

Junos® OS

Security Policies User Guide for Security Devices

Published
2024-06-12

Juniper Networks, Inc.
1133 Innovation Way
Sunnyvale, California 94089
USA
408-745-2000
www.juniper.net

Juniper Networks, the Juniper Networks logo, Juniper, and Junos are registered trademarks of Juniper Networks, Inc. in the United States and other countries. All other trademarks, service marks, registered marks, or registered service marks are the property of their respective owners.

Juniper Networks assumes no responsibility for any inaccuracies in this document. Juniper Networks reserves the right to change, modify, transfer, or otherwise revise this publication without notice.

Junos® OS Security Policies User Guide for Security Devices
Copyright © 2024 Juniper Networks, Inc. All rights reserved.

The information in this document is current as of the date on the title page.

YEAR 2000 NOTICE

Juniper Networks hardware and software products are Year 2000 compliant. Junos OS has no known time-related limitations through the year 2038. However, the NTP application is known to have some difficulty in the year 2036.

END USER LICENSE AGREEMENT

The Juniper Networks product that is the subject of this technical documentation consists of (or is intended for use with) Juniper Networks software. Use of such software is subject to the terms and conditions of the End User License Agreement ("EULA") posted at <https://support.juniper.net/support/eula/>. By downloading, installing or using such software, you agree to the terms and conditions of that EULA.

