 "telnet 192.168.1.77": Displaying the Telnet session being established

```
vyatta@R1:~$ telnet 192.168.1.77

Entering character mode
Escape character is '^]'.


Welcome to Vyatta
vyatta login:
```

Chapter 3: DHCP

This chapter describes how to implement DHCP on the Vyatta system.

This chapter presents the following topics:

- DHCP Commands

DHCP Commands

This chapter contains the following commands.

Configuration Commands	
DHCP Relay	
service dhcp-relay	Configures the system to relay DHCP client messages to an off-net DHCP server.
service dhcp-relay interface <interface>	Specifies the interface to use for accepting DHCP requests or relaying DHCP client messages.
service dhcp-relay relay-options	Specifies whether to add the Relay Agent Information option (option 82) to the client-to-server packet.
service dhcp-relay server <ipv4>	Sets the IP address of the DHCP server.
DHCP Server	
service dhcp-server	Enables DHCP server functionality.
service dhcp-server disabled <state>	Allows you to disable the DHCP server without discarding configuration.
service dhcp-server shared-network-name <name>	Defines a pool of addresses for DHCP leases.
service dhcp-server shared-network-name <name> subnet <ipv4net>	Specifies the IPv4 network to be served by a DHCP address pool.
service dhcp-server shared-network-name <name> subnet <ipv4net> authoritative <state>	Specifies whether the DHCP server is authoritative.
service dhcp-server shared-network-name <name> subnet <ipv4net> client-prefix-length <prefix>	Specifies the subnet prefix length to be assigned to clients.
service dhcp-server shared-network-name <name> subnet <ipv4net> default-router <ipv4>	Specifies the address of the default router for DHCP clients on this subnet.
service dhcp-server shared-network-name <name> subnet <ipv4net> dns-server <ipv4>	Specifies the address of a DNS server for DHCP clients.
service dhcp-server shared-network-name <name> subnet <ipv4net> domain-name <domain-name>	Provides the domain name for DHCP clients.
service dhcp-server shared-network-name <name> subnet <ipv4net> exclude <ipv4>	Excludes an IP address to from a DHCP address pool.
service dhcp-server shared-network-name <name> subnet <ipv4net> failover	Enables DHCP failover functionality for a DHCP address pool on a subnet.

service dhcp-server shared-network-name <name> subnet <ipv4net> lease <seconds>	Specifies how long the address assigned by the DHCP server will be valid.
service dhcp-server shared-network-name <name> subnet <ipv4net> server-identifier <ipv4>	Specifies the address for the DHCP server identifier.
service dhcp-server shared-network-name <name> subnet <ipv4net> start <ipv4> stop <ipv4>	Specifies the range of addresses that will be assigned to DHCP clients.
service dhcp-server shared-network-name <name> subnet <ipv4net> static-mapping	Specifies a static IP address for a specific DHCP client.
service dhcp-server shared-network-name <name> subnet <ipv4net> wins-server <ipv4>	Specifies the address of a WINS server that is available to DHCP clients.
Operational Commands	
clear dhcp client process	Restarts the DHCP client process.
clear dhcp lease ip <ipv4>	Removes the DHCP lease for the specified IP address.
clear dhcp leases	Removes current DHCP leases.
show dhcp client leases	Displays DHCP client information.
show dhcp leases	Displays current DHCP lease information.
show dhcp statistics	Displays DHCP server statistics.

clear dhcp client process

Restarts the DHCP client process.

Syntax

clear dhcp client process

Command Mode

Operational mode.

Parameters

None.

Default

None.

Usage Guidelines

Use this command to restart the DHCP client process.

DHCP is configured using the **service dhcp-server** command (see page 31).

clear dhcp lease ip <ipv4>

Removes the DHCP lease for the specified IP address.

Syntax

clear dhcp lease ip *ipv4*

Command Mode

Operational mode.

Parameters

ipv4	Clears the DHCP lease for the specified IP address.

Default

None.

Usage Guidelines

Use this command to remove a DHCP lease.

DHCP is configured using the **service dhcp-server** command (see page 31).

clear dhcp leases

Removes current DHCP leases.

Syntax

clear dhcp leases

Command Mode

Operational mode.

Parameters

None.

Default

None.

Usage Guidelines

Use this command to remove all DHCP leases.

DHCP is configured using the **service dhcp-server** command (see page 31).

service dhcp-relay

Configures the system to relay DHCP client messages to an off-net DHCP server.

Syntax

set service dhcp-relay

delete service dhcp-relay

show service dhcp-relay

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dhcp-relay {
   }
}
```

Parameters

None.

Default

None.

Usage Guidelines

Use this command to configure the system as a DHCP relay agent.

A DHCP relay agent receives DHCP packets from DHCP clients and forwards them to a DHCP server. This allows you to place DHCP clients and DHCP servers on different networks; that is, across router interfaces.

The relay agent is configured with addresses of DHCP servers to which they should relay client DHCP message. The relay agent intercepts the broadcast, sets the gateway address (the **giaddr** field of the DHCP packet) and, if configured, inserts the Relay Agent Information option (option 82) in the packet and forwards it to the DHCP server.

The DHCP server echoes the option back verbatim to the relay agent in server-to-client replies, and the relay agent strips the option before forwarding the reply to the client.

Use the **set** form of this command to define DHCP relay configuration.

Use the **delete** form of this command to remove DHCP relay configuration.

Use the **show** form of this command to view DHCP relay configuration.

service dhcp-relay interface <interface>

Specifies the interface to use for accepting DHCP requests or relaying DHCP client messages.

Syntax

set dhcp-relay interface *interface*

delete dhcp-relay interface *interface*

show dhcp-relay interface

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dhcp-relay {
      interface text {
      }
   }
}
```

Parameters

interface	Mandatory. Multi-node. The interface to use to accept DHCP requests or relay DHCP client messages. If the interface through which requests are received is different from the interface used to reach the DHCP server specified in the request, both interfaces must be configured. You can assign multiple interfaces to be used for DHCP by creating multiple **interface** configuration nodes.

Default

None.

Usage Guidelines

Use this command to specify the interface to use to accept DHCP requests or relay DHCP client messages.

Use the **set** form of this command to specify the interface to use to accept DHCP requests or relay DHCP client messages.

Use the **delete** form of this command to remove the specified value.

Use the **show** form of this command to view the specified value.

service dhcp-relay relay-options

Specifies whether to add the Relay Agent Information option (option 82) to the client-to-server packet.

Syntax

set service dhcp-relay relay-options [**hop-count** *count* | **max-size** *size* | **port** *port* | **relay-agents-packets** *policy*]

delete service dhcp-relay relay-options [**hop-count** | **max-size** | **port** | **relay-agents-packets**]

show service dhcp-relay relay-options [**hop-count** | **max-size** | **port** | **relay-agents-packets**]

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dhcp-relay {
      relay-options {
         hop-count: 1-255
         max-size: 64-1400
         port: 1-65535
         relay-agents-packets: [discard|forward]
      }
   }
}
```

Parameters

hop-count *count*	Optional. Sets the time-to-live, in seconds, for outgoing relayed messages. The range is 1 to 255. The default is 10.

max-size *size*	Optional. Sets the maximum size of the DHCP packet to be created after appending the relay agent information option. If, after appending the information, the packet would exceed this size, the packet is forwarded without appending the information. The range is 64 to 1400. The default is 576. If this option not configured, the router does not forward DHCP packets that exceed the MTU of the interface on which relaying is configured.
port *port*	Optional. Specifies the port on this interface to be used for relaying DHCP client messages. The range is 1 to 65535.
relay-agents-packet *policy*	Optional. Sets the reforwarding policy for a DHCP relay agent. This is the action the router will take if the DHCP message already contains relay information. Supported values are as follows: **discard**: If the packet already contains relay information, it will be discarded. **forward**: The packet will be forwarded regardless of whether it contains relay information. The default is **forward**.

Default

Usage Guidelines

Use this command to configure the Relay Agent Information option (option 82) in the client-to-server packet, as specified by RFC 3046, and configure DHCP relay options.

Use the **set** form of this command to set DHCP relay options.

Use the **delete** form of this command to restore default DHCP relay option values.

Use the **show** form of this command to view DHCP relay option configuration.

service dhcp-relay server <ipv4>

Sets the IP address of the DHCP server.

Syntax

set dhcp-relay server *ipv4*

delete dhcp-relay server *ipv4*

show dhcp-relay server

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dhcp-relay {
      server ipv4 {
      }
   }
}
```

Parameters

ipv4	Mandatory. Multi-node. The IP address of the DHCP server. You can relay messages to more than one DHCP server, by creating multiple **server** configuration nodes.

Default

None.

Usage Guidelines

Use this command to specify the IP address of the DHCP server.

Use the **set** form of this command to specify the IP address of the DHCP server in a DHCP relay configuration.

Use the **delete** form of this command to remove DHCP server configuration in a DHCP relay configuration.

Use the **show** form of this command to view DHCP server configuration in a DHCP relay configuration.

service dhcp-server

Enables DHCP server functionality.

Syntax

set service dhcp-server

delete service dhcp-server

show service dhcp-server

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dhcp-server {
   }
}
```

Parameters

None.

Default

None.

Usage Guidelines

Use this command to configure a pool of addresses the system can use for Dynamic Host Configuration Protocol (DHCP).

At least one address pool must be configured for DHCP to be available as a service.

Each subnet specified contains a distinct address pool. A given interface can support more than one address pool (that is, more than one subnet).

Use the **set** form of this command to enable DHCP server functionality.

Use the **delete** form of this command to remove the DHCP server functionality.

Use the **show** form of this command to view DHCP server configuration.

service dhcp-server disabled <state>

Allows you to disable the DHCP server without discarding configuration.

Syntax

set dhcp-server disabled *state*

delete dhcp-server disabled

show dhcp-server disabled

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dhcp-server {
      disabled: [true|false]
   }
}
```

Parameters

state	The administrative state of the DHCP server. Supported values are as follows: **true**: Disables DHCP server without discarding configuration. **false**: Enables the DHCP server.

Default

DHCP server functionality is disabled.

Usage Guidelines

Use this command to disable the DHCP server without discarding configuration.

Use the **set** form of this command to specify whether the DHCP server should be disabled or not.

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

Use the **show** form of this command to view DHCP server configuration.

service dhcp-server shared-network-name <name>

Defines a pool of addresses for DHCP leases.

Syntax

set service dhcp-server shared-network-name *name*

delete service dhcp-server shared-network-name *name*

show service dhcp-server shared-network-name *name*

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dhcp-server {
      shared-network-name text {
      }
   }
}
```

Parameters

name	Mandatory. Multi-node. The name for the DHCP address pool. You can define multiple address pools by creating multiple **shared-network-name** configuration nodes, each with a different name.

Default

None.

Usage Guidelines

Use this command to create a DHCP server address pool with the specified name.

Use the **set** form of this command to create a DHCP address pool.

Use the **delete** form of this command to remove a DHCP address pool.

Use the **show** form of this command to view DHCP address pool configuration.

service dhcp-server shared-network-name <name> subnet <ipv4net>

Specifies the IPv4 network to be served by a DHCP address pool.

Syntax

set service dhcp-server shared-network-name *name* **subnet** *ipv4net*

delete service dhcp-server shared-network-name *name* **subnet** *ipv4net*

show service dhcp-server shared-network-name *name* **subnet** *ipv4net*

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dhcp-server {
      shared-network-name text {
         subnet ipv4net {
         }
      }
   }
}
```

Parameters

name	Mandatory. The DHCP address pool.
ipv4net	Mandatory. Multi-node. The IPv4 network to be served with the addresses defined the specified address pool. The format is *ip-addr*/*prefix*.

Default

None.

Usage Guidelines

Use this command to specify the IPv4 network to be served with the addresses that are defined in this named rule. DHCP requests from devices on this subnet are served static address assignments or an address from the defined range.

Use the **set** form of this command to specify the DHCP address pool subnet.

Use the **delete** form of this command to remove DHCP address pool subnet configuration.

Use the **show** form of this command to view tDHCP address pool subnet configuration.

service dhcp-server shared-network-name <name> subnet <ipv4net> authoritative <state>

Specifies whether the DHCP server is authoritative.

Syntax

set service dhcp-server shared-network-name *name* **subnet** *ipv4net* **authoritative** *state*

delete service dhcp-server shared-network-name *name* **subnet** *ipv4net* **authoritative**

show service dhcp-server shared-network-name *name* **subnet** *ipv4net* **authoritative**

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dhcp-server {
      shared-network-name text {
         subnet ipv4net {
            authoritative: [enable|disable]
         }
      }
   }
}
```

Parameters

name	Mandatory. The DHCP address pool.
ipv4net	Mandatory. Multi-node. The IPv4 network served by the DHCP address pool. The format is *ip-addr*/*prefix*.
authoritative	Optional. Specifies whether the DHCP server is the authoritative server. Supported values are as follows: **enable**: Enables authoritative state. **disable**: Disables authoritative state. The default is **disable**.

Default

The DHCP server is not authoritative.

Usage Guidelines

Use this command to set the server as the authoritative DHCP server.

Setting the server as authoritative sets the server as a master server and allows it to protect itself from rogue DHCP servers or misconfigured DHCP clients. If the server is authoritative, it sends a DHCPNAK to a misconfigured client; otherwise, the client cannot update its IP address until after the old lease expires.

Use the **set** form of this command to enable or disable the authoritative state for a DHCP server.

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

Use the **show** form of this command to view the authoritative DHCP configuration.

service dhcp-server shared-network-name <name> subnet <ipv4net> bootfile-name <bootfile>

Specifies a bootstrap file from which diskless PCs can boot.

Syntax

set service dhcp-server shared-network-name *name* **subnet** *ipv4net* **bootfile-name** *bootfile*

delete service dhcp-server shared-network-name *name* **subnet** *ipv4net* **bootfile-name**

show service dhcp-server shared-network-name *name* **subnet** *ipv4net* **bootfile-name**

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dhcp-server {
      shared-network-name text {
         subnet ipv4net {
            bootfile-name: text
         }
      }
   }
}
```

Parameters

name	Mandatory. The DHCP address pool.
ipv4net	Mandatory. Multi-node. The IPv4 network served by the DHCP address pool. The format is *ip-addr*/*prefix*.
bootfile	The name of the bootstrap file to be used to boot.

Default

None.

Usage Guidelines

Use this command to specify a bootstrap file from which diskless PCs may boot.

Use the **set** form of this command to specify the bootstrap file.

Use the **delete** form of this command to remove boot file configuration.

Use the **show** form of this command to view boot file configuration.

service dhcp-server shared-network-name <name> subnet <ipv4net> client-prefix-length <prefix>

Specifies the subnet prefix length to be assigned to clients.

Syntax

set service dhcp-server shared-network-name *name* **subnet** *ipv4net* **client-prefix-length** *prefix*

delete service dhcp-server shared-network-name *name* **subnet** *ipv4net* **client-prefix-length**

show service dhcp-server shared-network-name *name* **subnet** *ipv4net* **client-prefix-length**

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dhcp-server {
      shared-network-name text {
         subnet ipv4net {
            client-prefix-length: 0-32
         }
      }
   }
}
```

Parameters

name	Mandatory. The DHCP address pool.
ipv4net	Mandatory. Multi-node. The IPv4 network served by the DHCP address pool. The format is *ip-addr*/*prefix*.
prefix	Optional. The subnet prefix length that will be assigned to each client. By default, the prefix length defined in the **subnet** parameter is assigned. The range is 0 to 32.

Default

None.

Usage Guidelines

Use this command to specify the subnet prefix length that will be assigned to each client.

Use the **set** form of this command to specify the subnet prefix length that will be assigned to each client.

Use the **delete** form of this command to remove the client-prefix-length configuration.

Use the **show** form of this command to view the client-prefix-length configuration.

service dhcp-server shared-network-name <name> subnet <ipv4net> default-router <ipv4>

Specifies the address of the default router for DHCP clients on this subnet.

Syntax

set service dhcp-server shared-network-name *name* **subnet** *ipv4net* **default-router** *ipv4*

delete service dhcp-server shared-network-name *name* **subnet** *ipv4net* **default-router**

show service dhcp-server shared-network-name *name* **subnet** *ipv4net* **default-router**

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dhcp-server {
      shared-network-name text {
         subnet ipv4net {
            default-router: ipv4
         }
      }
   }
}
```

Parameters

name	Mandatory. The DHCP address pool.
ipv4net	Mandatory. Multi-node. The IPv4 network served by the DHCP address pool. The format is *ip-addr/prefix*.
ipv4	Optional. Gives the address of the default router for DHCP clients on this subnet. The default router should be on the same subnet as the client. The format is an IP address.

Default

None.

Usage Guidelines

Use this command to specify the address of the default router for DHCP clients on this subnet.

Use the **set** form of this command to specify the address of the default router for DHCP clients on this subnet.

Use the **delete** form of this command to remove the default-router configuration.

Use the **show** form of this command to view the default-router configuration.

service dhcp-server shared-network-name <name> subnet <ipv4net> dns-server <ipv4>

Specifies the address of a DNS server for DHCP clients.

Syntax

set service dhcp-server shared-network-name *name* **subnet** *ipv4net* **dns-server** *ipv4*

delete service dhcp-server shared-network-name *name* **subnet** *ipv4net* **dns-server** *ipv4*

show service dhcp-server shared-network-name *name* **subnet** *ipv4net* **dns-server**

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dhcp-server {
      shared-network-name text {
         subnet ipv4net {
            dns-server: ipv4
         }
      }
   }
}
```

Parameters

name	Mandatory. The DHCP address pool.
ipv4net	Mandatory. Multi-node. The IPv4 network served by the DHCP address pool. The format is *ip-addr/prefix*.
ipv4	Optional. Multi-node. The IPv4 address of the DNS server . You can specify more than one DNS server by issuing this statement multiple times.

Default

None.

Usage Guidelines

Use this command to specify the address of a DNS server that is available to DHCP clients.

Use the **set** form of this command to specify the address of a DNS server that is available to DHCP clients.

Use the **delete** form of this command to remove DNS server configuration.

Use the **show** form of this command to view DNS server configuration.

service dhcp-server shared-network-name <name> subnet <ipv4net> domain-name <domain-name>

Provides the domain name for DHCP clients.

Syntax

set service dhcp-server shared-network-name *name* **subnet** *ipv4net* **domain-name** *domain-name*

delete service dhcp-server shared-network-name *name* **subnet** *ipv4net* **domain-name**

show service dhcp-server shared-network-name *name* **subnet** *ipv4net* **domain-name**

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dhcp-server {
      shared-network-name text {
         subnet ipv4net {
            domain-name: text
         }
      }
   }
}
```

Parameters

name	Mandatory. The DHCP address pool.
ipv4net	Mandatory. Multi-node. The IPv4 network served by the DHCP address pool. The format is *ip-addr/prefix*.
domain-name	Optional. The domain name to be given to DHCP clients on this subnet. A domain name can include letters, numbers, hyphens (“-”), and one period (“.”). For example, “vyatta.com”.

Default

None.

Usage Guidelines

Use this command to specify the domain name to be used by DHCP clients on this subnet.

Use the **set** form of this command to specify the client domain name.

Use the **delete** form of this command to remove client domain name configuration.

Use the **show** form of this command to view client domain name configuration.

service dhcp-server shared-network-name <name> subnet <ipv4net> exclude <ipv4>

Excludes an IP address to from a DHCP address pool.

Syntax

set service dhcp-server shared-network-name *name* **subnet** *ipv4net* **exclude** *ipv4*

delete service dhcp-server shared-network-name *name* **subnet** *ipv4net* **exclude** *ipv4*

show service dhcp-server shared-network-name *name* **subnet** *ipv4net* **exclude**

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dhcp-server {
      shared-network-name text {
         subnet ipv4net {
            exclude: ipv4
         }
      }
   }
}
```

Parameters

name	Mandatory. The DHCP address pool.
ipv4net	Mandatory. Multi-node. The IPv4 network served by the DHCP address pool. The format is *ip-addr/prefix*.
ipv4	Optional. Multi-node. The IP address to be excluded from the lease range. You can exclude more than one IP address by creating multiple **exclude** configuration nodes.

Default

None.

Usage Guidelines

Use this command to exclude IP address from a DHCP address pool. Excluded addresses are never leased to DHCP clients.

Use the **set** form of this command to exclude an IP address from the lease range.

Use the **delete** form of this command to remove an IP address from the exclusion list.

Use the **show** form of this command to view excluded addresses.

service dhcp-server shared-network-name <name> subnet <ipv4net> failover

Enables DHCP failover functionality for a DHCP address pool on a subnet.

Syntax

set service dhcp-server shared-network-name *name* **subnet** *ipv4net* **failover**

delete service dhcp-server shared-network-name *name* **subnet** *ipv4net* **failover**

show service dhcp-server shared-network-name *name* **subnet** *ipv4net* **failover**

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dhcp-server {
      shared-network-name text {
         subnet ipv4net {
            failover {
               local-address: ipv4
            }
         }
      }
   }
}
```

Parameters

name	Mandatory. The DHCP address pool.
ipv4net	Mandatory. Multi-node. The IPv4 network served by the DHCP address pool. The format is *ip-addr*/*prefix*.

Default

None.

Usage Guidelines

Use this command to enable DHCP failover for an address pool on a given network.

In a failover configuration, two DHCP servers act as failover peers, with one of the peers designated as the primary and the other as the secondary. For DHCP failover to work:

- Both peers must be Vyatta systems, and must be running the same version of Vyatta software.
- Each server must be configured to point to the other as the failover peer.
- The time on the servers must be exactly synchronized.

The system times should be synchronized before configuring DHCP failover. Use of NTP time synchronization is highly recommended. However, if difficulties arise due to incorrect system times, disable NTP, reset the times correctly, and then re-enable NTP.

Note that DHCP leases are only assigned in failover configurations if proper communication is established between the two failover peers. If the configuration is incorrect (if, for example, one failover peer is configured but the other is not), DHCP leases will not be dispersed.

Use the **set** form of this command to define DHCP failover configuration

Use the **delete** form of this command to remove DHCP failover configuration.

Use the **show** form of this command to view DCHP failover configuration.

service dhcp-server shared-network-name <name> subnet <ipv4net> failover local-address <ipv4>

Specifies the DHCP failover IP address for the local failover peer.