Table of Contents

About This Guide | xii

1

Overview

Security Basics Overview | 2

Security Policies Overview | 2

2

Security Zones

Security Zones | 7

Security Zones Overview | 7

Example: Creating Security Zones | 9

Requirements | 10

Overview | 10

Configuration | 10

Verification | 12

Supported System Services for Host Inbound Traffic | 13

Understanding How to Control Inbound Traffic Based on Traffic Types | 14

Example: Controlling Inbound Traffic Based on Traffic Types | 15

Requirements | 15

Overview | 15

Configuration | 15

Verification | 18

Understanding How to Control Inbound Traffic Based on Protocols | 19

Example: Controlling Inbound Traffic Based on Protocols | 20

Requirements | 20

Overview | 20

Configuration | 21

Verification | 22

Example: Configuring the TCP-Reset Parameter | 23

Requirements | 23

3

- Overview | 23
- Configuration | 23
- Verification | 24

Address Books and Address Sets

Address Books and Address Sets | 26

- Understanding Address Books | 26

- Understanding Global Address Books | 29

- Understanding Address Sets | 29

- Configuring Addresses and Address Sets | 30

- Limitations of Addresses and Address Sets in a Security Policy | 34

- Using Addresses and Address Sets in NAT Configuration | 36

- Example: Configuring Address Books and Address Sets | 37

- Requirements | 37
 - Overview | 38
 - Configuration | 39
 - Verification | 43

- Excluding Addresses from Policies | 45

- Example: Excluding Addresses from Policies | 46

- Requirements | 46
 - Overview | 46
 - Configuration | 47
 - Verification | 51

4

Security Policy Applications and Application Sets

Security Policy Applications and Application Sets | 54

- Security Policy Applications Overview | 54

- Security Policy Application Sets Overview | 55

- Example: Configuring Security Policy Applications and Application Sets | 55

- Requirements | 56
 - Overview | 56
 - Configuration | 57

Verification | 57

Understanding Policy Application Timeout Configuration and Lookup | 58

Understanding Policy Application Timeouts Contingencies | 59

Example: Setting a Policy Application Timeout | 59

Requirements | 60

Overview | 60

Configuration | 60

Verification | 61

Predefined Policy Applications | 61

Understanding Internet-Related Predefined Policy Applications | 62

Understanding Microsoft Predefined Policy Applications | 64

Understanding Dynamic Routing Protocols Predefined Policy Applications | 66

Understanding Streaming Video Predefined Policy Applications | 67

Understanding Sun RPC Predefined Policy Applications | 68

Understanding Security and Tunnel Predefined Policy Applications | 69

Understanding IP-Related Predefined Policy Applications | 70

Understanding Instant Messaging Predefined Policy Applications | 70

Understanding Management Predefined Policy Applications | 71

Understanding Mail Predefined Policy Applications | 73

Understanding UNIX Predefined Policy Applications | 74

Understanding Miscellaneous Predefined Policy Applications | 74

Understanding ICMP Predefined Policy Applications | 75

Example: Defining a Custom ICMP Application | 82

Requirements | 82

Overview | 82

Configuration | 83

Verification | 84

Custom Policy Applications | 85

Understanding Custom Policy Applications | 85

Custom Application Mappings | 85

Example: Adding and Modifying Custom Policy Applications | 86

Requirements | 86

Overview | 86

Configuration | 87

Verification | 88

Example: Configuring Custom Policy Application Term Options | 89

Requirements | 90

Overview | 90

Configuration | 90

Verification | 92

5

Security Policies

Configuring Security Policies | 95

Understanding Security Policy Elements | 95

Understanding Security Policy Rules | 96

Understanding Security Policies for Self Traffic | 100

Security Policies Configuration Overview | 101

Best Practices for Defining Policies on SRX Series Devices | 102

Configuring Policies Using the Firewall Wizard | 105

Example: Configuring a Security Policy to Permit or Deny All Traffic | 106

Requirements | 106

Overview | 106

Configuration | 107

Verification | 111

Example: Configuring a Security Policy to Permit or Deny Selected Traffic | 111

Requirements | 112

Overview | 112

Configuration | 113

Verification | 117

Example: Configuring a Security Policy to Permit or Deny Wildcard Address Traffic | 118

Requirements | 118

Overview | 118

Configuration | 119

Verification | 122

Example: Configuring a Security Policy to Redirect Traffic Logs to an External System Log Server | 123