Syntax

set service dhcp-server shared-network-name *name* **subnet** *ipv4net* **failover local-address** *ipv4*

delete service dhcp-server shared-network-name *name* **subnet** *ipv4net* **failover local-address**

show service dhcp-server shared-network-name *name* **subnet** *ipv4net* **failover local-address**

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dhcp-server {
      shared-network-name text {
         subnet ipv4net {
            failover {
               local-address: ipv4
               name: text
               peer-address: ipv4
               status: [primary|secondary]
            }
         }
      }
   }
}
```

Parameters

name	Mandatory. The DHCP address pool.
ipv4net	Mandatory. Multi-node. The IPv4 network served by the DHCP address pool. The format is *ip-addr*/*prefix*.
ipv4	The IP address for the local failover peer.

Default

None.

Usage Guidelines

Use this command to specify the DHCP failover IP address for the local failover peer.

Use the **set** form of this command to set the DHCP failover IP address.

Use the **delete** form of this command to remove local failover IP address configuration.

Use the **show** form of this command to view local failover IP address configuration.

service dhcp-server shared-network-name <name> subnet <ipv4net> failover name <peer-name>

Specifies the DHCP failover peer name for the local peer.

Syntax

set service dhcp-server shared-network-name *name* **subnet** *ipv4net* **failover name** *peer-name*

delete service dhcp-server shared-network-name *name* **subnet** *ipv4net* **failover name**

show service dhcp-server shared-network-name *name* **subnet** *ipv4net* **failover name**

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dhcp-server {
      shared-network-name text {
         subnet ipv4net {
            failover {
               name: text
            }
         }
      }
   }
}
```

Parameters

name	Mandatory. The DHCP address pool.
ipv4net	Mandatory. Multi-node. The IPv4 network served by the DHCP address pool. The format is *ip-addr/prefix*.
peer-name	The DHCP failover peer name for the local peer.

Default

None.

Usage Guidelines

Use this command to specify a name for the local peer in a DHCP failover pair.

Use the **set** form of this command to specify the DHCP failover peer name.

Use the **delete** form of this command to remove the local peer name configuration.

Use the **show** form of this command to view local peer name configuration.

service dhcp-server shared-network-name <name> subnet <ipv4net> failover peer-address <ipv4>

Specifies the DHCP failover IP address for the local peer.

Syntax

set service dhcp-server shared-network-name *name* **subnet** *ipv4net* **failover peer-address** *ipv4*

delete service dhcp-server shared-network-name *name* **subnet** *ipv4net* **failover peer-address**

show service dhcp-server shared-network-name *name* **subnet** *ipv4net* **failover peer-address**

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dhcp-server {
      shared-network-name text {
         subnet ipv4net {
            failover {
               peer-address: ipv4
            }
         }
      }
   }
}
```

Parameters

name	Mandatory. The DHCP address pool.
ipv4net	Mandatory. Multi-node. The IPv4 network served by the DHCP address pool. The format is *ip-addr*/*prefix*.
ipv4	Specifies the IP address for the failover peer.

Default

None.

Usage Guidelines

Use this command to specify the DHCP failover IP address for the local peer.

Use the **set** form of this command to specify the DHCP failover IP address for the local peer.

Use the **delete** form of this command to remove the IP address configuration.

Use the **show** form of this command to view the IP address configuration.

service dhcp-server shared-network-name <name> subnet <ipv4net> failover status <status>

Specifies the DHCP failover status for this peer.

Syntax

set service dhcp-server shared-network-name *name* **subnet** *ipv4net* **failover status** *status*

delete service dhcp-server shared-network-name *name* **subnet** *ipv4net* **failover status**

show service dhcp-server shared-network-name *name* **subnet** *ipv4net* **failover status**

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dhcp-server {
      shared-network-name text {
         subnet ipv4net {
            failover {
               status: [primary|secondary]
            }
         }
      }
   }
}
```

Parameters

name	Mandatory. The DHCP address pool.
ipv4net	Mandatory. Multi-node. The IPv4 network served by the DHCP address pool. The format is *ip-addr*/*prefix*.
status	Indicates whether this peer is the primary or secondary peer in the failover configuration. Supported values are as follows: **primary**: The local system is primary peer. **secondary**: The local system is the secondary peer.

Default

None.

Usage Guidelines

Use this command to specify the DHCP failover status of this system.

Use the **set** form of this command to specify whether this system is primary or secondary.

Use the **delete** form of this command to remove failover status configuration.

Use the **show** form of this command to view failover status configuration.

service dhcp-server shared-network-name <name> subnet <ipv4net> ip-forwarding enable <state>

Specifies whether the client should configure its IP layer for packet forwarding.

Syntax

set service dhcp-server shared-network-name *name* **subnet** *ipv4net* **ip-forwarding enable** *state*

delete service dhcp-server shared-network-name *name* **subnet** *ipv4net* **ip-forwarding enable**

show service dhcp-server shared-network-name *name* **subnet** *ipv4net* **ip-forwarding enable**

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dhcp-server {
      shared-network-name text {
         subnet ipv4net {
            ip-forwarding {
               enable: [true|false]
            }
         }
      }
   }
}
```

Parameters

name	Mandatory. The DHCP address pool.
ipv4net	Mandatory. Multi-node. The IPv4 network served by the DHCP address pool. The format is *ip-addr*/*prefix*.

state	Specifies whether or not the client should configure its IP layer for packet forwarding. Supported values are as follows: **true**: The client should configure its IP later for packet forwarding. **false**: The client should not configure its IP later for packet forwarding. The default **false**.

Default

The DHCP server does not direct clients to configure for packet forwarding.

Usage Guidelines

Use this command to specify whether the DHCP server directs clients to configure the IP layer for packet forwarding.

Use the **set** form of this command to specify whether the client should configure its IP layer for packet forwarding.

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

Use the **show** form of this command to view IP forwarding configuration.

service dhcp-server shared-network-name <name> subnet <ipv4net> lease <seconds>

Specifies how long the address assigned by the DHCP server will be valid.

Syntax

set service dhcp-server shared-network-name *name* **subnet** *ipv4net* **lease** *seconds*

delete service dhcp-server shared-network-name *name* **subnet** *ipv4net* **lease**

show service dhcp-server shared-network-name *name* **subnet** *ipv4net* **lease**

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dhcp-server {
      shared-network-name text {
         subnet ipv4net {
            lease: u32
         }
      }
   }
}
```

Parameters

name	Mandatory. The DHCP address pool.
ipv4net	Mandatory. Multi-node. The IPv4 network served by the DHCP address pool. The format is *ip-addr*/*prefix*.
seconds	Optional. Specifies how long the address assigned by the DHCP server will be valid, in seconds. The range is 120 to 4294967296.

Default

The default is 86400 (24 hours).

Usage Guidelines

Use this command to specify how long the address assigned by the DHCP server will be valid.

Use the **set** form of this command to specify how long the address assigned by the DHCP server will be valid.

Use the **delete** form of this command to remove the lease configuration.

Use the **show** form of this command to view the lease configuration.

service dhcp-server shared-network-name <name> subnet <ipv4net> ntp-server <ipv4>

Specifies the address of an NTP (Network Time Protocol) server available to clients.

Syntax

set service dhcp-server shared-network-name *name* **subnet** *ipv4net* **ntp-server** *ipv4*

delete service dhcp-server shared-network-name *name* **subnet** *ipv4net* **ntp-server** *ipv4*

show service dhcp-server shared-network-name *name* **subnet** *ipv4net* **ntp-server**

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dhcp-server {
      shared-network-name text {
         subnet ipv4net {
            ntp-server: ipv4
         }
      }
   }
}
```

Parameters

name	Mandatory. The DHCP address pool.
ipv4net	Mandatory. Multi-node. The IPv4 network served by the DHCP address pool. The format is *ip-addr/prefix*.
ipv4	Optional. Specifies the IP address of an NTP server available to clients. Multiple NTP server addresses can be specified in separate commands. The list of NTP servers should be specified in order of preference.

Default

None.

Usage Guidelines

Use this command to specify the address of an NTP (Network Time Protocol) server available to clients.

Use the **set** form of this command to specify the address of an NTP server available to clients.

Use the **delete** form of this command to remove the NTP server configuration.

Use the **show** form of this command to view the NTP server configuration.

service dhcp-server shared-network-name <name> subnet <ipv4net> pop-server <ipv4>

Specifies the address of a POP3 (Post Office Protocol 3) server available to clients.

Syntax

set service dhcp-server shared-network-name *name* **subnet** *ipv4net* **pop-server** *ipv4*

delete service dhcp-server shared-network-name *name* **subnet** *ipv4net* **pop-server** *ipv4*

show service dhcp-server shared-network-name *name* **subnet** *ipv4net* **pop-server**

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dhcp-server {
      shared-network-name text {
         subnet ipv4net {
            pop-server: ipv4
         }
      }
   }
}
```

Parameters

name	Mandatory. The DHCP address pool.
ipv4net	Mandatory. Multi-node. The IPv4 network served by the DHCP address pool. The format is *ip-addr*/*prefix*.
ipv4	Optional. Specifies the IP address of an POP3 server available to clients. Multiple POP3 server addresses can be specified in separate commands. The list of POP3 servers should be specified in order of preference.

Default

None.

Usage Guidelines

Use this command to specify the address of an POP3 (Post Office Protocol 3) server available to clients.

Use the **set** form of this command to specify the address of an POP3 server available to clients.

Use the **delete** form of this command to remove the POP3 server configuration.

Use the **show** form of this command to view the POP3 server configuration.

service dhcp-server shared-network-name <name> subnet <ipv4net> server-identifier <ipv4>

Specifies the address for the DHCP server identifier.

Syntax

set service dhcp-server shared-network-name *name* **subnet** *ipv4net* **server-identifier** *ipv4*

delete service dhcp-server shared-network-name *name* **subnet** *ipv4net* **server-identifier**

show service dhcp-server shared-network-name *name* **subnet** *ipv4net* **server-identifier**

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dhcp-server {
      shared-network-name text {
         subnet ipv4net {
            server-identifier ipv4
         }
      }
   }
}
```

Parameters

name	Mandatory. The DHCP address pool.
ipv4net	Mandatory. Multi-node. The IPv4 network served by the DHCP address pool. The format is *ip-addr*/*prefix*.
ipv4	Optional. Specifies the address for the DHCP server identifier.

Default

None.

Usage Guidelines

Use this command to specify the address for the DHCP server identifier.

The server identifier option is a field in a DHCP message that identifies the DHCP server as the destination address from clients to servers. When the DHCP server includes this field in a DHCPOffer, the client can use it to distinguish between multiple lease offers. The server identifier must be an address that is reachable from the client.

Use the **set** form of this command to specify the address for the DHCP server identifier.

Use the **delete** form of this command to remove the address for the DHCP server identifier.

Use the **show** form of this command to view the DHCP server identifier configuration.

service dhcp-server shared-network-name <name> subnet <ipv4net> smtp-server <ipv4>

Specifies the address of a SMTP (Simple Mail Transfer Protocol) server available to clients.

Syntax

set service dhcp-server shared-network-name *name* **subnet** *ipv4net* **smtp-server** *ipv4*

delete service dhcp-server shared-network-name *name* **subnet** *ipv4net* **smtp-server** *ipv4*

show service dhcp-server shared-network-name *name* **subnet** *ipv4net* **smtp-server**

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dhcp-server {
      shared-network-name text {
         subnet ipv4net {
            smtp-server: ipv4
         }
      }
   }
}
```

Parameters

name	Mandatory. The DHCP address pool.
ipv4net	Mandatory. Multi-node. The IPv4 network served by the DHCP address pool. The format is *ip-addr*/*prefix*.
ipv4	Optional. Specifies the IP address of an SMTP server available to clients. Multiple SMTP server addresses can be specified in separate commands. The list of SMTP servers should be specified in order of preference.

Default

None.

Usage Guidelines

Use this command to specify the address of an SMTP (Simple Mail Transfer Protocol) server available to clients.

Use the **set** form of this command to specify the address of an SMTP server available to clients.

Use the **delete** form of this command to remove the SMTP server configuration.

Use the **show** form of this command to view the SMTP server configuration.

service dhcp-server shared-network-name <name> subnet <ipv4net> start <ipv4> stop <ipv4>

Specifies the range of addresses that will be assigned to DHCP clients.

Syntax

set service dhcp-server shared-network-name *name* **subnet** *ipv4net* **start** *ipv4* **stop** *ipv4*

delete service dhcp-server shared-network-name *name* **subnet** *ipv4net* **start** [*ipv4* [**stop**]]

show service dhcp-server shared-network-name *name* **subnet** *ipv4net* **start** [*ipv4*]

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dhcp-server {
      shared-network-name text {
         subnet ipv4net {
            start ipv4 {
               stop: ipv4
            }
         }
      }
   }
}
```

Parameters

name	Mandatory. The DHCP address pool.
ipv4net	Mandatory. Multi-node. The IPv4 network served by the DHCP address pool. The format is *ip-addr/prefix*.
start	Optional. Multi-node. The start address in an address range. This is the first address in the range that can be assigned. You can define multiple address ranges within an address pool, by creating multiple **start** configuration nodes.

stop	Mandatory. The stop address in this address range. This is the last address in the range that can be assigned.

Default

None.

Usage Guidelines

Use this command to specify the range of addresses that will be assigned to DHCP clients.

Use the **set** form of this command to specify the range of addresses that will be assigned to DHCP clients.

Use the **delete** form of this command to remove the address range configuration.

Use the **show** form of this command to view the address range configuration.

service dhcp-server shared-network-name <name> subnet <ipv4net> static-mapping

Specifies a static IP address for a specific DHCP client.

Syntax

set service dhcp-server shared-network-name *name* **subnet** *ipv4net* **static-mapping** *mapname* {**ip-address** *ipv4*| **mac-address** *mac*}

delete service dhcp-server shared-network-name *name* **subnet** *ipv4net* **static-mapping** *mapname* [**ip-address**|**mac-address**]

show service dhcp-server shared-network-name *name* **subnet** *ipv4net* **static-mapping** *mapname* [**ip-address**|**mac-address**]

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dhcp-server {
      shared-network-name text {
         subnet ipv4net {
            static-mapping text {
               ip-address: ipv4
               mac-address: text
            }
         }
      }
   }
}
```

Parameters

name	Mandatory. The DHCP address pool.
ipv4net	Mandatory. Multi-node. The IPv4 network served by the DHCP address pool. The format is *ip-addr*/*prefix*.

mapname	Optional. Multi-node. Allows you to statically map an IP address within an address pool to the MAC address of a device on the network. You can define multiple static mappings of this type by creating multiple **static-mapping** configuration nodes.
ipv4	Mandatory. The IP address to be statically assigned to the device.
mac	Mandatory. The MAC address to be statically mapped to the specified IP address.

Default

None.

Usage Guidelines

Use this command to specify a static IP address for a specific DHCP client based on its MAC address.

Use the **set** form of this command to specify a static IP address for a specific DHCP client based on its MAC address.

Use the **delete** form of this command to remove the static mapping configuration.

Use the **show** form of this command to view the static mapping configuration.

service dhcp-server shared-network-name <name> subnet <ipv4net> static-route destination-subnet <ipv4net>

Specifies the destination subnet of a static route for clients to store in their routing cache.

Syntax

set service dhcp-server shared-network-name *name* **subnet** *ipv4net* **static-route destination-subnet** *ipv4net2*

delete service dhcp-server shared-network-name *name* **subnet** *ipv4net* **static-route destination-subnet**

show service dhcp-server shared-network-name *name* **subnet** *ipv4net* **static-route destination-subnet**

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dhcp-server {
      shared-network-name text {
         subnet ipv4net {
            static-route {
               destination-subnet: ipv4net
            }
         }
      }
}
```

Parameters

name	Mandatory. The DHCP address pool.
ipv4net	Mandatory. Multi-node. The IPv4 network served by the DHCP address pool. The format is *ip-addr*/*prefix*.
ipv4net2	Specifies the destination IP subnet of a static route for clients to store in their routing table.

Default

None.

Usage Guidelines

Use this command to specify the destination subnet of a static route for clients to store in their routing cache. The other part of the static route is defined by the the **service dhcp-server shared-network-name <name> subnet <ipv4net> static-route router <ipv4>** command (see page 78). Only one static route can be defined for a given subnet.

Use the **set** form of this command to specify the destination subnet of a static route for clients to store in their routing cache.

Use the **delete** form of this command to remove the destination subnet configuration.

Use the **show** form of this command to view the destination subnet configuration.

service dhcp-server shared-network-name <name> subnet <ipv4net> static-route router <ipv4>

Specifies the router for the destination of a static route for clients to store in their routing cache.

Syntax

set service dhcp-server shared-network-name *name* **subnet** *ipv4net* **static-route router** *ipv4*

delete service dhcp-server shared-network-name *name* **subnet** *ipv4net* **static-route router**

show service dhcp-server shared-network-name *name* **subnet** *ipv4net* **static-route router**

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dhcp-server {
      shared-network-name text {
         subnet ipv4net {
            static-route {
               router: ipv4
         }
      }
   }
}
```

Parameters

name	Mandatory. The DHCP address pool.
ipv4net	Mandatory. Multi-node. The IPv4 network served by the DHCP address pool. The format is *ip-addr*/*prefix*.
ipv4	Specifies the IP address of the router for the destination of a static route for clients to store in their routing cache.

Default

None.

Usage Guidelines

Use this command to specify the router for the destination of a static route for clients to store in their routing cache. The other part of the static route is defined by the the **service dhcp-server shared-network-name <name> subnet <ipv4net> static-route destination-subnet <ipv4net>** command (see page 76).

Use the **set** form of this command to specify the router for the destination of a static route for clients to store in their routing cache.

Use the **delete** form of this command to remove the router configuration.

Use the **show** form of this command to view the router configuration.

service dhcp-server shared-network-name <name> subnet <ipv4net> tftp-server-name <servername>

Specifies the name of a TFTP (Trivial File Transfer Protocol) server available to clients.

Syntax

set service dhcp-server shared-network-name *name* **subnet** *ipv4net* **tftp-server-name** *servername*

delete service dhcp-server shared-network-name *name* **subnet** *ipv4net* **tftp-server-name**

show service dhcp-server shared-network-name *name* **subnet** *ipv4net* **tftp-server-name**

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dhcp-server {
      shared-network-name text {
         subnet ipv4net {
            tftp-server-name: ipv4
         }
      }
   }
}
```

Parameters

name	Mandatory. The DHCP address pool.
ipv4net	Mandatory. Multi-node. The IPv4 network served by the DHCP address pool. The format is *ip-addr/prefix*.
servername	Specifies the name of a TFTP server available to clients.

Default

None.

Usage Guidelines

Use this command to specify the name of a TFTP (Trivial File Transfer Protocol) server available to clients.

Use the **set** form of this command to specify the name of a TFTP (Trivial File Transfer Protocol) server available to clients.

Use the **delete** form of this command to remove the TFTP server configuration.

Use the **show** form of this command to view the TFTP server configuration.

service dhcp-server shared-network-name <name> subnet <ipv4net> time-offset <seconds>

Specifies the offset of the client’s subnet in seconds from UTC (Coordinated Universal Time).

Syntax

set service dhcp-server shared-network-name *name* **subnet** *ipv4net* **time-offset** *seconds*

delete service dhcp-server shared-network-name *name* **subnet** *ipv4net* **time-offset**

show service dhcp-server shared-network-name *name* **subnet** *ipv4net* **time-offset**

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dhcp-server {
      shared-network-name text {
         subnet ipv4net {
            time-offset: u32
         }
      }
   }
}
```

Parameters

name	Mandatory. The DHCP address pool.
ipv4net	Mandatory. Multi-node. The IPv4 network served by the DHCP address pool. The format is *ip-addr*/*prefix*.
seconds	Specifies the offset of the client’s subnet in seconds from UTC (Coordinated Universal Time).

Default

None.

Usage Guidelines

Use this command to specify the offset of the client’s subnet in seconds from UTC (Coordinated Universal Time).

Use the **set** form of this command to specify the offset of the client’s subnet in seconds from UTC (Coordinated Universal Time).

Use the **delete** form of this command to remove the time offset configuration.

Use the **show** form of this command to view the time offset configuration.

service dhcp-server shared-network-name <name> subnet <ipv4net> time-server <ipv4>

Specifies the address of an RFC868 time server available to clients.

Syntax

set service dhcp-server shared-network-name *name* **subnet** *ipv4net* **time-server** *ipv4*

delete service dhcp-server shared-network-name *name* **subnet** *ipv4net* **time-server** *ipv4*

show service dhcp-server shared-network-name *name* **subnet** *ipv4net* **time-server**

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dhcp-server {
      shared-network-name text {
         subnet ipv4net {
            time-server: ipv4
         }
      }
   }
}
```

Parameters

name	Mandatory. The DHCP address pool.
ipv4net	Mandatory. Multi-node. The IPv4 network served by the DHCP address pool. The format is *ip-addr/prefix*.
ipv4	Optional. Specifies the IP address of an RFC868 time server available to clients. Multiple time server addresses can be specified in separate commands. The list of time servers should be specified in order of preference.

Default

None.

Usage Guidelines

Use this command to specify the address of an RFC 868 time server available to clients.

Use the **set** form of this command to specify the address of a time server available to clients.

Use the **delete** form of this command to remove the time server configuration.

Use the **show** form of this command to view the time server configuration.

service dhcp-server shared-network-name <name> subnet <ipv4net> wins-server <ipv4>

Specifies the address of a WINS server that is available to DHCP clients.

Syntax

set service dhcp-server shared-network-name *name* **subnet** *ipv4net* **wins-server** *ipv4*

delete service dhcp-server shared-network-name *name* **subnet** *ipv4net* **wins-server** *ipv4*

show service dhcp-server shared-network-name *name* **subnet** *ipv4net* **wins-server**

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dhcp-server {
      shared-network-name text {
         subnet ipv4net {
            wins-server: ipv4
         }
      }
   }
}
```

Parameters

name	Mandatory. The DHCP address pool.
ipv4net	Mandatory. Multi-node. The IPv4 network served by the DHCP address pool. The format is *ip-addr*/*prefix*.
ipv4	Optional. Multi-node. Gives the address of a NetBIOS Windows Internet Naming Server (WINS) available to DHCP clients on this subnet. The WINS server provides a name resolution services the Microsoft DHCP clients can use to correlate host names to IP addresses. You can specify more than one WINS server by issuing this statement multiple times. The format is an IP address.

Default

None.

Usage Guidelines

Use this command to specify the address of a WINS server that is available to DHCP clients.

Use the **set** form of this command to specify the address of a WINS server that is available to DHCP clients.

Use the **delete** form of this command to remove the wins-server configuration.