Requirements | 123

Overview | 123

Configuration | 124

Verification | 127

TAP Mode for Security Zones and Policies | 127

Understanding TAP Mode Support for Security Zones and Policies | 128

Example: Configuring Security Zones and Policies in TAP mode | 128

Dynamic Address Groups in Security Policies | 133

Configure Security Policies for VXLAN | 140

Requirements | 141

Overview | 141

Configuration | 142

Verification | 146

Enable Security Policies for Geneve Packet Flow Tunnel Inspection | 151

Requirements | 152

Overview | 152

Configuration (vSRX Virtual Firewall 3.0 as Tunnel Endpoint) | 153

Configuration (vSRX Virtual Firewall 3.0 as Transit Router) | 160

Unified Security Policies | 167

Unified Policies Overview | 168

Unified Policies Configuration Overview | 169

Example: Configure a Unified Policy Using a Redirect Message Profile | 178

Requirements | 178

Overview | 179

Configuration | 179

Verification | 182

Configure a URL Category with Unified Policies | 184

Understanding URL Category with Unified Policies | 185

Example: Configuring a Unified Policy Using URL Category | 185

Configure Applications in Unified Policies | 190

Applications in Unified Policies | 191

Example: Configure a Unified Policy Using Dynamic Applications | 191

Configure Micro-Applications in Unified Policies | 196

Global Security Policies | 198

Global Policy Overview | 198

Example: Configuring a Global Policy with No Zone Restrictions | 201

Requirements | 202

Overview | 202

Configuration | 202

Verification | 205

Example: Configuring a Global Policy with Multiple Zones | 207

Requirements | 207

Overview | 207

Configuration | 208

Verification | 210

User Role Firewall Security Policies | 210

Understanding User Role Firewalls | 211

User Role Retrieval and the Policy Lookup Process | 212

Understanding the User Identification Table | 214

Obtaining Username and Role Information Through Firewall Authentication | 221

Configuring a User Role Firewall For Captive Portal Redirection | 223

Example: Configuring a User Role Firewall on an SRX Series Device | 224

Requirements | 225

Overview | 225

Configuration | 227

Configuring Resource Policies Using UAC | 234

Reordering Security Policies | 237

Understanding Security Policy Ordering | 237

Example: Reordering Security Policies | 239

Requirements | 240

Overview | 240

Configuration | 240

Verification | 241

Scheduling Security Policies | 241

Security Policy Schedulers Overview | 241

Example: Configuring Schedulers for a Daily Schedule Excluding One Day | 242

Requirements | 243

Overview | 243

Configuration | 243

Verification | 246

Verifying Scheduled Policies | 247

Threat Profiling Support in Security Policy | 248

Configuring Security Policies for a VRF Routing Instance | 249

Overview | 250

Understanding Security Policy Rules | 252

Example: Configuring a Security Policy to Permit or Deny VRF-Based Traffic from MPLS Network to an IP Network | 253

Requirements | 253

Overview | 253

Configuration | 254

Example: Configuring a Security Policy to Permit VRF-Based Traffic from an IP Network to an MPLS Network | 259

Requirements | 259

Overview | 259

Configuration | 260

Example: Configuring a Security Policy to Permit VRF-Based Traffic from an MPLS Network to an MPLS Network over GRE without NAT | 265

Requirements | 265

Overview | 265

Configuration | 266

Example: Configuring Security Policies Using VRF Routing Instances in an MPLS Network | 271

Requirements | 272

Overview | 272

MPLS Network to Private IP Network | 272

Global IP Network to an MPLS Network | 275

Configuring Security Policies Using VRF Group | 282

Overview | 282

Example: Configuring a Security Policy to Permit or Deny VRF-Based Traffic from MPLS Network to an IP Network using Source VRF Group | 284

Requirements | 284

Overview | 284

Configuration | 285

Example: Configuring a Security Policy to Permit or Deny VRF-Based Traffic from an IP Network to MPLS Network using Destination VRF Group | 289

Requirements | 289

Overview | 289

Configuration | 290

Managing Overlapping VPN using VRF group | 295

Explicit Web Proxy | 296

Explicit Web Proxy | 296

Example: Configure Explicit Web Proxy | 301

Example Prerequisites | 301

Before You Begin | 302

Functional Overview | 302

Topology Overview | 303

Topology Illustration | 305

Configure Explicit Proxy on the SRX Series Firewall | 306

Verification | 308

Appendix 1: set Commands on SRX Series Firewall | 312

Appendix 2: show Configuration Output on SRX Series Firewall | 313

Monitoring and Troubleshooting Security Policies | 317

Understanding Security Alarms | 318

Example: Generating a Security Alarm in Response to Policy Violations | 318

Requirements | 319

Overview | 319

Configuration | 319

Verification | 321

Matching Security Policies | 322

Tracking Policy Hit Counts | 324

Checking Memory Usage on SRX Series Devices | 324

Monitor Security Policy Statistics | 326

Verifying Shadow Policies | 327

Verifying All Shadow Policies | 327

Verifying a Policy Shadows One or More Policies | 328

Verifying a Policy Is Shadowed by One or More Policies | 329

Troubleshooting Security Policies | 330

Synchronizing Policies Between Routing Engine and Packet Forwarding Engine | 330

Checking a Security Policy Commit Failure | 331

Verifying a Security Policy Commit | 332

Debugging Policy Lookup | 333

High Availability (HA) Synchronization of Address Name Resolving Cache | 333

About This Guide

Use this guide to configure security zones, address books and address sets, security policy applications and application sets, and security policies in Junos OS on the SRX Series Firewalls.

1

CHAPTER

Overview

[Security Basics Overview](#) | 2

[Security Policies Overview](#) | 2

Security Basics Overview

This guide provides information about the security basics used to configure features for security devices.

- A security zone is a collection of one or more network segments requiring the regulation of inbound and outbound traffic through policies. Security zones are logical entities to which one or more interfaces are bound. With many types of Juniper Networks devices, you can define multiple security zones, the exact number of which you determine based on your network needs.
- An address book is a collection of addresses and address sets. Junos OS allows you to configure multiple address books. Address books are like components, or building blocks, that are referenced in other configurations such as security policies or NAT. You can add addresses to address books or use the predefined addresses available to each address book by default.
- An application set is a group of applications. Junos OS simplifies the process by allowing you to manage a small number of application sets, rather than a large number of individual application entries. The application (or application set) is referred to by security policies as match criteria for packets initiating sessions.
- A security policy is a stateful firewall policy that provides a set of tools to network administrators, enabling them to implement network security for their organizations. Security policies enforce rules for transit traffic, in terms of what traffic can pass through the firewall, and the actions that need to take place on traffic as it passes through the firewall.

RELATED DOCUMENTATION

| [Getting Started Guide for Junos OS](#)

Security Policies Overview

To secure their business, organizations must control access to their LAN and their resources. Security policies are commonly used for this purpose. Secure access is required both within the company across the LAN and in its interactions with external networks such as the Internet. Junos OS provides powerful network security features through its stateful firewall, application firewall, and user identity firewall. All three types of firewall enforcement are implemented through security policies. The stateful firewall policy syntax is widened to include additional tuples for the application firewall and the user identity firewall.

In a Junos OS stateful firewall, the security policies enforce rules for transit traffic, in terms of what traffic can pass through the firewall, and the actions that need to take place on traffic as it passes through the firewall. From the perspective of security policies, the traffic enters one security zone and exits another security zone. This combination of a *from-zone* and *to-zone* is called a *context*. Each context contains an *ordered list* of policies. Each policy is processed in the order that it is defined within a context.

A security policy, which can be configured from the user interface, controls the traffic flow from one zone to another zone by defining the kind(s) of traffic permitted from specified IP sources to specified IP destinations at scheduled times.

Policies allow you to deny, permit, reject (deny and send a TCP RST or ICMP port unreachable message to the source host), encrypt and decrypt, authenticate, prioritize, schedule, filter, and monitor the traffic attempting to cross from one security zone to another. You decide which users and what data can enter and exit, and when and where they can go.

NOTE: For an SRX Series Firewall that supports virtual systems, policies set in the root system do not affect policies set in virtual systems.

An SRX Series Firewall secures a network by inspecting, and then allowing or denying, all connection attempts that require passage from one security zone to another.

Logging capability can also be enabled with security policies during session initialization (*session-init*) or session close (*session-close*) stage.

- To view logs from denied connections, enable log on *session-init*.
- To log sessions after their conclusion/tear-down, enable log on *session-close*.

NOTE: Session log is enabled at real time in the flow code which impacts the user performance. If both *session-close* and *session-init* are enabled, performance is further degraded as compared to enabling *session-init* only.

For SRX300, SRX320, SRX340, SRX345, SRX380, and SRX550M devices, a factory-default security policy is provided that:

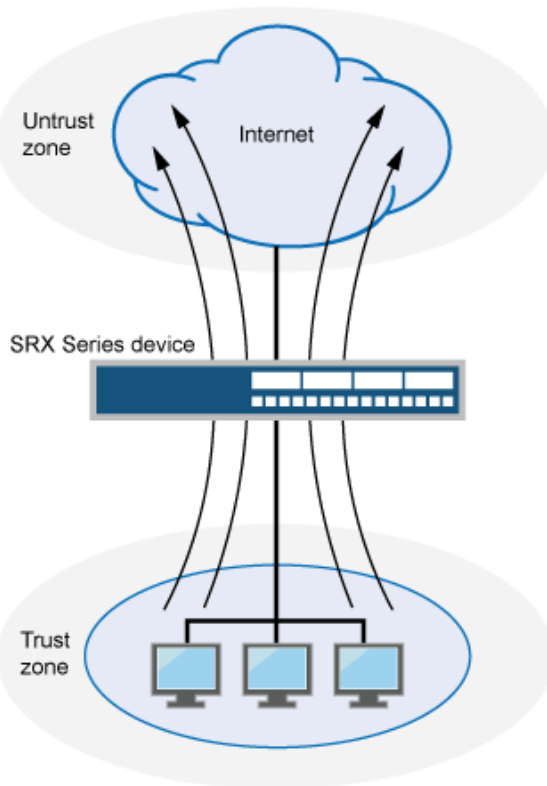
- Allows all traffic from the trust zone to the untrust zone.
- Allows all traffic between trusted zones, that is from the trust zone to intrazone trusted zones.
- Denies all traffic from the untrust zone to the trust zone.