Use the **show** form of this command to view the wins-server configuration.

service dhcp-server shared-network-name <name> subnet <ipv4net> wpad-url <url>

Specifies the Web Proxy Autodiscovery (WPAD) URL

Syntax

set service dhcp-server shared-network-name *name* **subnet** *ipv4net* **wpad-url** *url*

delete service dhcp-server shared-network-name *name* **subnet** *ipv4net* **wpad-url**

show service dhcp-server shared-network-name *name* **subnet** *ipv4net* **wpad-url**

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dhcp-server {
      shared-network-name text {
         subnet ipv4net {
            wpad-url: text
         }
      }
   }
}
```

Parameters

name	Mandatory. The DHCP address pool.
ipv4net	Mandatory. Multi-node. The IPv4 network served by the DHCP address pool. The format is *ip-addr*/*prefix*.
url	Optional. Specifies the Web Proxy Autodiscovery (WPAD) URL

Default

None.

Usage Guidelines

Use this command to specify the Web Proxy Autodiscovery (WPAD) URL

Use the **set** form of this command to specify the Web Proxy Autodiscovery (WPAD) URL

Use the **delete** form of this command to remove the WPAD URL configuration.

Use the **show** form of this command to view the WPAD URL configuration.

show dhcp client leases

Displays DHCP client information.

Syntax

show dhcp client leases [**interface** *ethx*]

Command Mode

Operational mode.

Parameters

ethx	Shows client information for the specified interface.

Usage Guidelines

Use this command to see current DHCP client information.

When used with no option, this command displays all client information. When an interface is provided, this command displays client information for the specified interface.

DHCP is configured using the the **service dhcp-server** command (see page 31).

show dhcp leases

Displays current DHCP lease information.

Syntax

show dhcp leases [**pool** *pool-name*]

Command Mode

Operational mode.

Parameters

pool-name	Shows lease information for the specified address pool.

Usage Guidelines

Use this command to see current lease information for DHCP subscribers.

When used with no option, this command displays all current lease information. When address pool is provided, this command displays lease information for the specified address pool.

DHCP is configured using the the **service dhcp-server** command (see page 31).

Examples

Example 3-1 shows sample output of **show dhcp leases** with no option.

Example 3-1 "show dhcp leases"

```
vyatta@R1> show dhcp leases

IP address        Hardware Address   Lease expiration     Pool     Client Name
----------        ----------------   ----------------     ----     -----------
192.168.11.101    00:12:3f:e3:af:67  2007/06/23 16:28:26  POOL1    Laptop 9

vyatta@R1>
```

show dhcp statistics

Displays DHCP server statistics.

Syntax

show dhcp statistics [**pool** *pool-name*]

Command Mode

Operational mode.

Parameters

pool-name	Shows DHCP statistics for the specified address pool

Usage Guidelines

Use this command to see current lease information for DHCP subscribers.

When used with no option, this command displays all current lease information. When address pool is provided, this command displays lease information for the specified address pool.

DHCP is configured using the the **service dhcp-server** command (see page 31).

Examples

Example 3-2 shows sample output of **show dhcp statistics** with no option.

Example 3-2 ”show dhcp statistics”

```
vyatta@R1> show dhcp statistics

Total DHCP requests for all pools:   2
Total DHCP responses for all pools:  0
```

```
pool                                    pool size   # leased    # avail
----                                    ---------   --------    -------
POOL1                                   100         1           99

vyatta@R1>
```

Chapter 4: DNS

This chapter explains how to use Domain Name System (DNS) on the Vyatta system.

This chapter presents the following topics:

- DNS Configuration
- DNS Commands

DNS Configuration

This section presents the following topics:

- DNS Overview
- DNS Configuration Examples

DNS Overview

The Domain Name System (DNS) is an Internet directory service providing mappings between human-readable domain names and numeric IP addresses. DNS mappings are recorded in resource records that are stored on name servers distributed throughout the Internet. A device needing to access a host across the Internet sends a DNS query to a name server. The name server consults its resource records and returns an answer with the IP address of the specified name.

The DNS system forms its own network on the Internet. If the requested record is not local to the consulted name server, the name server consults another name server, and so on, until the requested information is located and returned.

There are billions of resource records in the DNS system. To keep the data manageable, the records are divided into zones, which contain resource records for a DNS domain or subdomain.

The Vyatta system supports three main DNS-related features:

- System DNS
- Dynamic DNS
- DNS Forwarding

System DNS

In system DNS, you define the list of name servers that the Vyatta system can use to resolve hostnames to IP addresses. This list is created using the **system name-server** command. (The **system name-server** command is described in the Vyatta Basic System Reference Guide; for your convenience, an example of system DNS is provided in this chapter in “Example 4-1 Configuring static access to a DNS name server.”)

Dynamic DNS

Originally, DNS mappings were statically specified in “zone files,” which were periodically loaded onto DNS servers. This worked reasonably well at a time when most hosts were configured with static IP addresses. However, since the 1990s, many network endpoints have been assigned IP addresses using dynamic protocols such as Dynamic Host Configuration Protocol. Until 1997, devices with DHCP-assigned IP addresses essentially could not participate in the DNS system.

In 1997, the Internet Engineering Task Force (IETF) published RFC 2136, *Dynamic Updates in the Domain Name System*, describing the dynamic DNS update protocol. Dynamic DNS (DDNS) provides a mechanism for DNS entries to be established and removed dynamically. Devices using dynamic DNS can notify a domain name server in real time of changes to host name, IP address, or other DNS-related information.

This feature is particularly useful for systems where a dynamic IP address is provided by the Internet Service Provider (ISP). Whenever the IP address changes, the Vyatta system updates a DDNS service provider with the change. The DDNS provider is responsible for propagating this change to other DNS servers. The Vyatta system supports a number of DDNS providers.

DNS Forwarding

In many environments using consumer-level ISP connections, the ISP both assigns the client router with its IP address and notifies the client router of the DNS server to use. In many cases, the IP address of the DNS server itself is assigned through DHCP and changes periodically; the ISP notifies the client router of the change in DNS server IP address through periodic updates. This makes it problematic to statically configure a DNS server IP address on the client router's DHCP server for its LAN clients.

In cases like these, the Vyatta system can use DNS forwarding (also called DNS relay) to maintain connectivity between hosts on its network and the ISP's DNS server.

When DNS forwarding is used, the client router offers its own client-side IP address (which is static) as the DNS server address to the hosts on its network, so that all client DNS requests are made to the client router's client-side address. When DNS requests are made, the client router forwards them to the ISP DNS server; answers are directed back to the client router and forwarded through to the client hosts. If the ISP changes the address of its DNS server, the client router simply records the new address of the server. The server address remains unchanged from the point of view of the LAN clients.

Another advantage to DNS forwarding is that DNS requests are cached in the Vyatta system (until either the time-to-live value in the DNS record expires or the cache fills). Subsequent requests for a cached entry are responded to locally, with a corresponding reduction in WAN traffic.

DNS Configuration Examples

This section presents the following topics:

- Configuring Access to a Name Server
- Configuring Dynamic DNS

- Configuring DNS Forwarding
- Statically Configured Entries and DNS Forwarding

This section includes the following examples:

- Example 4-1 Configuring static access to a DNS name server
- Example 4-2 Setting up dynamic DNS
- Example 4-3 Setting up DNS forwarding

Configuring Access to a Name Server

In order to be able to translate host names (such as www.vyatta.com) to IP addresses (such as 69.59.150.141), the system must be able to access a DNS server.

Configuring access to a DNS server is a function of basic system management, and is described in the Vyatta Basic System Reference Guide. For your convenience, the configuration example is repeated here.

Example 4-1 configures a static IP address for the DNS server at address 12.34.56.100. To configure the Vyatta system in this way, perform the following steps.

Example 4-1 Configuring static access to a DNS name server

Step	Command

Specify the IP address of the DNS server.	`vyatta@R1#` **`set system name-server 12.34.56.100`**
	`[edit]`

Configuring Dynamic DNS

Figure 4-1 shows a typical DDNS scenario. In this scenario:

- The Vyatta system (R1) is connected to an ISP via eth0.
- The network domain is **company.com**.
- The Vyatta system hostname is **r1.company.com**.
- The company’s web server is located behind the Vyatta system. Its hostname is **www.company.com**.
- The ISP is providing dynamic IP addresses to its clients through DHCP.
- The IP address of the Vyatta system’s eth0 interface changes over time due to the dynamic assignment by the ISP.

- The company’s web server is behind a Network Address Translation (NAT) device on the Vyatta system, so its IP address (as viewed from the Internet) changes when the ISP assigns a new address to the eth0 interface.
- Because the web server’s address changes, responses to DNS queries for **www.company.com** must also change to the new IP address. DDNS resolves this problem.

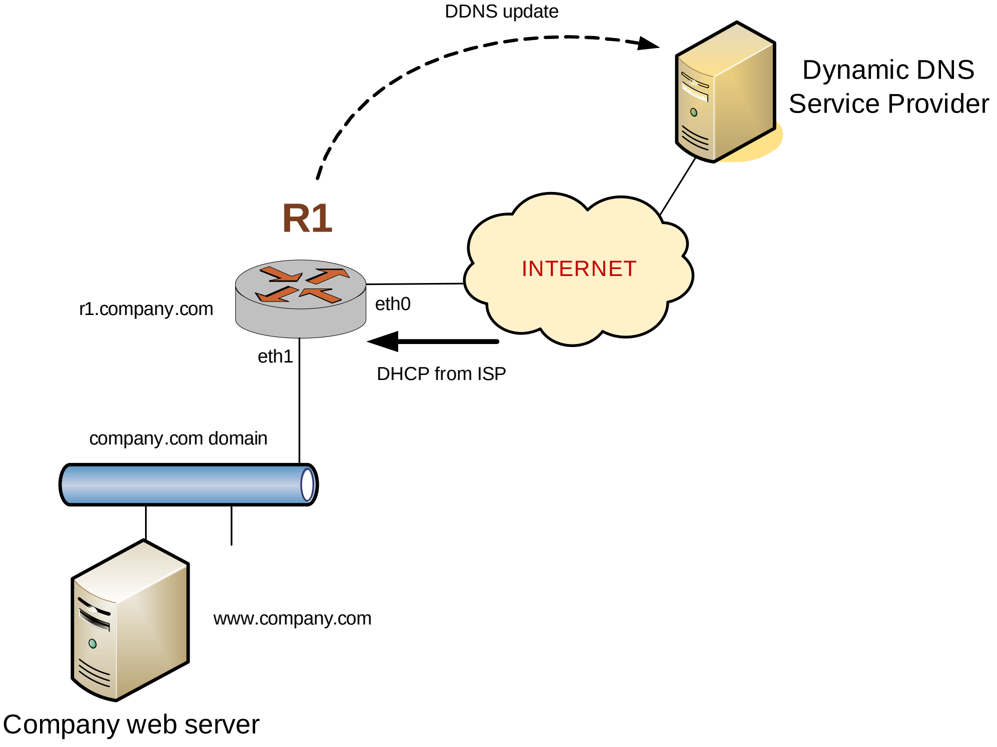
DDNS allows the Vyatta system (R1) to update the DNS system with the new IP address information for any local hostnames (for example, **r1.company.com**, and **www.company.com**) whenever the IP address on eth0 changes. The set-up process is as follows:

1. Sign up for DDNS service from one of the supported service providers:
   DNS Park: www.dnspark.com
   DSL Reports: www.dslreports.com
   DynDNS: www.dyndns.com
   easyDNS: www.easydns.com
   namecheap: www.namecheap.com
   SiteSolutions: www.sitelutions.com
   zoneedit: www.zoneedit.com.

   Instructions for sign-up are available at the individual providers.
2. Configure the Vyatta system (R1 in the example) with service provider information such as the service name, a login ID, and a password so that it knows how to log in and send updates to the DDNS service provider.
3. Configure the Vyatta system with the hostnames that must be updated in the DNS system when the IP address on eth0 changes.

NOTE *Depending on the service provider, hostnames may or may not need to include the domain name (e.g. “www” versus “www.company.com”).*

Figure 4-1 Dynamic DNS



Example 4-2 sets up DDNS for DDNS service provider DynDNS. This example assumes that you have already signed up with DynDNS). To configure the Vyatta system in this way, perform the following steps in configuration mode.

Example 4-2 Setting up dynamic DNS

Step	Command
Set the service provider.	vyatta@R1# **set service dns dynamic interface eth0 service dyndns** [edit]
Set the DDNS service provider login id (e.g. vtest).	vyatta@R1# **set service dns dynamic interface eth0 service dyndns login vtest** [edit]
Set the DDNS service provider password (e.g. testpwd).	vyatta@R1# **set service dns dynamic interface eth0 service dyndns password testpwd** [edit]
Specify r1 as a hostname whose DNS entry needs to be updated when the IP address on eth0 changes.	vyatta@R1# **set service dns dynamic interface eth0 service dyndns host-name r1.company.com** [edit]

Example 4-2 Setting up dynamic DNS

Specify www as a hostname whose DNS entry needs to be updated when the IP address on eth0 changes.	vyatta@R1# **set service dns dynamic interface eth0 service dyndns host-name www.company.com** [edit]
Commit the change	vyatta@R1# **commit** OK [edit]

Show the dynamic DNS configuration.	vyatta@R1# **show service dns dynamic**
	interface eth0 {
	   service dyndns {
	      host-name r1.company.com
	      host-name www.company.com
	      login vtest
	      password testpwd
	   }
	}
	[edit]

At this point, whenever the IP address on eth0 changes, the Vyatta system automatically logs onto the DynDNS service using login ID **vtest** and password **testpwd**. It sends an update for hostnames **r1.company.com** and **www.company.com** specifying the new IP address required to reach those hosts on the **company.com** domain. External users that query DNS for **r1.company.com** or **www.company.com** will subsequently be answered with the new address from the DNS system.

Configuring DNS Forwarding

There are two main steps to configuring the Vyatta system for DNS forwarding:

1. Specifying the DNS name servers to forward to

2. Specifying the interfaces on which to listen for DNS requests

Specifying DNS Name Servers

There are three places for which name server locations can be obtained:

- From the system name server list, defined using the **set system name-server** command.

- By DHCP.

- By listing additional name servers using the **set service dns forwarding dhcp** command

By default, the Vyatta system forwards DNS requests to name servers on the system name server list plus name servers obtained through DHCP. You can override the default behavior by specifying any or all of the following:

- Specifically use system-defined name servers. To do this, use the **set service dns forwarding** system command.
- Specifically use name servers received for the interface that is using DHCP client to get an IP. To do this use the **set service dns forwarding dhcp** command.
- List additional name servers using the **set service dns forwarding name-server** command.

These three options can be used in any combination; however, using any of them eliminates the default DNS forwarding behavior.

When DNS forwarding starts or restarts, it broadcasts a message to all the name servers in the pool and selects the first name server to answer. This name server is used unless it becomes unreachable, in which case the system sends another broadcast message to the remaining name servers in the pool.

Specifying the Listening Interfaces

The listening interfaces are the interfaces to which internal clients will forward DNS reqests. The DNS forwarding service listens for these requests and forwards them to the name server.

To set the listening interface, use the **set service dns forwarding listen-on** command. You can specify more than one interface by issuing this command multiple times.

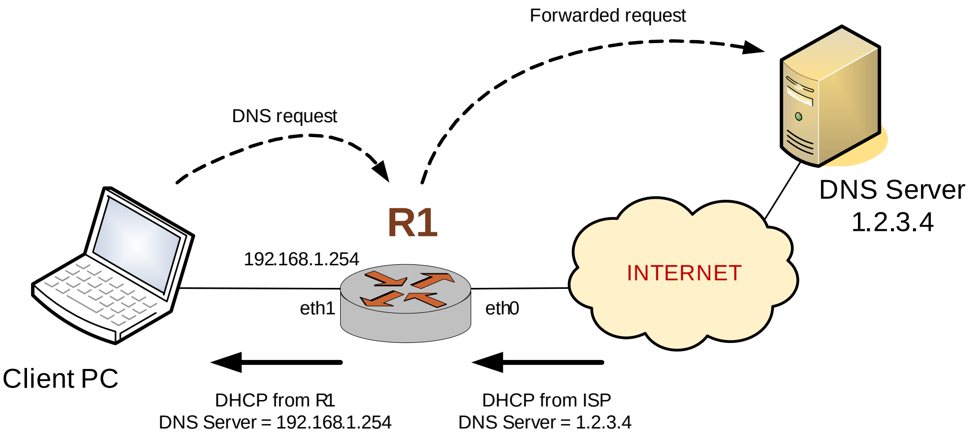
DNS Forwarding Scenario

Once these steps are complete DNS forwarding is set up. At this point, the Vyatta DHCP server can be used to distribute the DNS forwarding interface address to DHCP clients. (For information about setting up a DHCP server on the Vyatta system, see “Chapter 3: DHCP.”

Figure 4-3 shows a typical scenario where DNS forwarding would be deployed. In this scenario:

- The ISP is providing dynamic IP addresses to its customers, including a Vyatta system (R1) via DHCP.
- The Vyatta system (R1) is providing DHCP service to clients on its local network.
- Local clients send DNS requests to the Vyatta device.
- The DNS forwarding service on the Vyatta device forwards the requests to the ISP’s DNS server.

Figure 4-2 Scenario using DNS forwarding



Example 4-3 sets up the key parts of the Vyatta system for the scenario above. To configure the Vyatta system in this way, perform the following steps in configuration mode.

Example 4-3 Setting up DNS forwarding

Step	Command
Set IP address/prefix on eth1	vyatta@R1# **set interfaces ethernet eth1 address 192.168.1.254/24** [edit]
Set eth0 as a DHCP client	vyatta@R1# **set interfaces ethernet eth0 address dhcp** [edit]
Set up the DHCP Server on R1 by creating the configuration node for ETH1_POOL on subnet 192.168.1.0/24. Specify the start and stop IP addresses for the pool.	vyatta@R1# **set service dhcp-server shared-network-name ETH1_POOL subnet 192.168.1.0/24 start 192.168.1.100 stop 192.168.1.199** [edit]
Specify the default router for ETH1_POOL.	vyatta@R1# **set service dhcp-server shared-network-name ETH1_POOL subnet 192.168.1.0/24 default-router 192.168.1.254** [edit]
Create a DNS server list using DNS server information provided by the ISP's DHCP Server (on eth0).	vyatta@R1# **set service dns forwarding dhcp eth0** [edit]

Example 4-3 Setting up DNS forwarding

Listen for DNS requests on eth1	vyatta@R1# **set service dns forwarding listen-on eth1** [edit]
Specify a DNS server for ETH1_POOL (in this case it will act as a DNS Forwarder).	vyatta@R1# **set service dhcp-server shared-network-name ETH1_POOL subnet 192.168.1.0/24 dns-server 192.168.1.254** [edit]
Commit the change	vyatta@R1# **commit** [edit]

Show the DNS-related configuration.	vyatta@R1# **show service dns**
	forwarding {
	   dhcp eth0
	   listen-on eth1
	}
	[edit]

Statically Configured Entries and DNS Forwarding

Due to difficulties interworking with network address translation (NAT) on the corporate gateway, it is sometimes difficult to obtain correct IP addresses for hosts on the corporate network. To work around this problem, you can create static entries on a local Vyatta system using the **system static-host-mapping** command. Any entries configured in this way are compared with incoming DNS queries prior to the query being passed to DNS forwarding. If a match is found, the corresponding IP address is returned.

Example 4-4 sets up the system to return an IP address of 12.34.56.78 if it receives a DNS query for either "vyatta.com" or "vdut1"

Example 4-4 Setting up static entries

Step	Command
Create the static host mapping configuration node.	vyatta@R1# **set system static-host-mapping host-name vyatta.com** [edit]
Provide an alias host name (this is optional).	vyatta@R1# **set system static-host-mapping host-name vyatta.com alias vdut1** [edit]
Specify the IP address to be returned in response to the DNS query.	vyatta@R1# **set system static-host-mapping host-name vyatta.com inet 12.34.56.78** [edit]

Example 4-4 Setting up static entries

Commit the change	`vyatta@R1#` **`commit`**
	`[edit]`

Show the static host mapping configuration.	`vyatta@R1#` **`show system static-host-mapping`**
	` host-name vyatta.com{`
	`   alias vdut1`
	`   inet 12.34.56.78`
	` }`
	`[edit]`

DNS Commands

This chapter contains the following commands

Configuration Commands	Description
Dynamic DNS Configuration Commands	
service dns dynamic interface <interface>	Enables support for DDNS on an interface.
service dns dynamic interface <interface> service <service>	Specifies a DDNS service provider.
service dns dynamic interface <interface> service <service> host-name <hostname>	Specifies the host name to update the DNS record for with DDNS service provider.
service dns dynamic interface <interface> service <service> login <service-login>	Specifies the login ID to use to log on to a DDNS service provider.
service dns dynamic interface <interface> service <service> password <service-password>	Specifies the password to use to log on to a DDNS service provider.
DNS Forwarding Configuration Commands	
service dns forwarding cache-size <size>	Specifies the size of the DNS forwarding service cache.
service dns forwarding dhcp <interface>	Specifies an interface on which DHCP updates to name server information will be received.
service dns forwarding listen-on <interface>	Specifies an interface on which to listen for DNS requests.
service dns forwarding name-server <ipv4>	Specifies a name server to forward DNS requests to.
service dns forwarding system	Specifies DNS forwarding to system configured name servers.

Operational Commands	Description
clear dns forwarding all	Clears all counters related to DNS forwarding and clears the DNS forwarding cache.
clear dns forwarding cache	Removes all entries in the DNS forwarding cache.
show dns dynamic status	Displays update status for all hosts configured for dynamic DNS updates.
show dns forwarding nameservers	Displays name servers being used for DNS forwarding.
show dns forwarding statistics	Displays counters related to DNS forwarding.

update dns dynamic interface <interface>	Sends a forced update to a DDNS service provider on the specified interface.

clear dns forwarding all

Clears all counters related to DNS forwarding and clears the DNS forwarding cache.

Syntax

clear dns forwarding all

Command Mode

Operational mode.

Parameters

None.

Default

None.

Usage Guidelines

Use this command to clear all counters related to DNS forwarding. All entries in the DNS forwarding cache are also removed.

clear dns forwarding cache

Removes all entries in the DNS forwarding cache.

Syntax

clear dns forwarding cache

Command Mode

Operational mode.

Parameters

None.

Default

None.

Usage Guidelines

Use this command to remove all entries in the DNS forwarding cache.

service dns dynamic interface <interface>

Enables support for DDNS on an interface.

Syntax

set service dns dynamic interface *interface*

delete service dns dynamic interface *interface*

show service dns dynamic interface *interface*

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dns {
      dynamic {
         interface text {
         }
      }
   }
}
```

Parameters

interface	Multi-node. The interface to support DDNS. You can have more than one interface supporting DDNS, by creating multiple **interface** configuration nodes.