Through the creation of policies, you can control the traffic flow from zone to zone by defining the kinds of traffic permitted to pass from specified sources to specified destinations at scheduled times.

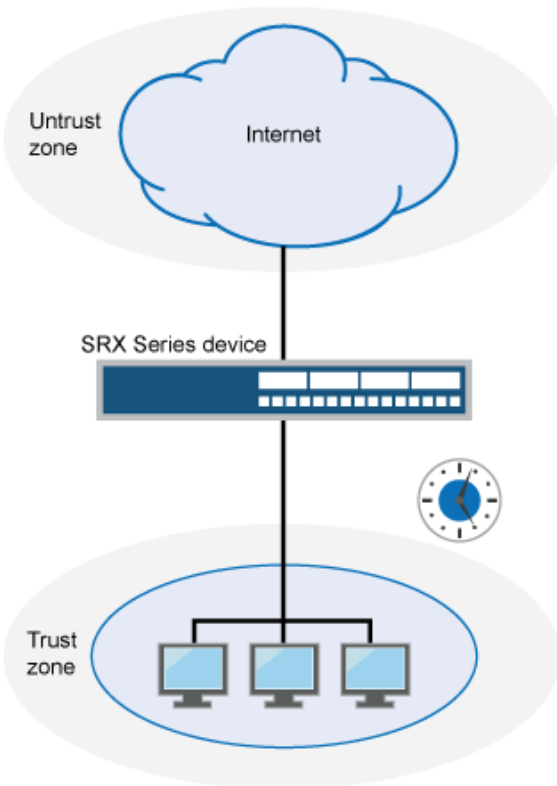
At the broadest level, you can allow all kinds of traffic from any source in one zone to any destination in all other zones without any scheduling restrictions. At the narrowest level, you can create a policy that allows only one kind of traffic between a specified host in one zone and another specified host in another zone during a scheduled interval of time. See [Figure 1 on page 4](#).

Figure 1: Security Policy

Broadly defined Internet access: Any service from any point in the trust zone to any point in the untrust zone at any time.



Narrowly defined Internet access: SMTP service from a mail server in the trust zone to a mail server in the untrust zone from 5:00 AM to 7:00 PM.



g0306177

Every time a packet attempts to pass from one zone to another or between two interfaces bound to the same zone, the device checks for a policy that permits such traffic (see ["Understanding Security Zones" on page 7](#) and ["Example: Configuring Security Policy Applications and Application Sets" on page 55](#)). To allow traffic to pass from one security zone to another—for example, from zone A to zone B—you must configure a policy that permits zone A to send traffic to zone B. To allow traffic to flow the other way, you must configure another policy permitting traffic from zone B to zone A.

To allow data traffic to pass between zones, you must configure firewall policies.

RELATED DOCUMENTATION

| [Configuring Security Policies](#) | 95

2

CHAPTER

Security Zones

Security Zones | 7

Security Zones

IN THIS SECTION

- [Security Zones Overview | 7](#)
- [Example: Creating Security Zones | 9](#)
- [Supported System Services for Host Inbound Traffic | 13](#)
- [Understanding How to Control Inbound Traffic Based on Traffic Types | 14](#)
- [Example: Controlling Inbound Traffic Based on Traffic Types | 15](#)
- [Understanding How to Control Inbound Traffic Based on Protocols | 19](#)
- [Example: Controlling Inbound Traffic Based on Protocols | 20](#)
- [Example: Configuring the TCP-Reset Parameter | 23](#)

A security zone is a collection of one or more network segments requiring the regulation of inbound and outbound traffic through policies. Security zones are logical entities to which one or more interfaces are bound. You can define multiple security zones, the exact number of which you determine based on your network needs.