Default

None.

Usage Guidelines

Use this command to specify which interfaces will support dynamic DNS (DDNS).

Use the **set** form of this command to enable DDNS on an interface.

Use the **delete** form of this command to disable DDNS on an interface and remove all its dynamic DNS configuration.

Use the **show** form of this command to view DDNS configuration.

service dns dynamic interface <interface> service <service>

Specifies a DDNS service provider.

Syntax

set service dns dynamic interface *interface* **service** *service*

delete service dns dynamic interface *interface* **service** *service*

show service dns dynamic interface *interface* **service** *service*

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dns {
      dynamic {
         interface text {
            service text {}
         }
      }
   }
}
```

Parameters

interface	Multi-node. The interface supporting DDNS.
service	Multi-node. The name of a DDNS service provider. Supported values are as follows: **dnspark**, **dslreports**, **dyndns**, **easydns**, **namecheap**, **sitelutions**, and **zoneedit**. You can specify more than one DDNS provider per interface by creating multiple **service** configuration nodes.

Default

None.

Usage Guidelines

Use this command to specify the organizations providing the dynamic DNS (DDNS) service to the Vyatta system.

Use the **set** form of this command to specify the DDNS service provider.

Use the **delete** form of this command to remove a DDNS service provider from the configuration.

Use the **show** form of this command to view the DDNS service provider information.

service dns dynamic interface <interface> service <service> host-name <hostname>

Specifies the host name to update the DNS record for with DDNS service provider.

Syntax

set service dns dynamic interface *interface* **service** *service* **host-name** *hostname*

delete service dns dynamic interface *interface* **service** *service* **host-name** *hostname*

show service dns dynamic interface *interface* **service** *service* **host-name**

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dns {
      dynamic {
         interface text {
            service text {
               host-name text
            }
         }
      }
   }
}
```

Parameters

interface	Multi-node. The interface supporting DDNS.
service	Multi-node. The name of a DDNS service provider. Supported values are as follows: **dnspark**, **dslreports**, **dyndns**, **easydns**, **namecheap**, **sitelutions**, and **zoneedit**.
hostname	The host name to update DNS record for at the Dynamic DNS provider.

Default

None.

Usage Guidelines

Use this command to specify the host name to update DNS record for at the Dynamic DNS provider.

Use the **set** form of this command to specify the host name.

Use the **delete** form of this command to remove the host name from the configuration.

Use the **show** form of this command to view host name configuration.

service dns dynamic interface <interface> service <service> login <service-login>

Specifies the login ID to use to log on to a DDNS service provider.

Syntax

set service dns dynamic interface *interface* **service** *service* **login** *service-login*

delete service dns dynamic interface *interface* **service** *service* **login**

show service dns dynamic interface *interface* **service** *service* **login**

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dns {
      dynamic {
         interface text {
            service text {
               login text
            }
         }
      }
   }
}
```

Parameters

interface	Multi-node. The interface supporting DDNS.
service	Multi-node. The name of a DDNS service provider. Supported values are as follows: **dnspark**, **dslreports**, **dyndns**, **easydns**, **namecheap**, **sitelutions**, and **zoneedit**.
login	The login ID for the system to use when logging on to the DDNS service provider's system.

Default

None.

Usage Guidelines

Use this command to specify the login ID the system should use when it logs on to the system of a dynamic DNS (DDNS) service provider.

Use the **set** form of this command to specify the login ID for a DDNS service provider.

Use the **delete** form of this command to remove the login ID for a DDNS service provider.

Use the **show** form of this command to view DDNS service provider login ID configuration.

service dns dynamic interface <interface> service <service> password <service-password>

Specifies the password to use to log on to a DDNS service provider.

Syntax

set service dns dynamic interface *interface* **service** *service* **password** *service-password*

delete service dns dynamic interface *interface* **service** *service* **password**

show service dns dynamic interface *interface* **service** *service* **password**

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dns {
      dynamic {
         interface text {
            service text {
               password text
            }
         }
      }
   }
}
```

Parameters

interface	Multi-node. The interface supporting DDNS.
service	Multi-node. The name of a DDNS service provider. Supported values are as follows: **dnspark**, **dslreports**, **dyndns**, **easydns**, **namecheap**, **sitelutions**, and **zoneedit**.
password	The password for the system to use when logging on to the DDNS service provider’s system.

Default

None.

Usage Guidelines

Use this command to specify the password the system should use when it logs on to the system of a dynamic DNS (DDNS) service provider.

Use the **set** form of this command to specify the password for a DDNS service provider.

Use the **delete** form of this command to remove the password for a DDNS service provider.

Use the **show** form of this command to view DDNS service provider password configuration.

service dns forwarding cache-size <size>

Specifies the size of the DNS forwarding service cache.

Syntax

set service dns forwarding cache-size *size*

delete service dns forwarding cache-size

show service dns forwarding cache-size

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dns {
      forwarding {
         cache-size u32
      }
   }
}
```

Parameters

size	Optional. The maximum number of DNS entries to be held in the DNS forwarding cache. The range is 0 to 10000, where 0 means an unlimited number of entries are stored. The default is 150.

Default

A maximum of 150 DNS entries are stored in the DNS forwarding cache.

Usage Guidelines

Use this command to specify the DNS forwarding service cache size.

Use the **set** form of this command to set the DNS forwarding service cache size.

Use the **delete** form of this command to restore the DNS forwarding service cache size to the default.

Use the **show** form of this command to view DNS forwarding service cache size configuration.

service dns forwarding dhcp <interface>

Specifies an interface on which DHCP updates to name server information will be received.

Syntax

set service dns forwarding dhcp *interface*

delete service dns forwarding dhcp *interface*

show service dns forwarding dhcp *interface*

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dns {
      forwarding {
         dhcp text
      }
   }
}
```

Parameters

interface	Multi-node. An interface that is to receive name server information updates from a DHCP server.

Default

The system forwards DNS requests to all configured name servers and all name servers specified through DHCP.

Usage Guidelines

Use this command to specify an interface that is to act as a DHCP client and receive updates to DNS name server information. The Vyatta system will use this information to forward DNS requests from its local clients to the name server.

In order to be configured to listen for updates to name server information, the interface must be configured to obtain its own IP address through DHCP; that is, it must be configured as a DHCP client. For information about configuring the IP address of a physical interface, see the Vyatta Interfaces Reference Guide.

By default, the DNS forwarding service creates a pool of name servers to which it forwards DNS requests; this comprises any name servers statically configured for the system (using the **system name-server**), and those of which it is notified through DHCP. This command is used to override the default behavior: when an interface is specified using this command, the system will attend to DHCP name server information updates arriving on the specified interface.

This command can be combined with **service dns forwarding name-server <ipv4>** and/or **service dns forwarding system** to provide a larger pool of candidate name servers.

Use the **set** form of this command to specify an interface to be used as the source for DHCP name server updates.

Use the **delete** form of this command to restore the default method of receiving name server updates.

Use the **show** form of this command to view DNS forwarding DHCP update configuration.

service dns forwarding listen-on <interface>

Specifies an interface on which to listen for DNS requests.

Syntax

set service dns forwarding listen-on *interface*

delete service dns forwarding listen-on *interface*

show service dns forwarding listen-on *interface*

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dns {
      forwarding {
         listen-on text {}
      }
   }
}
```

Parameters

interface	Mandatory. Multi-node. The interface on which to listen for client-side DNS requests. You can specify more than one interface to receive client-side DNS requests, by creating multiple **listen-on** configuration nodes.

Default

None.

Usage Guidelines

Use this command to specify interfaces on which to listen for client DNS requests. Only queries received on interfaces specified with this command will receive DNS answers. At least one interface must be specified for DNS forwarding to operate.

Use the **set** form of this command to specify an interface on which to listen for DNS requests.

Use the **delete** form of this command to stop an interface from listening for DNS requests.

Use the **show** form of this command to view DNS request listening configuration.

service dns forwarding name-server <ipv4>

Specifies a name server to forward DNS requests to.

Syntax

set service dns forwarding name-server *ipv4*

delete service dns forwarding name-server *ipv4*

show service dns forwarding name-server *ipv4*

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dns {
      forwarding {
         name-server ipv4
      }
   }
}
```

Parameters

ipv4	Optional. Multi-node. The IPv4 address of a name server to which to forward DNS requests. You can forward DNS requests to more than one name server by creating multiple **name-server** configuration nodes.

Default

None.

Usage Guidelines

Use this command to specify a name server to which client DNS requests should be forwarded.

Use of this command is optional. By default, the DNS forwarding service creates a default pool of name servers comprised of those statically configured specified using the **system name-server** command plus those of which it was notified using DHCP. This command is used to override the defaults: when this command is issued, the system forwards DNS requests to the specified name server(s).

This command can be combined with **service dns forwarding dhcp <interface>** and/or **service dns forwarding system** to provide a larger pool of candidate name servers.

Use the **set** form of this command to specify a name server to forward DNS requests to.

Use the **delete** form of this command to remove a name server from the list of name servers to forward DNS requests to. If the last specified server is removed, the default forwarding behavior is restored.

Use the **show** form of this command to see which name servers DNS requests will be forwarded to.

service dns forwarding system

Specifies DNS forwarding to system configured name servers.

Syntax

set service dns forwarding system

delete service dns forwarding system

show service dns forwarding

Command Mode

Configuration mode.

Configuration Statement

```
service {
   dns {
      forwarding {
         system
      }
   }
}
```

Parameters

None

Default

None.

Usage Guidelines

Use this command to direct the system to forward DNS requests to name servers statically configured using the **system name-server** command.

By default, the DNS forwarding service forwards DNS requests to a pool of name servers comprised of the statically configured name servers plus those of which it was notified using DHCP. This command is used to override the defaults: when this command is issued, DNS requests are forwarded to statically configured name servers.

This command can be combined with **service dns forwarding dhcp <interface>** and/or **service dns forwarding name-server <ipv4>** to provide a larger pool of candidate name servers.

Use the **set** form of this command to specify the system-set name servers to forward DNS requests to.

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

Use the **show** form of this command to view DNS forwarding configuration.

show dns dynamic status

Displays update status for all hosts configured for dynamic DNS updates.

Syntax

show dns dynamic status

Command Mode

Operational mode.

Parameters

None

Usage Guidelines

Use this command to display the update status for all host names configured to be updated by dynamic DNS (DDNS).

Examples

Example 4-5 shows sample output of **show dns dynamic status**.

Example 4-5 Displaying information for hosts configured for DDNS

```
vyatta@R1> show dns dynamic status
show dns dynamic status
interface    : eth2
ip address   : 1.2.3.4
host-name    : test1.getmyip.com
last update  : Thu Sep 11 19:30:43 2008
update-status: good

interface    : eth2
ip address   : 1.2.3.5
host-name    : test2.getmyip.com
last update  : Thu Sep 11 19:30:43 2008
update-status: good
```

```
interface    : eth3
ip address   : 1.3.4.5
host-name    : test4
last update  : Thu Sep 11 19:34:16 2008
update-status: good
vyatta@R1>
```

show dns forwarding nameservers

Displays name servers being used for DNS forwarding.

Syntax

show dns forwarding nameservers

Command Mode

Operational mode.

Parameters

None

Usage Guidelines

Use this command to display the name servers that are currently being used for DNS forwarding as well as those that are available but are not being used for DNS forwarding.

Examples

Example 4-6 shows sample output of **show dns forwarding nameservers**.

Example 4-6 Displaying DNS forwarding name server information

```
vyatta@R1> show dns forwarding nameservers
-----------------------------------------------
   Nameservers configured for DNS forwarding
-----------------------------------------------
10.0.0.30 available via 'system'

-----------------------------------------------
   Nameservers NOT configured for DNS forwarding
-----------------------------------------------
10.0.0.31 available via 'dhcp eth3'

vyatta@R1>
```

show dns forwarding statistics

Displays counters related to DNS forwarding.

Syntax

show dns forwarding statistics

Command Mode

Operational mode.

Parameters

None

Usage Guidelines

Use this command to display statistics related to DNS forwarding. The statistics restart each time there is a change in name servers from any source (dhcp, system, or statically configured), a change in static host mapping (using the **system static-host-mapping** command), or a change made to the DNS forwarding configuration.

Examples

Example 4-7 shows sample output of **show dns forwarding statistics**.

Example 4-7 Displaying DNS forwarding statistics

```
vyatta@R1> show dns forwarding statistics
----------------
Cache statistics
----------------
Cache size: 150
Queries forwarded: 5
Queries answered locally: 2
Total DNS entries inserted into cache: 23
DNS entries removed from cache before expiry: 0

---------------------
Nameserver statistics
---------------------
Server: 10.0.0.30
```

```
Queries sent: 5
Queries retried or failed: 0

vyatta@R1>
```

update dns dynamic interface <interface>

Sends a forced update to a DDNS service provider on the specified interface.

Syntax

update dns dynamic interface *text*

Command Mode

Operational mode.

Parameters

interface	The interface from which to send the forced update.

Usage Guidelines

Use this command to manually initiate a forced update to a dynamic DNS (DDNS) service provider. The forced update provides the DDNS service provider with the current status of the specified interface.

Note that this command should be used sparingly as frequent unnecessary updates could cause the host name to be blocked by the DDNS service provider.

Chapter 5: NAT

This chapter explains how to set up network address translation (NAT) on the Vyatta system.

This chapter presents the following topics:

- NAT Configuration
- NAT Commands

NAT Configuration

This section presents the following topics:

- NAT Overview
- Concepts for Configuring NAT
- NAT Configuration Examples

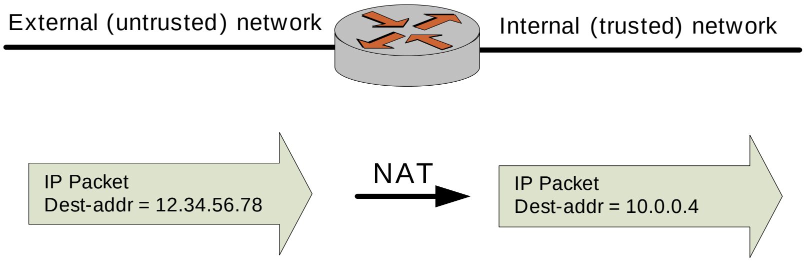
NAT Overview

This section presents the following topics:

- Benefits of NAT
- Types of NAT
- Interaction Between NAT, Routing, Firewall, and DNS

Network Address Translation (NAT) is a service that provides modification of address and/or port information within network packets as they pass through a computer or network device. The device performing NAT on the packets can be the source of the packets, the destination of the packets, or an intermediate device on the path between the source and destination devices; see .

Figure 5-1 A NAT device



NAT was originally designed to help conserve the number of IP addresses used by the growing number of devices accessing the Internet, but it also has important applications in network security.

The computers on an internal network can use any of the addresses set aside by the Internet Assigned Numbers Authority (IANA) for private addressing (see also RFC 1918). These reserved IP addresses are not in use on the Internet, so an external machine cannot directly route to them. The following addresses are reserved for private use:

- 10.0.0.0 to 10.255.255.255 (CIDR: 10.0.0.0/8)
- 172.16.0.0 to 172.31.255.255 (CIDR: 172.16.0.0/12)

- 192.168.0.0 to 192.168.255.255 (CIDR: 192.268.0.0/16)

A NAT-enabled router hides the IP addresses of an internal network from the external network, by replacing the internal, private IP addresses with public IP addresses that have been provided to it. These public IP addresses are the only addresses that are ever exposed to the external network. The router can manage a pool of multiple public IP addresses, from which it can dynamically choose when performing address replacement.

Be aware that, although NAT can minimize the possibility that internal computers make unsafe connections to the external network, it provides no protection to a computer that, for one reason or another, connects to an untrusted machine. Therefore, you should always combine NAT with packet filtering and other features of a complete security policy to fully protect your network.

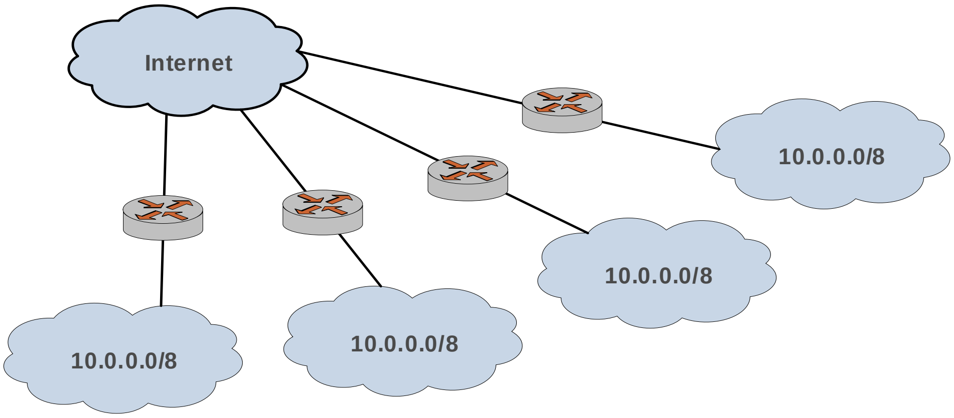
Benefits of NAT

NAT confers several advantages:

- NAT conserves public Internet address space.

  Any number of hosts within a local network can use private IP addresses, instead of consuming public IP addresses. The addresses of packets that are transmitted from this network to the public Internet are translated to the appropriate public IP address. This means that the same private IP address space can be re-used within any number of private networks, as shown in Re-using private address space Figure 5-2.

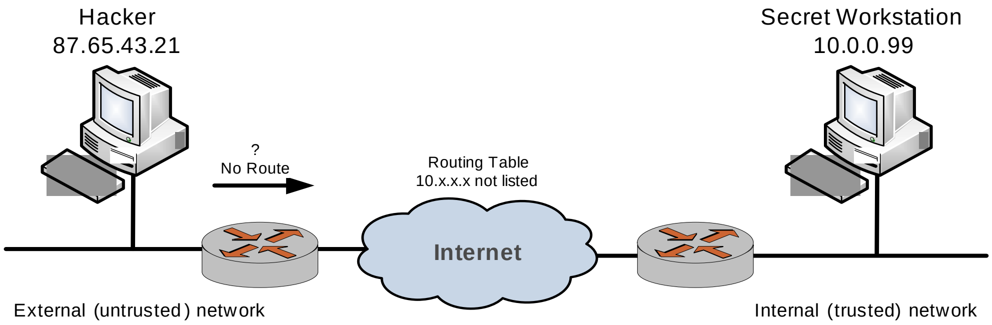
Figure 5-2 Re-using private address space



- NAT enhances security.

  IP addresses within the private (internal) network are hidden from the public (external) network. This makes it more difficult for hackers to initiate an attack on an internal host. However, private network hosts are still vulnerable to attack, and therefore NAT is typically combined with firewall functionality.

Figure 5-3 NAT combined with firewall



- NAT is seamless.

  Standard client/server network services work without modification through a NAT-enabled device.

- NAT facilitates network migration from one address space to another.

  The address space within a NATted private network is independent of the public IP address. This means that the private network can be moved to a new public IP address without changing network configurations within the private network. Likwise, the addressing within the private network can change without affecting the public IP address.

- NAT simplifies routing.

  NAT reduces the need to implement more complicated routing schemes within larger local networks.

Types of NAT

There are three main types of NAT:

- Source NAT. This is also called S-NAT or SNAT.
- Destination NAT. This is also called D-NAT or DNAT.
- Bi-directional NAT. When both SNAT and DNAT are configured, the result is bi-directional NAT.

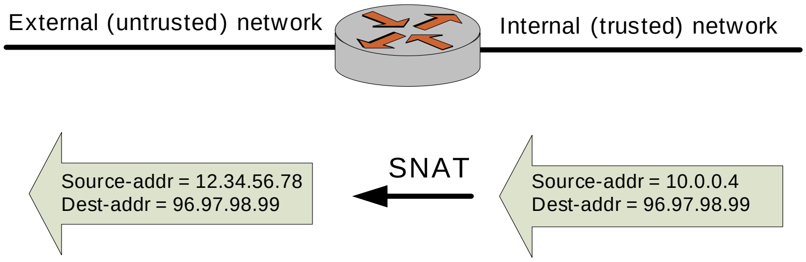
Source NAT (SNAT)

SNAT is the most common form of NAT. SNAT is used when an internal host needs to initiate a session to an external host.

Tip: SNAT takes place after routing occurs.

SNAT is implemented at the egress from an internal (trusted) network to an external (untrusted) network. SNAT takes place *after* routing occurs. SNAT changes the source address of the packets that pass from the internal to the external network, as shown in Figure 5-4.

Figure 5-4 Source NAT (SNAT)


External (untrusted) network
Internal (trusted) network
Source-addr = 12.34.56.78
Dest-addr = 96.97.98.99
SNAT
Source-addr = 10.0.0.4
Dest-addr = 96.97.98.99

A special form of source NAT, called “masquerade” also exists. With “masquerade” the source address of the outgoing packet is replaced with the primary IP address of the outbound interface.

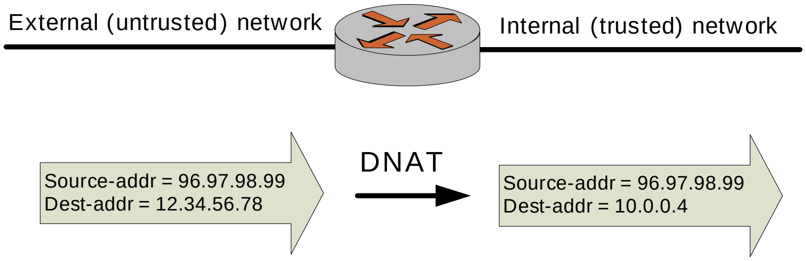
Destination NAT (DNAT)

DNAT is used when an external host needs to initiate a session with an internal host; for example, when a subscriber accesses a news service.

Tip: DNAT takes place before routing occurs.

DNAT is implemented at the ingress from a external (untrusted) network to an internal (trusted) network and takes place *before* routing occurs. DNAT changes the destination address of packets passing from the external to the internal network, as shown in Figure 5-5.