Security Zones Overview

IN THIS SECTION

- [Understanding Security Zone Interfaces | 8](#)
- [Understanding Functional Zones | 8](#)
- [Understanding Security Zones | 9](#)

Interfaces act as a doorway through which traffic enters and exits a Juniper Networks device. Many interfaces can share exactly the same security requirements; however, different interfaces can also have different security requirements for inbound and outbound data packets. Interfaces with identical security requirements can be grouped together into a single security zone.

A security zone is a collection of one or more network segments requiring the regulation of inbound and outbound traffic through policies.

Security zones are logical entities to which one or more interfaces are bound. With many types of Juniper Networks devices, you can define multiple security zones, the exact number of which you determine based on your network needs.

On a single device, you can configure multiple security zones, dividing the network into segments to which you can apply various security options to satisfy the needs of each segment. At a minimum, you must define two security zones, basically to protect one area of the network from the other. On some security platforms, you can define many security zones, bringing finer granularity to your network security design—and without deploying multiple security appliances to do so.

From the perspective of security policies, traffic enters into one security zone and goes out on another security zone. This combination of a *from-zone* and a *to-zone* is defined as a *context*. Each context contains an ordered list of policies. For more information on policies, see ["Security Policies Overview" on page 2](#).

This topic includes the following sections:

Understanding Security Zone Interfaces

An interface for a security zone can be thought of as a doorway through which TCP/IP traffic can pass between that zone and any other zone.

Through the policies you define, you can permit traffic between zones to flow in one direction or in both. With the routes that you define, you specify the interfaces that traffic from one zone to another must use. Because you can bind multiple interfaces to a zone, the routes you chart are important for directing traffic to the interfaces of your choice.

An interface can be configured with an IPv4 address, IPv6 address, or both.

Understanding Functional Zones

A functional zone is used for special purposes, like management interfaces. Currently, only the management (MGT) zone is supported. Management zones have the following properties:

- Management zones host management interfaces.
- Traffic entering management zones does not match policies; therefore, traffic cannot transit out of any other interface if it was received in the management interface.
- Management zones can only be used for dedicated management interfaces.

Understanding Security Zones

Security zones are the building blocks for policies; they are logical entities to which one or more interfaces are bound. Security zones provide a means of distinguishing groups of hosts (user systems and other hosts, such as servers) and their resources from one another in order to apply different security measures to them.

Security zones have the following properties:

- **Policies**—Active security policies that enforce rules for the transit traffic, in terms of what traffic can pass through the firewall, and the actions that need to take place on the traffic as it passes through the firewall. For more information, see ["Security Policies Overview" on page 2](#).
- **Screens**—A Juniper Networks stateful firewall secures a network by inspecting, and then allowing or denying, all connection attempts that require passage from one security zone to another. For every security zone, you can enable a set of predefined screen options that detect and block various kinds of traffic that the device determines as potentially harmful. For more information, see [Reconnaissance Deterrence Overview](#).
- **Address books**—IP addresses and address sets that make up an address book to identify its members so that you can apply policies to them. Address book entries can include any combination of IPv4 addresses, IPv6 addresses, and Domain Name System (DNS) names. For more information, see ["Example: Configuring Address Books and Address Sets" on page 37](#).
- **TCP-RST**—When this feature is enabled, the system sends a TCP segment with the RESET flag set when traffic arrives that does not match an existing session and does not have the SYNchronize flag set.
- **Interfaces**—List of interfaces in the zone.

Security zones have the following preconfigured zone:

- **Trust zone**—Available only in the factory configuration and is used for initial connection to the device. After you commit a configuration, the trust zone can be overridden.