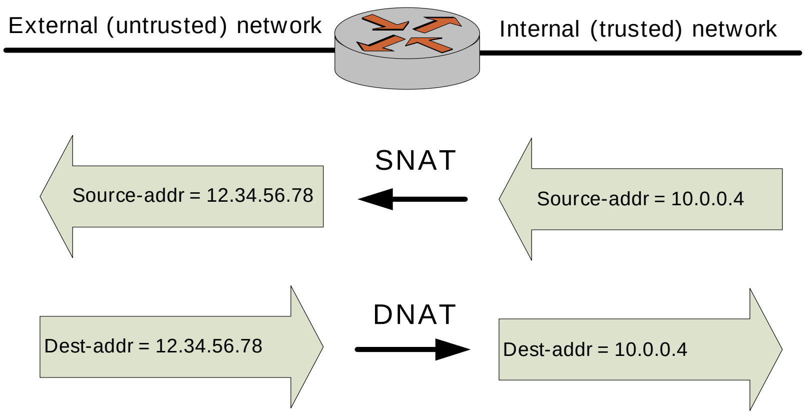
Figure 5-5 Destination NAT (DNAT)


External (untrusted) network
Internal (trusted) network
Source-addr = 96.97.98.99
Dest-addr = 12.34.56.78
DNAT
Source-addr = 96.97.98.99
Dest-addr = 10.0.0.4

Bi-Directional NAT

When both SNAT and DNAT are configured at the same time, the result is called bi-directional NAT. Bi-directional NAT is used when internal hosts need to initiate sessions with external hosts AND external hosts need to initiate sessions with internal hosts. Figure 5-6 shows bi-directional NAT.

Figure 5-6 Bi-directional NAT


External (untrusted) network
Internal (trusted) network
SNAT
Source-addr = 12.34.56.78
Source-addr = 10.0.0.4
DNAT
Dest-addr = 12.34.56.78
Dest-addr = 10.0.0.4

Interaction Between NAT, Routing, Firewall, and DNS

One of the most important things to understand when working with NAT is the processing order of the various services that might be configured within the Vyatta system. If processing order is not considered, the results achieved may not be as intended.

For example, if you are using NAT you should take care not to set up the firewall to filter packets based on particular external addresses. Such a rule would not have the intended result, because the addresses of external packets would have all been changed to internal addresses by NAT.

Interaction Between NAT and Routing

When considering NAT in relation to routing, it is important to be aware that routing operates on the real (internal) addresses. The scenarios in this section illustrate this point.

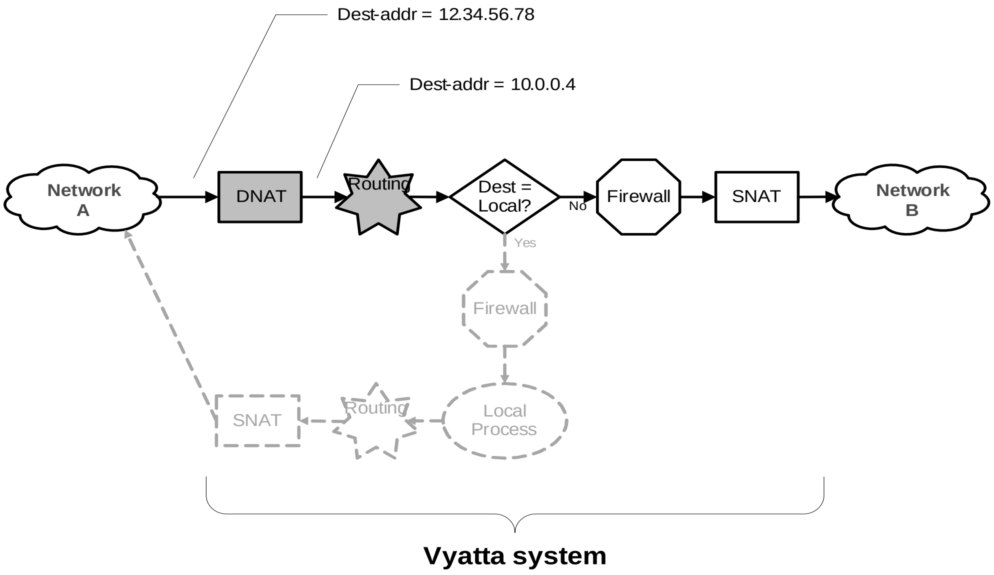
Scenario 1: Packets Passing Through the VYATTA SYSTEM

In this scenario, packets are originated at external and internal hosts and passed through the Vyatta system. Note the following:

Tip: *DNAT routing decisions are based on converted destination address.*

DNAT operates on the packets *prior* to the routing decision. This means that routing decisions based on the destination address are made relative to the *converted* destination address—*not* the original destination address; see Figure 5-7.

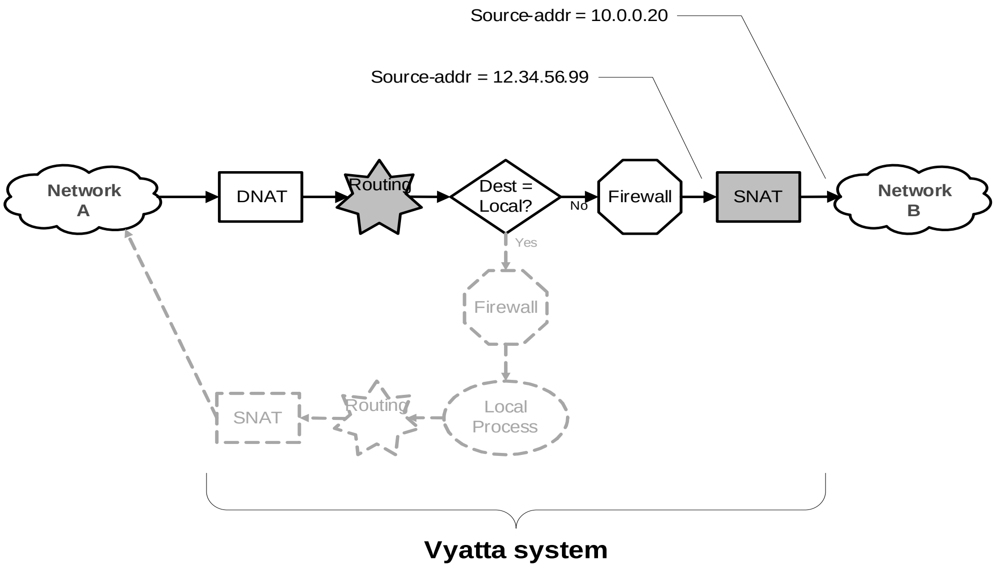
Figure 5-7 Pass-through DNAT routing decisions



Tip: *SNAT routing decisions are based on original source address.*

On the other hand, routing decisions are made prior to SNAT. This means that routing decisions based on source address are made on the *original* source address—*not* the converted source address; see Figure 5-8.

Figure 5-8 Pass-through SNAT routing decisions

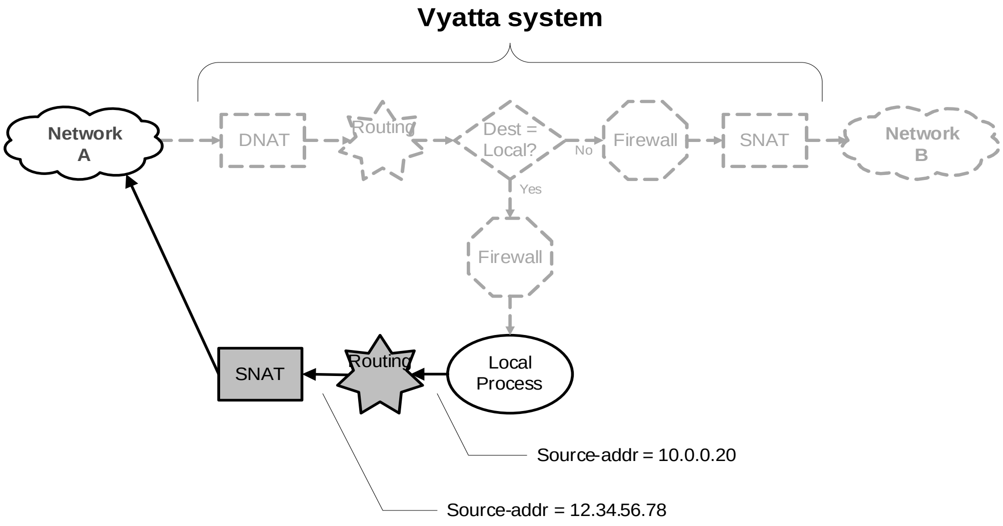


Scenario 2: Packets Originating at the Vyatta SYSTEM

In this scenario, packets are originated by a process within the Vyatta system. Here, only SNAT is involved; DNAT never occurs.

Again, because routing decisions are made prior to SNAT, routing decisions based on source address are made on the *original* source address—*not* the converted source address; see Figure 5-9.

Figure 5-9 Vyatta system-originated SNAT routing decisions

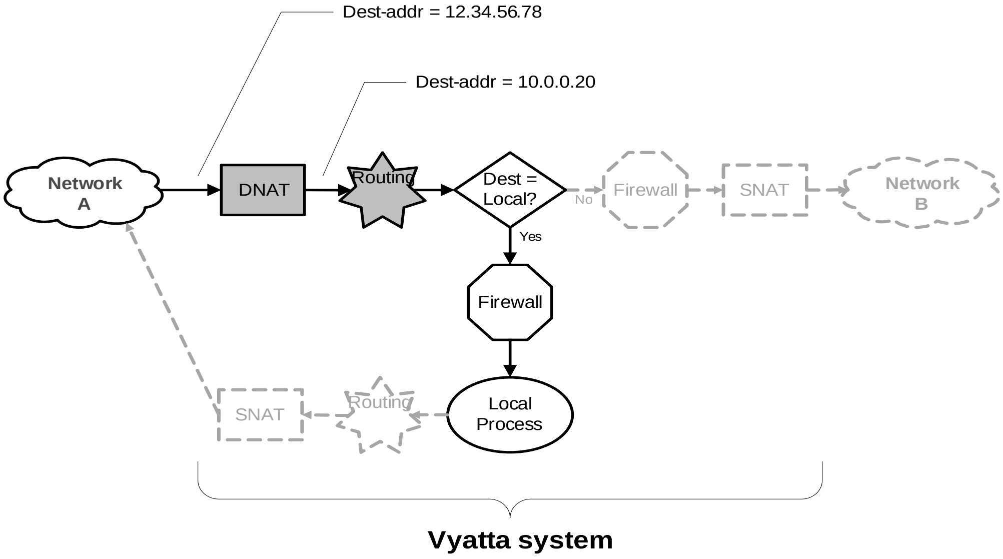


Scenario 3: Packets Destined for the Vyatta SYSTEM

In this scenario, packets are destined for a process within the Vyatta system. Here, only DNAT is involved; SNAT never occurs.

Again, because DNAT operates on the packets *prior* to the routing decision, routing decisions based on destination address are made on the *converted* destination address—*not* the original destination address; see Figure 5-10.

Figure 5-10 Vyatta system-destined DNAT routing decisions



Interaction between NAT and Firewall

When considering NAT in relation to the firewall, it is important to be aware that the firewall, like routing, operates on the real (internal) addresses. The following scenarios illustrate this point.

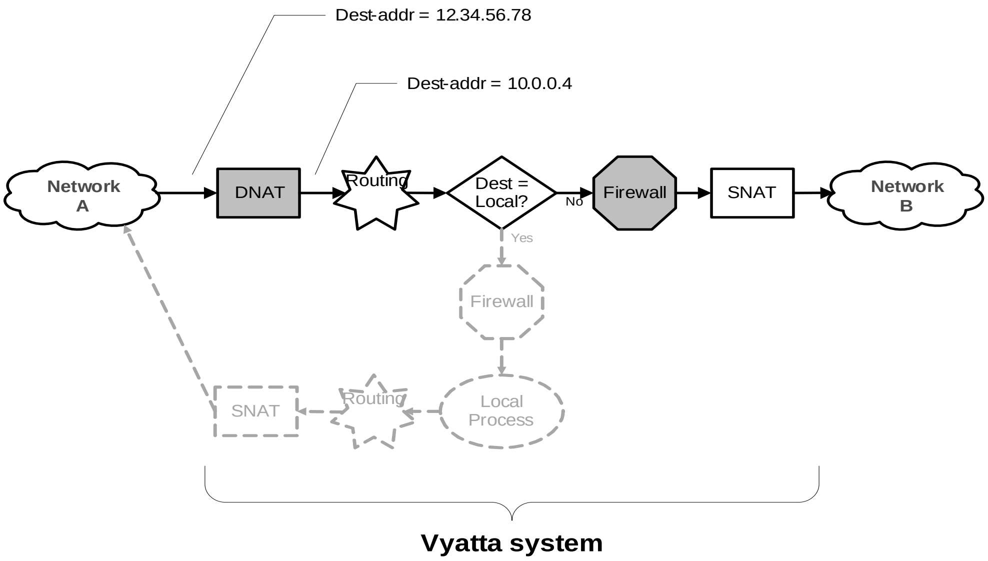
Scenario 1: Packets Passing Through the Vyatta System

In this scenario, packets are originated at external and internal hosts and passed through the Vyatta system. Note the following:

Tip: *DNAT firewall rules are applied on converted destination address.*

DNAT operates on the packets *prior* to the application of firewall rules. This means that firewall decisions based on the destination address are made relative to the *converted* destination address—*not* the original destination address; see Figure 5-11.

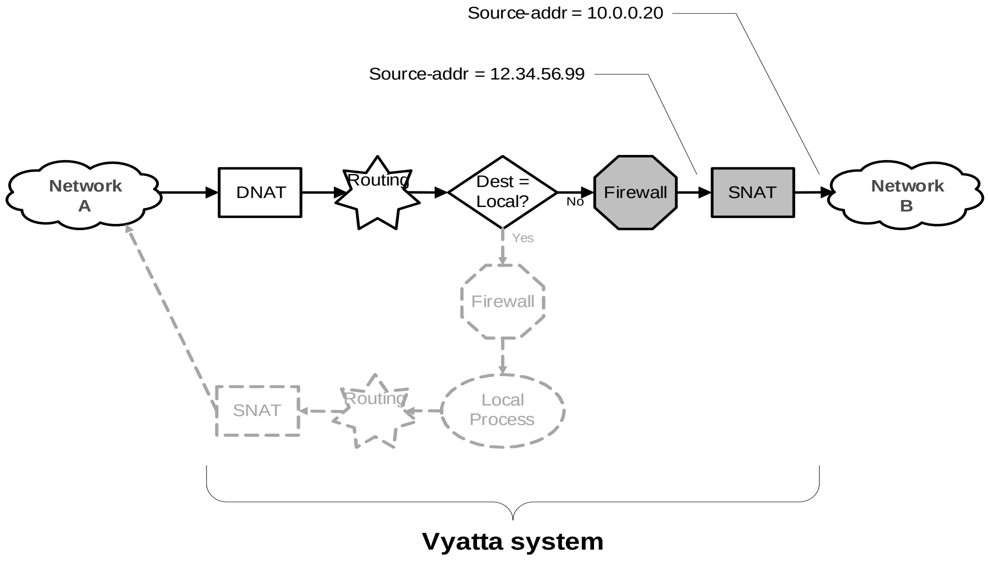
Figure 5-11 Pass-through DNAT firewall decisions



Tip: *SNAT firewall rules are applied on original source address.*

On the other hand, firewall rules are applied *prior* to SNAT. This means that firewall decisions based on source address are made on the *original* source address—*not* the converted source address; see Figure 5-12.

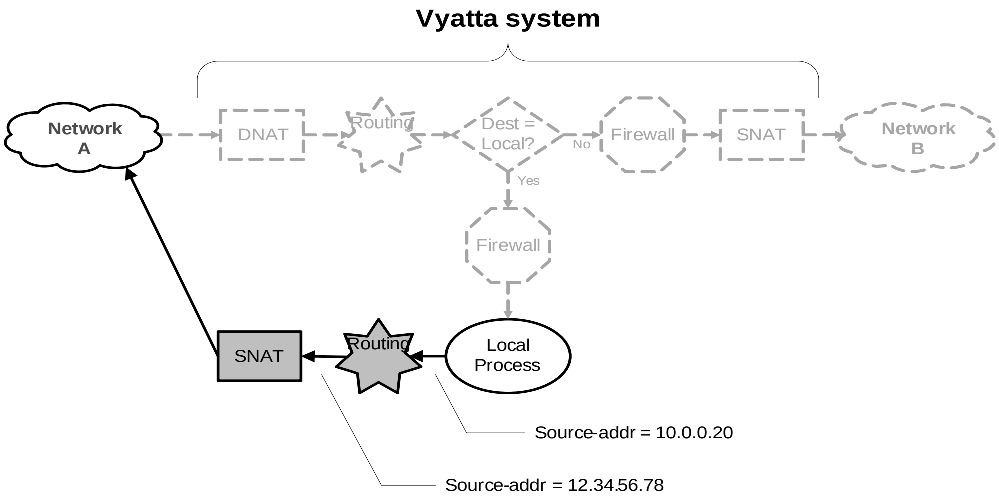
Figure 5-12 Pass-through SNAT firewall decisions



Scenario 2: Packets Originating at the Vyatta System

In this scenario, packets are originated by a process within the Vyatta system. Here, only SNAT is involved; DNAT never occurs. Note that, because the session originates from an internal process the firewall is not involved.

Figure 5-13 Vyatta system-originated SNAT bypasses firewall

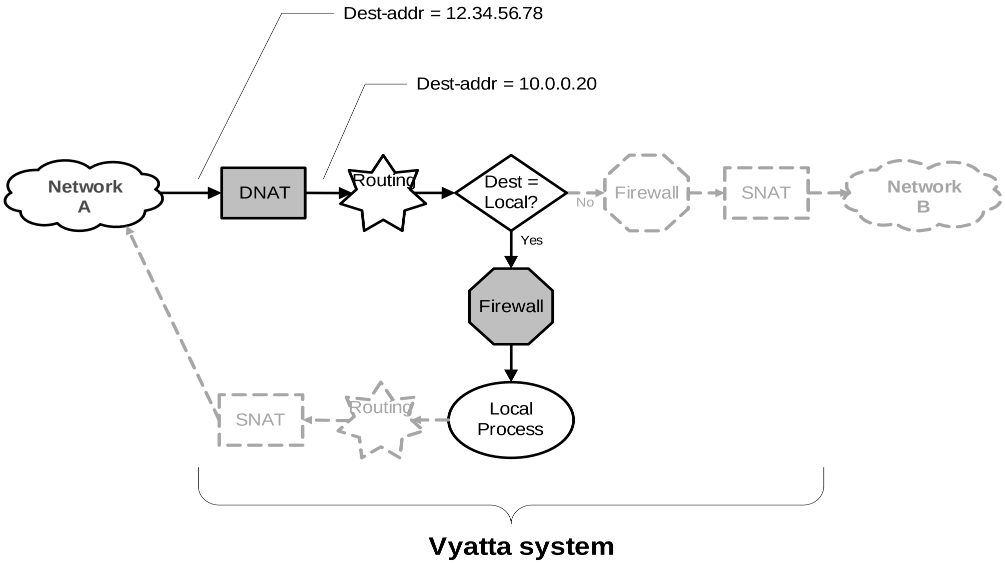


Scenario 3: Packets destined for the Vyatta System

In this scenario, packets are destined for a process within the Vyatta system. Here, only DNAT is involved; SNAT never occurs.

Again, because DNAT operates on the packets *prior* to application of firewall rules, firewall decisions based on destination address are made on the *converted* destination address—*not* the original destination address; see Figure 5-14.

Figure 5-14 Vyatta system-destined DNAT firewall decisions



Interaction between NAT and DNS

NAT and DNS can be combined in various scenarios involving load balancing. These can include additional load-balancing switches that operate at higher protocol layers (Layers 4 through 7). For example, a large bank may have many web servers with transactions load-balanced across them.

In these cases the NAT configuration must be carefully considered to achieve the desired results. Discussion of DNS and load-balancing scenarios is beyond the scope of this chapter.

Concepts for Configuring NAT

NAT is configured as as series of NAT “rules”. Each rule instructs NAT to perform a network address translation that you require.

This section presents the following topics:

- NAT Rules
- NAT Type
- Filters: Protocols, Source, and Destination
- Address Conversion: “Inside” and “Outside” Addresses
- “Inbound” and “Outbound” Interfaces

NAT Rules

NAT rules are numbered, and are evaluated in numerical order.

Note that once configured, a NAT rule number is its permanent identifier. The number of the NAT rule cannot be changed in the same way that the rule's attributes can be changed. To change the number of a NAT rule, you must delete the rule and re-create it using the new number.

Tip: *Leave space between NAT rule numbers.*

For this reason, it makes sense to create your NAT rules leaving “space” between the numbers. For example, you might initial create your set of NAT rules numbered 10, 20, 30, and 40. This way, if you need to insert a new rule later on, and you want it to execute in a particular sequence, you can insert it between existing rules without having to delete and recreate any other rules.

To create or modify a NAT rule, you use the **set** command on the **service nat** configuration node, providing the number that will be the rule identifier; see Example 5-1:

Example 5-1 Creating a NAT rule

```
vyatta@vyatta#set service nat rule 10
```

NAT Type

There are three NAT types defined: source, destination, and masquerade. You specify the rule type during configuration. Example 5-2 sets NAT Rule 10 to provide source NAT.

Example 5-2 Creating a source NAT (SNAT) rule

```
vyatta@vyatta#set service nat rule 10 type source
```

Filters: Protocols, Source, and Destination

Filters control which packets will have the NAT rules applied to them. There are three different filters that can be applied within a NAT rule: **protocols**, **source**, and **destination**.

The “protocols” Filter

The **protocols** filter specifies which protocol types the NAT rule will be applied to. Only packets of the specified protocol are NATted. The default is **all** protocols.

Example 5-3 sets Rule 10 to apply to TCP protocol packets.

Example 5-3 Filtering packets by protocol

```
vyatta@vyatta#set service nat rule 10 protocols tcp
```

The “source” Filter

The **source** filter filters packets based on their source address and/or port. Only packets with a source address/port matching that defined in the filter are NATted. (Port information is optional.)

If the source filter is not specified, by default the rule will match packets with any source address or port.

Example 5-4 sets Rule 10 to apply to packets with a source address of 10.0.0.4.

Example 5-4 Filtering packets by source address

```
vyatta@vyatta#set service nat rule 10 source address 10.0.0.4
```

Example 5-5 sets Rule 15 to apply to packets with a source network of 10.0.0.0/24.

Example 5-5 Filtering packets by source network address

```
vyatta@vyatta#set service nat rule 15 source address 10.0.0.0/24
```

In addition to “address” the other parameter associated with the “source” filter is “port”.

The “destination” Filter

The **destination** filter filters packets based on their destination address/port. Only packets with a destination address/port matching that defined within the filter are NATted. (Port information is optional.)

If the destination filter is not specified, by default the rule will match packets with any source address or port.

Example 5-6 sets Rule 20 to apply to packets with a destination address of 12.34.56.78.

Example 5-6 Filtering packets by destination address

```
vyatta@vyatta#set service nat rule 20 destination address
12.34.56.78
```

In addition to “address” the other parameter associated with the “destination” filter is “port”.

Address Conversion: “Inside” and “Outside” Addresses

The **inside-address** and **outside-address** specify the address conversions that take place within the NAT rule. They define the information that is substituted into the packet for the original addresses.

Inside-Address

The **inside-address** is used with DNAT. The inside-address specifies the address that is substituted for the destination IP address of the incoming packet. Port translation is also available and can be specified as part of the inside-address.

Example 5-7 sets Rule 20 to substitute 10.0.0.4 as the destination IP address of inbound packets matching its criteria.

Example 5-7 Setting an inside IP address

```
vyatta@vyatta#set service nat rule 20 inside-address address
10.0.0.4
```

Example 5-8 sets Rule 25 to substitute addresses 10.0.0.0 through 10.0.0.3 as the range of destination IP addresses for inbound packets that match its criteria.

Example 5-8 Setting a range of inside addresses

```
vyatta@vyatta#set service nat rule 25 inside-address
10.0.0.0-10.0.0.3
```

Outside-Address

The **outside-address** is used with SNAT. The outside-address specifies the address that is substituted for the source IP address of the outgoing packet. Port translation is also available and can be specified as part of the outside-address.

Note the following:

- Outside-address is *mandatory* for SNAT rules
- Outside-address *must* be one of the addresses defined on the outbound interface.

- Outside address *cannot be set* for rules of type **masquerade**. This is because masquerade always uses the primary IP address of the outbound interface. However, outside ports can be set for type **masquerade**.

Example 5-9 sets Rule 10 to substitute 12.34.56.78 as the source IP address of outbound packets matching its criteria.

Example 5-9 Setting an outside address

```
vyatta@vyatta#set service nat rule 10 outside-address address
12.34.56.78
```

Example 5-10 sets Rule 15 to substitute addresses 12.34.56.64 through 12.34.56.79 as the source IP addresses of outbound packets that match its criteria.

Example 5-10 Setting a range of outside addresses

```
vyatta@vyatta#set service nat rule 15 outside-address
12.34.56.64-12.34.56.79
```

“Inbound” and “Outbound” Interfaces

For each NAT rule you may specify through which interface packets will enter or exit. Note the following:

- For **destination** type, you would specify the inbound-interface. This is the interface through which inbound traffic first enters the NAT device.
- For **source** type you would specify the outbound-interface. This is the interface through which outbound traffic exits the NAT device.
- For **masquerade** type you must specify the outbound interface. This is the interface through which outbound traffic exits the NAT device.

Example 5-11 sets Rule 20 to listen on interface eth0 for inbound traffic.

Example 5-11 Setting the inbound interface

```
vyatta@vyatta#set service nat rule 20 inbound-interface eth0
```

Example 5-12 sets Rule 10 to send outbound traffic to interface eth1.

Example 5-12 Setting the outbound interface

```
vyatta@vyatta#set service nat rule 10 outbound-interface eth1
```

NAT Configuration Examples

This section presents the following scenarios:

- Source NAT (One-to-One)
- Source NAT (Many-to-One)
- Source NAT (Many-to-Many)
- Source NAT (One-to-Many)
- Masquerade
- Destination NAT (One-to-One)
- Destination NAT (One-to-Many)
- Bi-Directional NAT
- Masquerade NAT and VPN

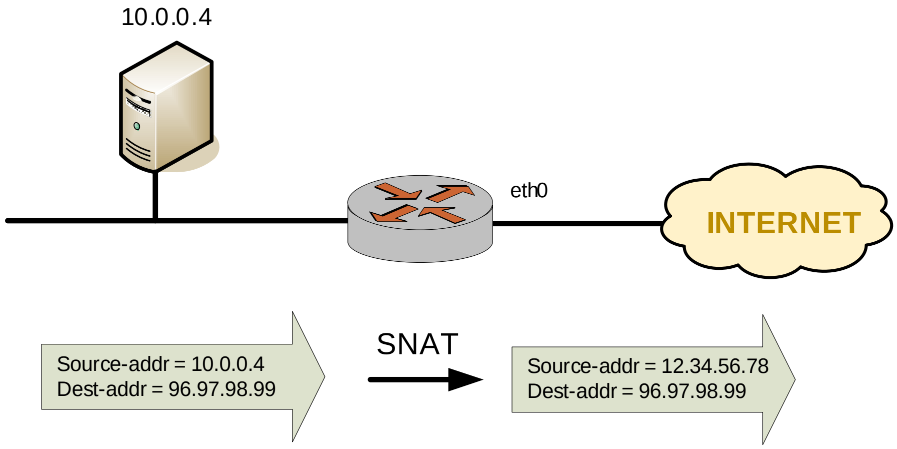
NOTE *Each NAT rule in these examples could be independently deployed on a system. They are not intended to be deployed together. For that reason, all rules in the examples are given the same rule number (Rule 10).*

Source NAT (One-to-One)

Figure 5-15 shows an example of SNAT where a single “inside” source address is translated to a single “outside” source address. In this example:

- An internal news server (NNTP) that needs to connect to an external news server
- The external news server accepts connections only from known clients.
- The internal news server does not receive connections from outside the local network.

Figure 5-15 Source NAT (one-to-one)



To configure NAT in this way, perform the following steps in configuration mode.

Example 5-13 Source NAT (one-to-one)

Step	Command

Create Rule 10. Rule 10 is an SNAT rule.	`vyatta@vyatta# set service nat rule 10 type source`
	`[edit]`

Apply this rule to packets coming from address 10.0.0.4.	`vyatta@vyatta# set service nat rule 10 source address 10.0.0.4`
	`[edit]`

Send traffic out through interface eth0. Use 12.34.56.78 as the source address in outgoing packets. Note that the outside-address must be one of the addresses defined on the outbound interface.	`vyatta@vyatta# set service nat rule 10 outbound-interface eth0`
	`[edit]`
	`vyatta@vyatta# set service nat rule 10 outside-address address 12.34.56.78`
	`[edit]`

Commit the change.	`vyatta@vyatta# commit`
	`OK`
	`[edit]`

Example 5-13 Source NAT (one-to-one)

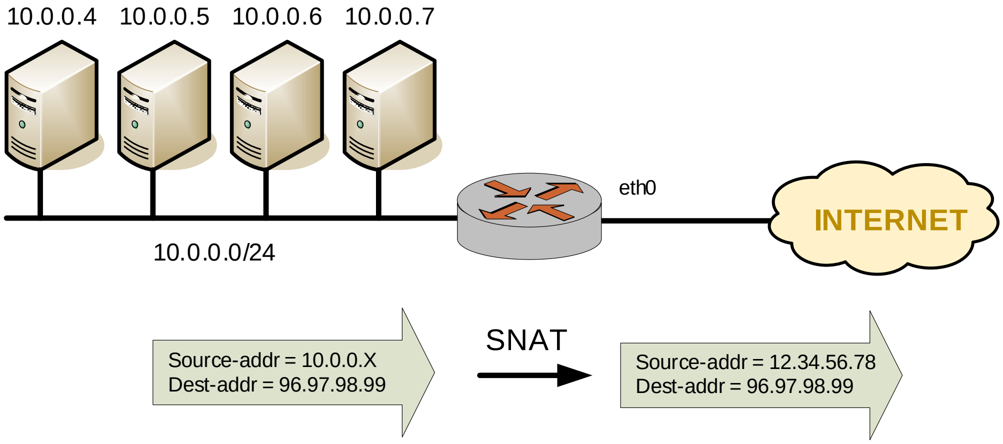
Show the configuration.

```
vyatta@vyatta# show service nat rule 10
   outbound-interface eth0
   outside-address {
        address 12.34.56.78
   }
   source {
        address 10.0.0.4
   }
   type source
[edit]
```

Source NAT (Many-to-One)

Figure 5-16 shows an example of SNAT where many different “inside” addresses are dynamically translated to a single “outside” address. In this example, all hosts on the 10.0.0.0/24 subnet will show the same source address externally.

Figure 5-16 Source NAT (many-to-one)



To configure NAT in this way, perform the following steps in configuration mode.

Example 5-14 Source NAT (many-to-one)

Step	Command

Create Rule 10. Rule 10 is an SNAT rule.	`vyatta@vyatta# set service nat rule 10 type source`
	`[edit]`

Example 5-14 Source NAT (many-to-one)

Apply this rule to packets coming from any host on network 10.0.0.0/24.	`vyatta@vyatta# set service nat rule 10 source address 10.0.0.0/24`
	`[edit]`

Send traffic out through interface eth0. Use 12.34.56.78 as the source address in outgoing packets. Note that the outside-address must be one of the addresses defined on the outbound interface.	`vyatta@vyatta# set service nat rule 10 outbound-interface eth0`
	`[edit]`
	`vyatta@vyatta# set service nat rule 10 outside-address address 12.34.56.78`
	`[edit]`

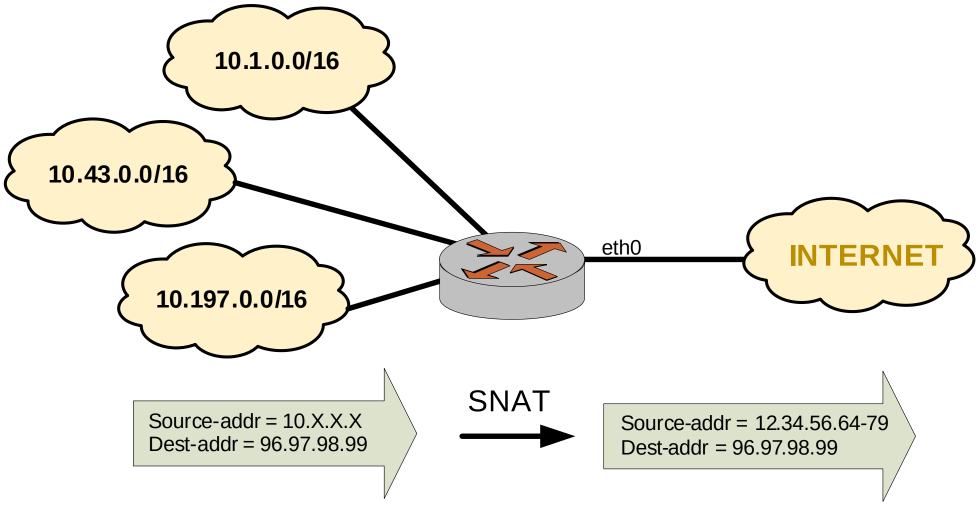
Commit the change.	`vyatta@vyatta# commit`
	`OK`
	`[edit]`

Show the configuration.	`vyatta@vyatta# show service nat rule 10`
	`   outbound-interface eth0`
	`   outside-address {`
	`        address 12.34.56.78`
	`   }`
	`   source {`
	`        address 10.0.0.0/24`
	`   }`
	`   type source`
	`[edit]`

Source NAT (Many-to-Many)

In many-to-many translations, a number of private addresses are NATted to a number of public addresses. Figure 5-17 shows a large private address space (/8) NATted to a few external addresses (/28 or /30).

Figure 5-17 Source NAT (many-to-many)



To configure NAT in this way, perform the following steps in configuration mode.

Example 5-15 Source NAT (many-to-many)

Step	Command
Create Rule 10. Rule 10 is an SNAT rule.	vyatta@vyatta# **set service nat rule 10 type source** [edit]
Apply this rule to packets coming from any host on network 10.0.0.0/8.	vyatta@vyatta# **set service nat rule 10 source address 10.0.0.0/8** [edit]
Send traffic out through interface eth0. Choose an address in the range 12.34.56.64 through 12.34.56.79 as the source address in outgoing packets. Note that the outside-addresses must be addresses defined on the outbound interface.	vyatta@vyatta# **set service nat rule 10 outbound-interface eth0** [edit] vyatta@vyatta# **set service nat rule 10 outside-address address 12.34.56.64-12.34.56.79** [edit]
Commit the change.	vyatta@vyatta# **commit** OK [edit]

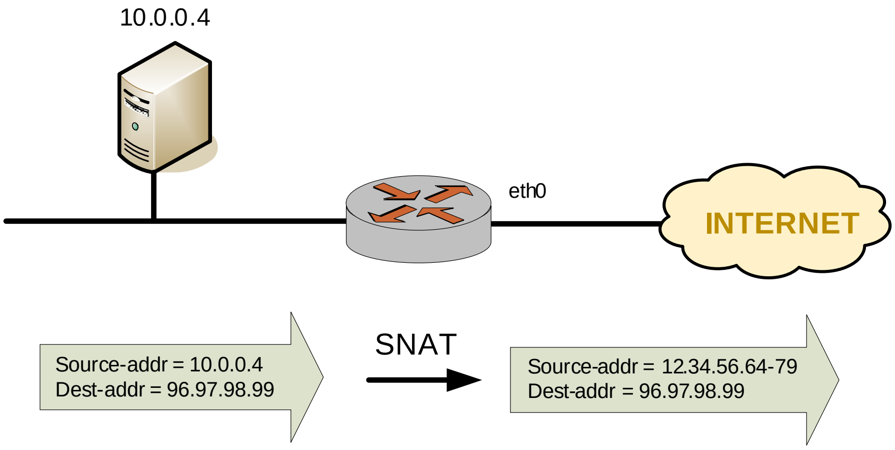
Example 5-15 Source NAT (many-to-many)

Show the configuration.	`vyatta@vyatta# show service nat rule 10`
	`   outbound-interface eth0`
	`   outside-address {`
	`      address 12.34.56.64-12.34.56.79`
	`   }`
	`   source {`
	`        address 10.0.0.0/8`
	`   }`
	`   type source`
	`[edit]`

Source NAT (One-to-Many)

This scenario is less common. One application of this scenario might be to test an upstream load-balancing device. In this scenario, a single test source device behind the NAT device appears externally to be multiple devices; see Figure 5-18.

Figure 5-18 Source NAT (one-to-many)



To configure NAT in this way, perform the following steps in configuration mode.

Example 5-16 Source NAT (one-to-many)

Step	Command

Create Rule 10. Rule 10 is an SNAT rule.	`vyatta@vyatta# set service nat rule 10 type source`
	`[edit]`

Example 5-16 Source NAT (one-to-many)

Apply this rule to packets coming from address 10.0.0.4.	vyatta@vyatta# **set service nat rule 10 source address 10.0.0.4** [edit]
Send traffic out through interface eth0. Choose an address in the range 12.34.56.64 through 12.34.56.79 as the source address in outgoing packets. Note that the outside-addresses must be addresses defined on the outbound interface.	vyatta@vyatta# **set service nat rule 10 outbound-interface eth0** [edit] vyatta@vyatta# **set service nat rule 10 outside-address address 12.34.56.64-12.34.56.79** [edit]
Commit the change.	vyatta@vyatta# **commit** OK [edit]

Show the configuration.	vyatta@vyatta# **show service nat rule 10**
	   outbound-interface eth0
	   outside-address {
	      address 12.34.56.64-12.34.56.79
	   }
	   source {
	      address 10.0.0.4
	   }
	   type source
	[edit]

Masquerade

Masquerade NAT is used in situations where LAN devices are assigned private IPaddressess and reside behind the Vyatta router, which has an outside-facing (that is, Internet-facing) interface with only one public IP address. When masquerade NAT is used, all traffic leaving the private network “masquerades” such that packets appear to be sourced from the single public IP address. This mechanism works well for providing Internet connectivity to network devices and hosts that are assigned private (RFC 1918) IP addresses, since otherwise packets sourced from those IP addresses cannot traverse the Internet.

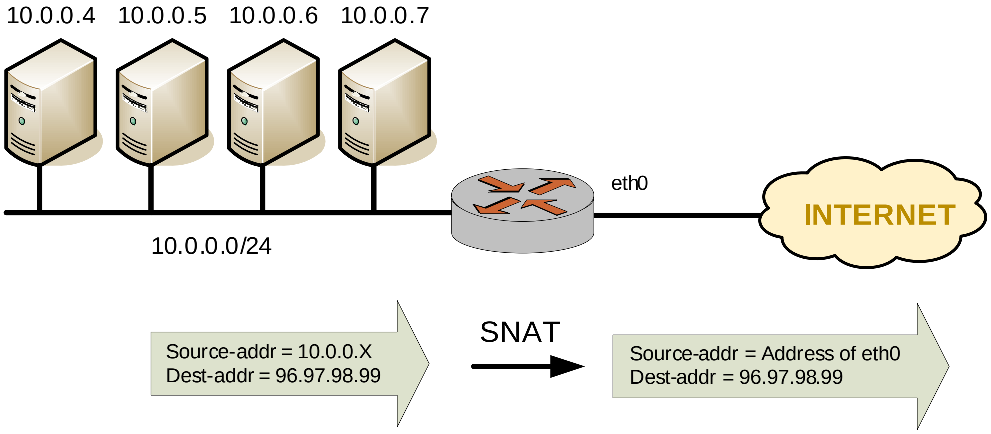
Masquerade NAT rules consist of a set of match conditions containing:

- Tthe source network (usually the private IP network assigned to LAN devices)
- A destination network (usually 0.0.0.0/0, which is used to represent the Internet or “any” address)
- The outbound interface (the Internet-facing interface that is assigned the public IP).

When a packet is matched against the masquerade NAT rule, the source address of the packet is modified before it is forwarded to its destination.

In this scenario, a number of hosts need to initiate sessions to external resources, but only one external public IP address is available. This would be the case, for example, if connecting via a serial interface. Figure 5-19 shows an example of masquerade NAT.

Figure 5-19 Masquerade



To configure NAT in this way, perform the following steps in configuration mode.

Example 5-17 Masquerade

Step	Command
Create Rule 10. Rule 10 is an SNAT rule.	vyatta@vyatta# **set service nat rule 10 type masquerade** [edit]
Apply this rule to packets coming from any host on network 10.0.0.0/24.	vyatta@vyatta# **set service nat rule 10 source address 10.0.0.0/24** [edit]
Send traffic out through interface eth0. Use the IP address of the outbound interface as the outside address.	vyatta@vyatta# **set service nat rule 10 outbound-interface eth0** [edit]
Commit the change.	vyatta@vyatta# **commit** OK [edit]

Example 5-17 Masquerade

Show the configuration.

```
vyatta@vyatta# show service nat rule 10
   outbound-interface eth0
   source {
        address 10.0.0.0/24
   }
   type masquerade
[edit]
```

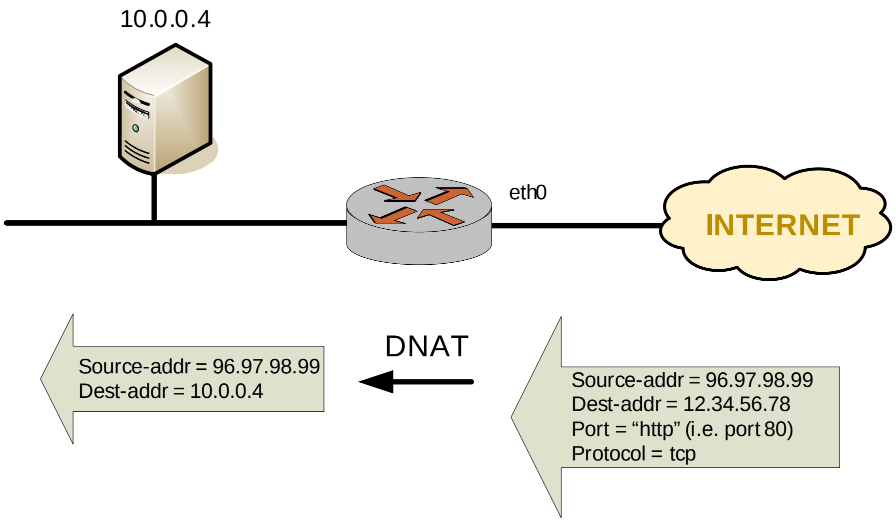
Destination NAT (One-to-One)

Destination NAT (DNAT) is used where only inbound traffic is expected.

Scenario 1: Packets destined for internal web server

For example, DNAT might be used in a scenario where a corporate web server needs to be reachable from external locations but never initiates outbound sessions, as shown in Figure 5-22.

Figure 5-20 Destination NAT (sone-to-one)



To configure NAT in this way, perform the following steps in configuration mode.

Example 5-18 Destination NAT (one-to-one)

Step	Command

Create Rule 10. Rule 10 is a DNAT rule.	`vyatta@vyatta#` **`set service nat rule 10 type destination`**
	`[edit]`

Apply this rule to all incoming tcp packets on eth0 bound for address 12.34.56.78 on the HTTP port.	`vyatta@vyatta#` **`set service nat rule 10 inbound-interface eth0`**
	`[edit]`
	`vyatta@vyatta#` **`set service nat rule 10 destination address 12.34.56.78`**
	`[edit]`
	`vyatta@vyatta#` **`set service nat rule 10 protocols tcp`**
	`[edit]`
	`vyatta@vyatta#` **`set service nat rule 10 destination port http`**
	`[edit]`

Forward traffic to address 10.0.0.4.	`vyatta@vyatta#` **`set service nat rule 10 inside-address address 10.0.0.4`**
	`[edit]`

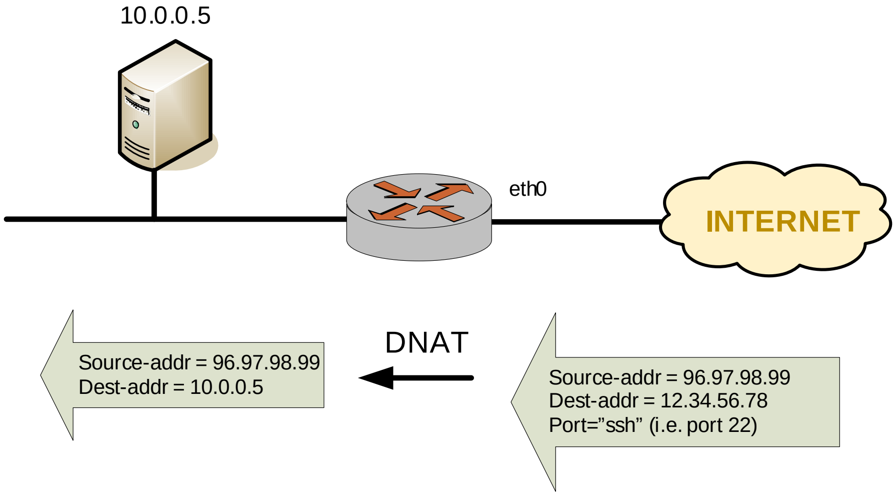
Commit the change.	`vyatta@vyatta#` **`commit`**
	`OK`
	`[edit]`

Show the configuration.	`vyatta@vyatta#` **`show service nat rule 10`**
	`destination {`
	`address 12.34.56.78`
	`port http`
	`}`
	`inbound-interface eth0`
	`inside-address {`
	`address 10.0.0.4`
	`}`
	`protocols tcp`
	`type destination`
	`[edit]`

Scenario 2: Packets destined for internal SSH server

In this scenario all traffic destined for the “ssh” port is passed through to a host containing an SSH server, as shown in Figure 5-21.

Figure 5-21 Destination NAT (one-to-one): filtering port name


10.0.0.5
eth0
INTERNET
DNAT
Source-addr = 96.97.98.99
Dest-addr = 10.0.0.5
Source-addr = 96.97.98.99
Dest-addr = 12.34.56.78
Port=”ssh” (i.e. port 22)

To configure NAT in this way, perform the following steps in configuration mode.

Example 5-19 Destination NAT (one-to-one): filtering port name

Step	Command
Create Rule 10. Rule 10 is a DNAT rule.	vyatta@vyatta# **set service nat rule 10 type destination** [edit]
Apply this rule to all incoming packets on eth0 bound for the SSH port of address 12.34.56.78.	vyatta@vyatta# **set service nat rule 10 inbound-interface eth0** [edit] vyatta@vyatta# **set service nat rule 10 protocol tcp** [edit] vyatta@vyatta# **set service nat rule 10 destination port ssh** [edit] vyatta@vyatta# **set service nat rule 10 destination address 12.34.56.78** [edit]
Forward traffic to address 10.0.0.5.	vyatta@vyatta# **set service nat rule 10 inside-address address 10.0.0.5** [edit]

Example 5-19 Destination NAT (one-to-one): filtering port name

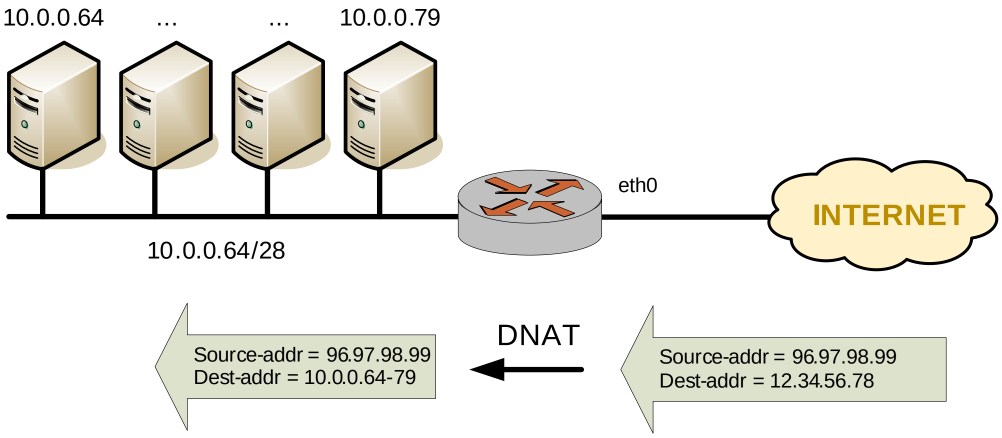
Commit the change.	`vyatta@vyatta#` **`commit`**
	`OK`
	`[edit]`

Show the configuration.	`vyatta@vyatta#` **`show service nat rule 10`**
	`   destination {`
	`        address 12.34.56.78`
	`        port ssh`
	`   }`
	`   inbound-interface eth0`
	`   inside-address {`
	`        address 10.0.0.5`
	`   }`
	`   protocols tcp`
	`   type destination`
	`[edit]`

Destination NAT (One-to-Many)

Another example where DNAT might be used in a scenario where a corporate web farm is accessed through a single IP address (i.e. a single IP address translated to many IP addresses dynamically), as shown in Figure 5-22.

Figure 5-22 Destination NAT (one-to-many)



To configure NAT in this way, perform the following steps in configuration mode.

Example 5-20 Destination NAT(one-to-many)

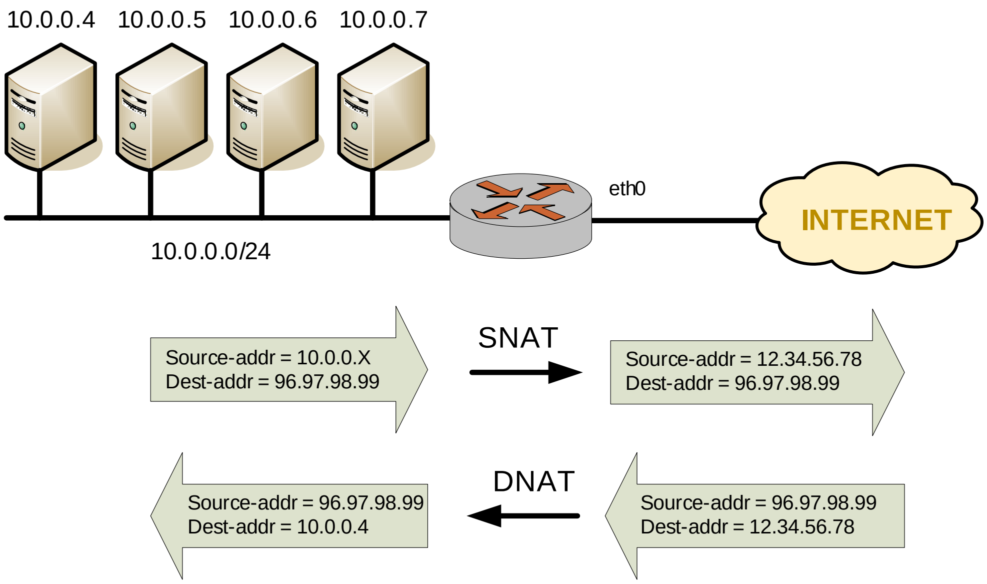
Step	Command
Create Rule 10. Rule 10 is a DNAT rule.	vyatta@vyatta# **set service nat rule 10 type destination** [edit]
Apply this rule to all incoming packets on eth0 bound for address 12.34.56.78.	vyatta@vyatta# **set service nat rule 10 inbound-interface eth0** [edit] vyatta@vyatta# **set service nat rule 10 destination address 12.34.56.78** [edit]
Forward traffic to addresses in the range 10.0.0.64 to 10.0.0.79.	vyatta@vyatta# **set service nat rule 10 inside-address address 10.0.0.64-10.0.0.79** [edit]
Commit the change.	vyatta@vyatta# **commit** OK [edit]

Show the configuration.	vyatta@vyatta# **show service nat rule 10**
	destination {
	address 12.34.56.78
	}
	inbound-interface eth0
	inside-address {
	address 10.0.0.64-10.0.0.79
	}
	type destination
	[edit]

Bi-Directional NAT

Bi-directional NAT is simply a combination of source and destination NAT. A typical scenario might use SNAT on the outbound traffic of an entire private network, and DNAT for specific internal services (for example, mail, or web); see Figure 5-24.

Figure 5-23 Bi-Directional NAT



To configure NAT in this way, perform the following steps in configuration mode.

Example 5-21 Bi-Directional NAT

Step	Command

Create Rule 10. Rule 10 is an SNAT rule.	`vyatta@vyatta# set service nat rule 10 type source`
	`[edit]`

Apply this rule to packets coming from any host in the 10.0.0.0/24 network.	`vyatta@vyatta# set service nat rule 10 source address 10.0.0.0/24`
	`[edit]`

Send traffic through interface eth0. Use 12.34.56.78 as the source address in outgoing packets.	`vyatta@vyatta# set service nat rule 10 outbound-interface eth0`
	`[edit]`
	`vyatta@vyatta# set service nat rule 10 outside-address address 12.34.56.78`
	`[edit]`

Example 5-21 Bi-Directional NAT

Create Rule 20. Rule 20 is a DNAT rule.	vyatta@vyatta# **set service nat rule 20 type destination** [edit]
Apply this rule to all incoming packets on eth0 bound for address 12.34.56.78.	vyatta@vyatta# **set service nat rule 20 inbound-interface eth0** [edit] vyatta@vyatta# **set service nat rule 20 destination address 12.34.56.78** [edit]
Forward traffic to address 10.0.0.4.	vyatta@vyatta# **set service nat rule 20 inside-address address 10.0.0.4** [edit]
Commit the change.	vyatta@vyatta# **commit** OK [edit]

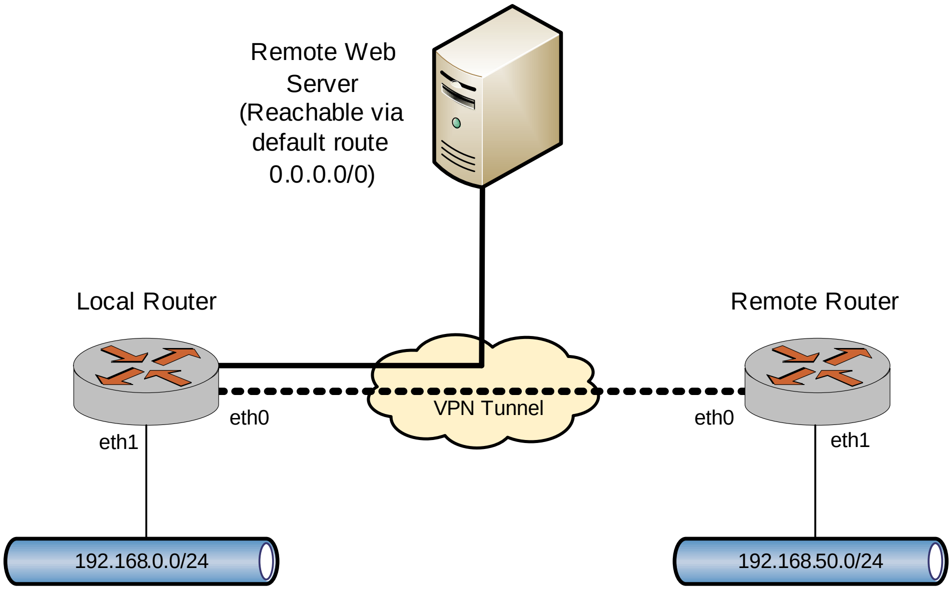
Show the configuration.	vyatta@vyatta# **show service nat rule 10**
	outbound-interface eth0
	outside-address {
	address 12.34.56.78
	}
	source {
	address 10.0.0.0/24
	}
	type source
	[edit]
	vyatta@vyatta# **show service nat rule 20**
	destination {
	address 12.34.56.78
	}
	inbound-interface eth0
	inside-address {
	address 10.0.0.4
	}
	type destination
	[edit]

Masquerade NAT and VPN

When a packet is matched against the masquerade NAT rule, the source address of the packet is modified before it is forwarded to its destination. This means that masquerade NAT rules are applied before the VPN process compares the packets against the VPN configuration. If the source network configured for masquerade NAT is also configured to use a site-to-site VPN connection using the same externally facing interface, the packets will not be recognized by the VPN process (since the source address has been changed) and they will not be placed into the VPN tunnel for transport.

To account for this behavior, packets destined for the VPN tunnel must be excluded from being masqueraded. This is shown in Figure 5-24.

Figure 5-24 Masquerade NAT and VPN



To configure NAT in this way, perform the following steps in configuration mode.

Example 5-22 Masquerade NAT configured to bypass a VPN tunnel

Step	Command
Create Rule 10. Rule 10 is an SNAT rule.	vyatta@vyatta# **set service nat rule 10 type masquerade** [edit]
Apply this rule to packets coming from any host on network 192.168.0.0/24.	vyatta@vyatta# **set service nat rule 10 source address 192.168.0.0/24** [edit]
Apply this rule to all packets except those destined for network 192.168.50.0/24.	vyatta@vyatta# **set service nat rule 10 destination address !192.168.50.0/24** [edit]
Send traffic out through interface eth0. Use the IP address of the outbound interface as the outside address.	vyatta@vyatta# **set service nat rule 10 outbound-interface eth0** [edit]

Example 5-22 Masquerade NAT configured to bypass a VPN tunnel

Commit the change.

```
vyatta@vyatta# commit
OK
[edit]
```

Show the configuration.

```
vyatta@vyatta# show service nat rule 10
   destination {
        address !192.168.50.0/24
   }
   outbound-interface eth0
   source {
        address 192.168.0.0/24
   }
   type masquerade
[edit]
```

Note that you should take care using more than one “exclusion” rule (that is, a rule using the negation operation [“!”] in combination). NAT rules are evaluated sequentially, and a sequence of exclusion rules may result in unexpected behavior.

Consider the NAT rule shown in Example 5-23.

Example 5-23 Single NAT exclusion rule: correct behavior

```
rule 10 {
   destination {
      address !192.168.50.0/24
   }
   outbound-interface eth0
   source {
      address 192.168.0.0/24
   }
   type masquerade
}
```

This NAT will exclude the 192.168.50.0/24 network, as expected.

On the other hand, consider the set of two NAT rules shown in Example 5-24.

Example 5-24 Multiple NAT exclusion rules: unexpected behavior

```
rule 10 {
   destination {
      address !192.168.50.0/24
   }
   outbound-interface eth0
   source {
      address 192.168.0.0/24
   }
   type masquerade
}
rule 20 {
   destination {
      address !172.16.50.0/24
   }
   outbound-interface eth0
   source {
      address 192.168.0.0/24
   }
   type masquerade
}
```

This combination rules will NOT result in the exclusion of networks 192.168.50.0/24 and 172.16.50.0/24. As explained above, these NAT rules are evaluated sequentially: when a packet arrives, it is tested against the first rule and if it does not match, it is tested against the second rule, and so on until it matches a rule.

In this example, a packet with a destination in 192.168.50.0/24 does NOT meet the match criteria in rule 10 (which matches all packets with destination NOT in 192.168.50.0/24). As a result, the packet “falls through” to rule 20. A packet with a destination in 192.168.50.0/24 DOES match rule 20 (because it is not in 172.16.50.0/24), and therefore the packet is NATted, which is not the desired result.

Similarly, a packet with a destination in 172.16.50.0/24 will be matched and NATed by rule 10.

Using “exclude”

Another way to address this issue is to use **exclude**, which excludes packets that match a given rule from NAT. The following example uses **exclude** to provide the same functionality as in Example 5-23

Example 5-25 Single NAT exclusion rule: correct behavior - using **exclude**

```
   rule 10 {
      destination {
         address 192.168.50.0/24
      }
      exclude
      outbound-interface eth0
      source {
         address 192.168.0.0/24
      }
      type masquerade
   }
   rule 20 {
      outbound-interface eth0
      source {
         address 192.168.0.0/24
      }
      type masquerade
   }
```

Note that an additional rule (rule 20) is required to handle packets that are not “excluded”.

The following example uses **exclude** to provide the behavior that was expected, but not achieved, in Example 5-24

Example 5-26 Multiple NAT exclusion rules: expected behavior - using **exclude**

```
   rule 10 {
      destination {
         address 192.168.50.0/24
      }
      exclude
      outbound-interface eth0
      source {
         address 192.168.0.0/24
      }
      type masquerade
   }
   rule 20 {
      destination {
         address 172.16.50.0/24
      }
      exclude
      outbound-interface eth0
      source {
         address 192.168.0.0/24
      }
      type masquerade
   }
   rule 30 {
      outbound-interface eth0
      source {
         address 192.168.0.0/24
```

```
            }
            type masquerade
        }
```

In this example, rule 30 handles packets that are not “excluded”

NAT Commands

This chapter contains the following commands.

Configuration Commands	
service nat	Enables NAT on the system.
service nat rule <rule-num>	Defines a NAT rule.
service nat rule <rule-num> destination	Specifies the destination address and port to match in a NAT rule.
service nat rule <rule-num> exclude	Creates an exclusion rule, excluding the specified packets from being translated.
service nat rule <rule-num> inbound-interface <interface>	Specifies the interface on which to receive inbound traffic for a destination NAT rule.
service nat rule <rule-num> inside-address	Defines the inside address for a destination NAT rule.
service nat rule <rule-num> outbound-interface <interface>	Specifies the interface on which to transmit outbound traffic for source and masquerade NAT rules.
service nat rule <rule-num> outside-address	Defines an outside address configuration for a Source NAT (SNAT) rule.
service nat rule <rule-num> protocol <protocol>	Specifies which protocols are to have NAT performed on them.
service nat rule <rule-num> source	Specifies the source address and port to match in a NAT rule.
service nat rule <rule-num> type <type>	Sets the type of translation for a NAT rule.
Operational Commands	
clear nat counters	Resets counters for active NAT rules.
clear nat translations	Clears state information associated with the specified NAT rule(s).
show nat rules	Lists configured NAT rules.
show nat statistics	Displays statistics for NAT.

clear nat counters

Resets counters for active NAT rules.

Syntax

clear nat counters

Command Mode

Operational mode.

Parameters

None.

Default

None.

Usage Guidelines

Use this command to reset counters for NAT translation rules. Counters are reset for all rules.

clear nat translations

Clears state information associated with the specified NAT rule(s).

Command Mode

Operational mode.

Syntax

clear nat translations

Parameters

None.

Default

None.

Usage Guidelines

Use this rule to clear state information associated with all NAT rules.

service nat

Enables NAT on the system.

Syntax

set service nat

delete service nat

show service nat

Command Mode

Configuration mode.

Configuration Statement

```
service {
   nat {
   }
}
```

Parameters

None.

Default

None.

Usage Guidelines

Use this command to enable Network Address Translation (NAT) on the Vyatta system.

Use the **set** form of this command to create and modify NAT configuration.

Use the **delete** form of this command to remove NAT configuration and disable NAT on the system.

Use the **show** form of this command to view NAT configuration.

service nat rule <rule-num>

Defines a NAT rule.

Syntax

set service nat rule *rule-num*

delete service nat rule [*rule-num*]

show service nat rule [*rule-num*]

Command Mode

Configuration mode.

Configuration Statement

```
service {
   nat {
      rule 1-1024 {
      }
   }
}
```

Parameters

rule-num	Mandatory. Multi-node. A numeric identifier for the rule. The range is 1–1024.

Default

None.

Usage Guidelines

Use this command to specify a NAT rule configuration.

NAT rules are executed in numeric order. Note that the identifier of a NAT rule (its number) cannot be changed after configuration. To allow insertion of more rules in the future, choose rule numbers with space between; for example, number your initial rule set 10, 20, 30, 40, and so on.

Use the **set** form of this command to create or modify a NAT rule.

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

Use the **show** form of this command to view NAT rule configuration.

service nat rule <rule-num> destination

Specifies the destination address and port to match in a NAT rule.

Syntax

set service nat rule *rule-num* **destination** [**address** *address* | **port** *port*]

delete service nat rule *rule-num* **destination** [**address** | **port**]

show service nat rule *rule-num* **destination** [**address** | **port**]

Command Mode

Configuration mode.

Configuration Statement

```
service {
   nat {
      rule 1-1024 {
         destination {
            address: text
            port: text
         }
      }
   }
}
```

Parameters

rule-num	Mandatory. Multi-node. A numeric identifier for the rule. The range is 1–1024.

address	The destination address to match. The following formats are valid: *ip-address*: Matches the specified IP address. *ip-address/prefix*: A network address, where 0.0.0.0/0 matches any network. *ip-address–ip-address*: Matches a range of contiguous IP addresses; for example, 192.168.1.1–192.168.1.150. **!***ip-address*: Matches all IP addresses except the one specified. **!***ip-address/prefix*: Matches all network addresses except the one specified. **!***ip-address–ip-address*: Matches all IP addresses except those in the specified range.
port	The destination port to match. The following formats are valid: *port-name*: Matches the name of an IP service; for example, **http**. You can specify any service name in the file **etc/services**. *port-num*: Matches a port number. The range is 1 to 65535. *start–end*: Matches the specified range of ports; for example, 1001–1005. You can use a combination of these formats in a comma-separated list. You can also negate the entire list by prepending it with an exclamation mark (“!”); for example, **!22,telnet,http,123,1001-1005**.

Default

None.

Usage Guidelines

Use this command to specify the destination to match in a NAT rule.

Note that you should take care in using more than one “exclusion” rule (that is, a rule using the negation operation (“!”) in combination. NAT rules are evaluated sequentially, and a sequence of exclusion rules could result in unexpected behavior.

Use the **set** form of this command to create a NAT destination.

Use the **delete** form of this command to remove a NAT destination configuration.

Use the **show** form of this command to view NAT destination onfiguration.

service nat rule <rule-num> exclude

Creates an exclusion rule, excluding the specified packets from being translated.

Syntax

set service nat rule *rule-num* **exclude**

delete service nat rule *rule-num* **exclude**

show service nat rule *rule-num*

Command Mode

Configuration mode.

Configuration Statement

```
service {
   nat {
      rule 1-1024 {
         exclude
      }
   }
}
```

Parameters

rule-num	Mandatory. Multi-node. A numeric identifier for the rule. The range is 1–1024.

Default

None.

Usage Guidelines

Use this command to specify that packets matching this rule are to be excluded from address translation. Exclusion can be used in scenarios where certain types of traffic (for example VPN traffic) should not be translated.

Use the **set** form of this command to specify that packets matching this rule will be excluded from NAT.

Use the **delete** form of this command to remove the configuration

Use the **show** form of this command to view the configuration.

service nat rule <rule-num> inbound-interface <interface>

Specifies the interface on which to receive inbound traffic for a destination NAT rule.

Syntax

set service nat rule *rule-num* **inbound-interface** *interface*

delete service nat rule *rule-num* **inbound-interface**

show service nat rule *rule-num* **inbound-interface**

Command Mode

Configuration mode.

Configuration Statement

```
service {
   nat {
      rule 1-1024 {
         inbound-interface: text
      }
   }
}
```

Parameters

rule-num	Mandatory. Multi-node. A numeric identifier for the rule. The range is 1–1024.
interface	The inbound Ethernet or serial interface. Destination NAT (DNAT) will be performed on traffic received on this interface. You can specify an individual vif, rather than an entire interface. To do this, refer to the vif using *int.vif* notation. For example to refer to vif 40 on interface eth0, use **eth0.40**.

Default

None.

Usage Guidelines

Use this command to specify the inbound Ethernet or serial interface at which destination NAT (DNAT) traffic will be received. inbound Ethernet or serial interface. Destination NAT will be performed on traffic received on this interface.

This command can only be used on destination NAT rules (that is, NAT rules with a type of **destination**). It is not applicable to rules with a type of **source** or **masquerade**.

Use the **set** form of this command to specify inbound interface configuration

Use the **delete** form of this command to remove inbound interface configuration.

Use the **show** form of this command to view inbound interface configuration.

service nat rule <rule-num> inside-address

Defines the inside address for a destination NAT rule.

Syntax

set service nat rule *rule-num* **inside-address** [**address** *address* | **port** *port*]

delete service nat rule *rule-num* **inside-address** [**address** *address* | **port** *port*]

show service nat rule *rule-num* **inside-address** [**address** *address* | **port** *port*]

Command Mode

Configuration mode.

Configuration Statement

```
service {
   nat {
      rule 1-1024 {
         inside-address {
            address: text
            port: text
         }
      }
   }
}
```

Parameters

rule-num	Mandatory. Multi-node. A numeric identifier for the rule. The range is 1–1024.
address	The address or range of addresses to be used to translate the inside address. The following formats are valid: *ip-address*: Translates to the specified IP address. *ip-address–ip-address*: Translates to one of the IP addresses in the specified pool of contiguous IP addresses; for example, 192.168.1.1–192.168.1.150.

port	The IP port to be used to translate the inside address. The following formats are valid: *port-num*: Translates to the specified port. The range is 1 to 65535. *start–end*: Translates to one of the ports in the specified pool of contiguous ports; for example, 1001–1005.

Default

None.

Usage Guidelines

Use this command to defines the “inside” IP address for a destination NAT (DNAT) rule.

Defining an inside address is mandatory for **destination** rules. Inside address is not used with **source** or **masquerade** rules.

Destination rules ingress from the untrusted to the trusted network. The inside address defines the IP address of the host on the trusted network. This is the address that will be substituted for the original destination IP address on packets sent to the system.

Use the **set** form of this command to create an inside address configuration for a Destination NAT (DNAT) rule.

Use the **delete** form of this command to remove the configuration.

Use the **show** form of this command to view the configuration.

service nat rule <rule-num> outbound-interface <interface>

Specifies the interface on which to transmit outbound traffic for source and masquerade NAT rules.

Syntax

set service nat rule *rule-num* **outbound-interface** *interface*

delete service nat rule *rule-num* **outbound-interface**

show service nat rule *rule-num* **outbound-interface**

Command Mode

Configuration mode.

Configuration Statement

```
service {
   nat {
      rule 1-1024 {
         outbound-interface: text
      }
   }
}
```

Parameters

rule-num	Mandatory. Multi-node. A numeric identifier for the rule. The range is 1–1024.
interface	Optional for **source** rules; mandatory for **masquerade** rules. Not configurable for **destination** rules. The outbound Ethernet or serial interface. Source NAT (SNAT) or masquerade will be performed on traffic transmitted from this interface. You can specify an individual vif, rather than an entire interface. To do this, refer to the vif using *int.vif* notation. For example to refer to vif 40 on interface eth0, use **eth0.40**.

Default

None.

Usage Guidelines

Use this command to specify the outbound serial or Ethernet interface from which Source NAT (SNAT) or masquerade traffic is to be transmitted. Source NAT (SNAT) or masquerade will be performed on traffic transmitted from this interface.

Configuring an outbound interface is optional for **source** rules and mandatory for **masquerade** rules. Outbound address cannot be configured for **destination** rules.

Use the **set** form of this command to specify the outbound interface.

Use the **delete** form of this command to remove outbound interface configuration.

Use the **show** form of this command to view outbound interface configuration.

service nat rule <rule-num> outside-address

Defines an outside address configuration for a Source NAT (SNAT) rule.

Syntax

set service nat rule *rule-num* **outside-address** [**address** *address* | **port** *port*]

delete service nat rule *rule-num* **outside-address** [**address** | **port**]

show service nat rule *rule-num* **outside-address** [**address** | **port**]

Command Mode

Configuration mode.

Configuration Statement

```
service {
   nat {
      rule 1-1024 {
         outside-address {
            address: text
            port: text
         }
      }
   }
}
```

Parameters

rule-num	Mandatory. Multi-node. A numeric identifier for the rule. The range is 1–1024.
address	The address or range of addresses to be used to translate the outside address. The address or addresses chosen must be present on the outbound interface. The following formats are valid: *ip-address*: Translates to the specified IP address. *ip-address–ip-address*: Translates to one of the IP addresses in the specified pool of contiguous IP addresses; for example, 192.168.1.1–192.168.1.150.

port	The IP port to be used to translate the outside address. The following formats are valid: *port-num*: Translates to the specified port. The range is 1 to 65535. *start–end*: Translates to one of the ports in the specified pool of contiguous ports; for example, 1001–1005.

Default

None.

Usage Guidelines

Use this command to set the “outside” IP address for a source NAT (SNAT) rule.

Setting the outside address is mandatory for **source** NAT rules. Setting the outside address is not allowed with **destination** NAT rules or **masquerade** rules; for **masquerade** rules, the primary address of the interface is always used.

Use the **set** form of this command to create an outside address configuration for a Source NAT (SNAT) rule.

Use the **delete** form of this command to remove the configuration.

Use the **show** form of this command to view the configuration.

service nat rule <rule-num> protocol <protocol>

Specifies which protocols are to have NAT performed on them.

Syntax

set service nat rule *rule-num* **protocol** *protocol*

delete service nat rule *rule-num* **protocol**

show service nat rule *rule-num* **protocol**

Command Mode

Configuration mode.

Configuration Statement

```
service {
   nat {
      rule 1-1024 {
         protocol: text
      }
   }
}
```

Parameters

rule-num	Mandatory. Multi-node. A numeric identifier for the rule. The range is 1–1024.
protocol	The protocol(s) on which to perform NAT. Any protocol literals or numbers listed in **/etc/protocols** can be used. The keyword **all** is also supported. Prefixing the protocol name with the exclamation mark character (“!”) matches every protocol except the specified protocol. For example, **!tcp** matches all protocols except TCP.

Default

None.

Usage Guidelines

Use this command to specify the protocol(s) on which to perform NAT.

Note that you should take care in using more than one “exclusion” rule (that is, a rule using the negation operation (“!”) in combination. NAT rules are evaluated sequentially, and a sequence of exclusion rules could result in unexpected behavior.

Use the **set** form of this command to specify the protocol(s) on which to perform NAT.

Use the **delete** form of this command to remove the configuration

Use the **show** form of this command to view the configuration.

service nat rule <rule-num> source

Specifies the source address and port to match in a NAT rule.

Syntax

set service nat rule *rule-num* **source** [**address** *address* | **port** *port*]

delete service nat rule *rule-num* **source** [**address** | **port**]

show service nat rule *rule-num* **source** [**address** | **port**]

Command Mode

Configuration mode.

Configuration Statement

```
service {
   nat {
      rule 1-1024 {
         source {
            address: text
            port: text
         }
      }
   }
}
```

Parameters

rule-num	Mandatory. Multi-node. A numeric identifier for the rule. The range is 1–1024.

address	The source address to match. The following formats are valid: *ip-address*: Matches the specified IP address. *ip-address/prefix*: A network address, where 0.0.0.0/0 matches any network. *ip-address–ip-address*: Matches a range of contiguous IP addresses; for example, 192.168.1.1–192.168.1.150. **!***ip-address*: Matches all IP addresses except the one specified. **!***ip-address/prefix*: Matches all network addresses except the one specified. **!***ip-address–ip-address*: Matches all IP addresses except those in the specified range.
port	The source port to match. The following formats are valid: *port-name*: Matches the name of an IP service; for example, **http**. You can specify any service name in the file **etc/services** . *port-num*: Matches a port number. The range is 1 to 65535. *start–end*: Matches the specified range of ports; for example, 1001–1005. You can use a combination of these formats in a comma-separated list. You can also negate the entire list by prepending it with an exclamation mark (“!”); for example, **!22,telnet,http,123,1001-1005**.

Default

None.

Usage Guidelines

Use this command to specify the source to match in a NAT rule.

Note that you should take care in using more than one “exclusion” rule (that is, a rule using the negation operation (“!”) in combination. NAT rules are evaluated sequentially, and a sequence of exclusion rules could result in unexpected behavior.

Use the **set** form of this command to create a NAT source.

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

Use the **show** form of this command to view NAT source configuration.

service nat rule <rule-num> type <type>

Sets the type of translation for a NAT rule.

Syntax

set service nat rule *rule-num* **type** *type*

delete service nat rule *rule-num* **type**

show service nat rule *rule-num* **type**

Command Mode

Configuration mode.

Configuration Statement

```
service {
   nat {
      rule 1-1024 {
         type: [source|destination|masquerade]
      }
   }
}
```

Parameters

rule-num	Mandatory. Multi-node. A numeric identifier for the rule. The range is 1–1024.
type	Indicates whether this rule is translating the source IP or the destination IP. Note that this is dependent on the direction of the interface. The supported values are as follows: **source**: This rule translates the source network address. Typically “source” rules are applied to outbound packets. **destination**: This rule translates the destination network address. Typically “destination” rules are applied to inbound packets. **masquerade**: This rule is a type of source NAT. It translates the source network address using the outbound router interface IP address as the translated address.

Default

None.

Usage Guidelines

Use this command to specify whether the rule is translating the source or destination IP address.

You must create explicit NAT rules for each direction of traffic. For example, if you configure a one-to-one source NAT rule and you want inbound traffic to match the NAT rule, you must explicitly create a matching destination NAT rule.

Source rules egress from the trusted to the untrusted network. For source NAT rules, the outside address defines the IP address that faces the untrusted network. This is the address that will be substituted in for the original source IP address in packets egressing to the

An outside address is not required for rules with a type of **masquerade**, because for masquerade rules the original source IP address is replaced with the IP address of the outbound interface. In fact, if you configure a NAT rule with a type of masquerade, you cannot define the outside IP address, because the system uses the primary address of the outbound interface. If you want to use one of the other IP addresses you have assigned to the interface, change the type from **masquerade** to **source**. Then you will be able to define an outside address.

outbound address:Optional for **source** rules; mandatory for **masquerade** rules. Not configurable for **destination** rules. The outbound Ethernet or serial interface. Source NAT (SNAT) or masquerade will be performed on traffic transmitted from this interface.

Use the **set** form of this command to specify whether the rule is translating the source or destination IP address.

Use the **delete** form of this command to remove the configuration

Use the **show** form of this command to view the configuration.

show nat rules

Lists configured NAT rules.

Syntax

show nat rules

Command Mode

Operational mode.

Parameters

None.

Usage Guidelines

Use this command to display the NAT rules you have configured. You can use this command for troubleshooting, to confirm whether traffic is matching the NAT rules as expected.

show nat statistics

Displays statistics for NAT.

Syntax

show nat statistics

Command Mode

Operational mode.

Parameters

None.

Usage Guidelines

Use this command to display current statistics for NAT.

Chapter 6: Web Caching

This chapter explains how to set up web caching on the Vyatta system.

This chapter presents the following topics:

- Web Caching Configuration
- Web Caching Commands

Web Caching Configuration

This section presents the following topics:

- Web Caching Overview
- Web Caching Configuration Example

Web Caching Overview

The Vyatta system can be configured to act as a web proxy server for web caching and URL filtering. A client can request a web page from the Vyatta system, which connects to the web server and requests the page on the client's behalf. The Vyatta system caches the response; if the page is requested again it can be served directly from the cache, saving the time and bandwidth required for transacting with the web server.

By default, the system acts as a transparent proxy. A transparent proxy automatically redirects port 80 traffic to the web proxy server.

The Vyatta system can also be set as non-transparent proxy. Non-transparent proxies require client browsers to supply the proxy address and port before requests are redirected. The clients must be configured with this information. The advantage of non-transparent proxying is that the client web browser can detect that a proxy is in use, and can behave accordingly. In addition, web-transmitted malware can sometimes be blocked by a non-transparent web proxy, since the malware is unlikely to be aware of the proxy settings.

To configure the Vyatta system as a non-transparent proxy, use the **service webproxy listen-address <ipv4> disable-transparent** command.

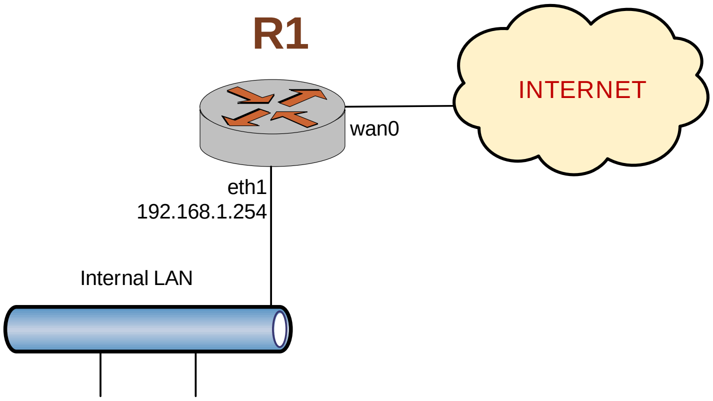
NOTE *Vyatta recommends against enabling web caching on systems with flash memory storage as the cache will repeatedly write to disk and wear out the flash storage medium over time. Web caching should only be used in environments with a hard disk drive.*

Web Caching Configuration Example

Figure 6-1 shows the web proxy deployment used in the examples in this section. In this scenario:

- Devices on the company's internal LAN are accessing the Internet through the Vyatta system (R1).
- The web proxy is deployed on R1 to provide caching and URL filtering functionality to employees accessing the Internet.

Figure 6-1 Web proxy



This section presents the following example:

- Example 6-1 Setting up web caching

Configuring Web Caching

Example 6-1 sets up simple web caching. In this example:

- The listen address is set to the primary IP address of the internal interface.
- The default cache-size is set to 100MB.
- The default port is set to 3128. HTTP traffic (that is, traffic on port 80) will be redirected to this port.

To set up web caching on the Vyatta system perform the following steps:

Example 6-1 Setting up web caching

Step	Command

Set web proxy to listen on address 192.168.1.254 for web requests.	`vyatta@R1# set service webproxy listen-address 192.168.1.254`
	`[edit]`

Commit the change	`vyatta@R1# commit`
	`[edit]`

Show web proxy–related configuration.	`vyatta@R1# show service webproxy`
	`listen-address 192.168.1.254 {`
	`}`
	`[edit]`

Web Caching Commands

This chapter contains the following commands.

Configuration Commands	
service webproxy cache-size <size>	Sets the size of the web proxy service cache.
service webproxy default-port <port>	Sets the default listening port for web proxy listen addresses.
service webproxy disable-access-log	Disables logging of http accesses.
service webproxy listen-address <ipv4>	Specifies a web proxy listening address.
service webproxy listen-address <ipv4> disable-transparent	Disables web proxy transparent mode at a listening address.
service webproxy listen-address <ipv4> port <port>	Sets the listening port for a listening address.
Operational Commands	
None.	

service webproxy cache-size <size>

Sets the size of the web proxy service cache.

Syntax

set service webproxy cache-size *size*

delete service webproxy cache-size

show service webproxy cache-size

Command Mode

Configuration mode.

Configuration Statement

```
service {
   webproxy {
      cache-size u32
   }
}
```

Parameters

size	Optional. The amount of disk space, in megabytes, to allocate for the webproxy cache. The range is 0 to ????, where 0 disables web caching. The default is 100 MB.

Default

The web cache is 100 MB.

Usage Guidelines

Use this command to specify the size of the web proxy service cache size.

Use the **set** form of this command to specify the web proxy service cache size.

Use the **delete** form of this command to remove the web proxy service cache size.

Use the **show** form of this command to view the web proxy service cache size.

service webproxy default-port <port>

Sets the default listening port for web proxy listen addresses.

Syntax

set service webproxy default-port *port*

delete service webproxy default-port

show service webproxy default-port

Command Mode

Configuration mode.

Configuration Statement

```
service {
   webproxy {
      default-port u32
   }
}
```

Parameters

port	Optional. The port number to use for the web proxy service. The range is 0 to 65535. The default is 3128.

Default

Port 3128 is used on web proxy listen addresses.

Usage Guidelines

Use this command to specify the port on which the web proxy service is to listen for web requests from clients. This port is used by default on web proxy listen addresses.

Use the **set** form of this command to specify the listening port.

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

Use the **show** form of this command to view web proxy listening port configuration.

service webproxy disable-access-log

Disables logging of http accesses.

Syntax

set service webproxy disable-access-log

delete service webproxy disable-access-log

show service webproxy disable-access-log

Command Mode

Configuration mode.

Configuration Statement

```
service {
   webproxy {
      disable-access-log
   }
}
```

Parameters

None.

Default

HTTP accesses are logged.

Usage Guidelines

Use this command to disable loggin of HTTP accesses.

Use the **set** form of this command to disable logging.

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

Use the **show** form of this command to view the configuration.

service webproxy listen-address <ipv4>

Specifies a web proxy listening address.

Syntax

set service webproxy listen-address *ipv4* **port** *port*

delete service webproxy listen-address *ipv4* **port**

show service webproxy listen-address *ipv4* **port**

Command Mode

Configuration mode.

Configuration Statement

```
service {
   webproxy {
      listen-address ipv4 {
         port u32
      }
   }
}
```

Parameters

ipv4	Multi-node. The IP address the web proxy service listens on. You can set the system to listen for client web requests at more than one IP address by creating multiple **listen-address** configuration nodes.

Default

None.

Usage Guidelines

Use this command to specify an IP address on which the web proxy service will listen for client web requests. By default, the system listens on the port specified by the **service webproxy default-port <port>** command (see page 202). This can be changed using the the **service webproxy listen-address <ipv4> port <port>** command (see page 208).

The listen address should only be used on internal/trusted networks, since a proxy can be used to hide the client's true IP address.

Use the **set** form of this command to set a listening address for the web proxy service.

Use the **delete** form of this command to remove a listening address for the web proxy service.

Use the **show** form of this command to view web proxy listening address configuration.

service webproxy listen-address <ipv4> disable-transparent

Disables web proxy transparent mode at a listening address.

Syntax

set service webproxy listen-address *ipv4* **disable-transparent**

delete service webproxy listen-address *ipv4* **disable-transparent**

show service webproxy listen-address *ipv4*

Command Mode

Configuration mode.

Configuration Statement

```
service {
   webproxy {
      listen-address ipv4 {
         disable-transparent
      }
   }
}
```

Parameters

ipv4	An IP address the web proxy service is listening on.
disable-transparent	Disables transparent mode.

Default

Transparent mode is enabled.

Usage Guidelines

Use this command to disable web proxy transparent mode for the specified listening address.

In transparent mode, all traffic arriving on port 80 and destined for the Internet is automatically forwarded through the web proxy. This allows immediate proxy forwarding without configuring client browsers.

Non-transparent proxying requires that the client browsers be configured with the proxy settings before requests are redirected. The advantage of this is that the client web browser can detect that a proxy is in use and can behave accordingly. In addition, web-transmitted malware can sometimes be blocked by a non-transparent web proxy, since they are not aware of the proxy settings.

Use the **set** form of this command to disable web proxy transparent mode for the specified listening address.

Use the **delete** form of this command to re-enable transparent mode.

Use the **show** form of this command to view the configuration for the specified listening address.

service webproxy listen-address <ipv4> port <port>

Sets the listening port for a listening address.

Syntax

set service webproxy listen-address *ipv4* **port** *port*

delete service webproxy listen-address *ipv4* **port**

show service webproxy listen-address *ipv4* **port**

Command Mode

Configuration mode.

Configuration Statement

```
service {
   webproxy {
      listen-address ipv4 {
         port u32
      }
   }
}
```

Parameters

ipv4	An IP address the web proxy service is listening on.
port	The port on which the web proxy service is to listen. The default is the value configured as the default listening port.

Default

The default listening port is specified by the the **service webproxy default-port <port>** command (see page 202).

Usage Guidelines

Use this command to specify the listening port for a listening address.

By default, the web proxy service listens on the port defined as the default listening port. This value can be changed using the the **service webproxy default-port <port>** command (see page 202).

Use the **set** form of this command to specify the listening port for a listening address.

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

Use the **show** form of this command to view listening port configuration.

Glossary of Acronyms

ACL	access control list
ADSL	Asymmetric Digital Subscriber Line
AS	autonomous system
ARP	Address Resolution Protocol
BGP	Border Gateway Protocol
BIOS	Basic Input Output System
BPDU	Bridge Protocol Data Unit
CA	certificate authority
CHAP	Challenge Handshake Authentication Protocol
CLI	command-line interface
DDNS	dynamic DNS
DHCP	Dynamic Host Configuration Protocol
DLCI	data-link connection identifier
DMI	desktop management interface
DMZ	demilitarized zone
DNS	Domain Name System
DSCP	Differentiated Services Code Point
DSL	Digital Subscriber Line
eBGP	external BGP
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/Ouput
ICMP	Internet Control Message Protocol
IDS	Intrusion Detection System
IEEE	Institute of Electrical and Electronics Engineers
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
ISP	Internet Service Provider
L2TP	Layer 2 Tunneling Protocol
LACP	Link Aggregation Control Protocol
LAN	local area network
MAC	medium access control
MIB	Management Information Base
MLPPP	multilink PPP
MRRU	maximum received reconstructed unit
MTU	maximum transmission unit

NAT	Network Address Translation
ND	Neighbor Discovery
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
PCI	peripheral component interconnect
PKI	Public Key Infrastructure
PPP	Point-to-Point Protocol
PPPoA	PPP over ATM
PPPoE	PPP over Ethernet
PPTP	Point-to-Point Tunneling Protocol
PVC	permanent virtual circuit
QoS	quality of service
RADIUS	Remote Authentication Dial-In User Service
RIB	Routing Information Base
RIP	Routing Information Protocol
RIPng	RIP next generation
Rx	receive
SNMP	Simple Network Management Protocol
SONET	Synchronous Optical Network
SSH	Secure Shell
STP	Spanning Tree Protocol
TACACS+	Terminal Access Controller Access Control System Plus

TCP	Transmission Control Protocol
ToS	Type of Service
Tx	transmit
UDP	User Datagram Protocol
vif	virtual interface
VLAN	virtual LAN
VPN	Virtual Private Network
VRRP	Virtual Router Redundancy Protocol
WAN	wide area network