Example: Creating Security Zones

IN THIS SECTION

- [Requirements | 10](#)
- [Overview | 10](#)

- Configuration | 10
- Verification | 12

This example shows how to configure zones and assign interfaces to them. When you configure a security zone, you can specify many of its parameters at the same time.

Requirements

Before you begin, configure network interfaces. See the [Interfaces User Guide for Security Devices](#).

Overview

An interface for a security zone can be thought of as a doorway through which TCP/IP traffic can pass between that zone and any other zone.

NOTE: By default, interfaces are in the null zone. The interfaces will not pass traffic until they have been assigned to a zone.

NOTE: You can configure 2000 interfaces within a security zone on SRX3400, SRX3600, SRX4600, SRX5400, SRX5600, or SRX5800 devices, depending on the Junos OS release in your installation.

Configuration

IN THIS SECTION

- Procedure | 11

Procedure

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the [edit] hierarchy level, and then enter `commit` from configuration mode.

```
set interfaces ge-0/0/1 unit 0 family inet address 203.0.113.1/24
set interfaces ge-0/0/1 unit 0 family inet6 address 2001:db8:1::1/64
set security zones security-zone ABC interfaces ge-0/0/1.0
```

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode* in the CLI User guide.

To create zones and assign interfaces to them:

1. Configure an Ethernet interface and assign an IPv4 address to it.

```
[edit]
user@host# set interfaces ge-0/0/1 unit 0 family inet address 203.0.113.1/24
```

2. Configure an Ethernet interface and assign an IPv6 address to it.

```
[edit]
user@host# set interfaces ge-0/0/1 unit 0 family inet6 address 2001:db8::1/32
```

3. Configure a security zone and assign it to an Ethernet interface.

```
[edit]
user@host# set security zones security-zone ABC interfaces ge-0/0/1.0
```

Results

From configuration mode, confirm your configuration by entering the `show security zones security-zone ABC` and `show interfaces ge-0/0/1` commands. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

For brevity, this `show` output includes only the configuration that is relevant to this example. Any other configuration on the system has been replaced with ellipses (...).

```
[edit]

user@host# show security zones security-zone ABC
...
  interfaces {
    ge-0/0/1.0 {
      ...
    }
  }

[edit]

user@host# show interfaces ge-0/0/1
...
  unit 0 {
    family inet {
      address 203.0.113.1/24;
    }
    family inet6 {
      address 2001:db8:1::1/64;
    }
  }
}
```

If you are done configuring the device, enter `commit` from configuration mode.

Verification

IN THIS SECTION

- [Troubleshooting with Logs](#) | 13

Troubleshooting with Logs

Purpose

Use these logs to identify any issues.

Action

From operational mode, enter the `show log messages` command and the `show log dcd` command.

Supported System Services for Host Inbound Traffic

This topic describes the supported system services for host inbound traffic on the specified zone or interface.

For example, suppose a user whose system was connected to interface 203.0.113.4 in zone ABC wanted to telnet into interface 198.51.100.4 in zone ABC. For this action to be allowed, the Telnet application must be configured as an allowed inbound service on both interfaces and a policy must permit the traffic transmission.

See the *Options* section in *system-services (Security Zones Host Inbound Traffic)* to view the system services that can be used for host inbound traffic.

NOTE: On SRX Series Firewalls, the `xnm-clear-text` field is enabled in the factory-default configuration. This setting enables incoming Junos XML protocol traffic in the trust zone for the device when the device is operating with factory-default settings. We recommend that you replace the factory-default settings with a user-defined configuration that provides additional security once the box is configured. You must delete the `xnm-clear-text` field manually by using the CLI command `delete system services xnm-clear-text`.

See the *Options* section in *protocols (Security Zones Interfaces)* to view the supported protocols that can be used for host inbound traffic.

NOTE: All services (except DHCP and BOOTP) can be configured either per zone or per interface. A DHCP server is configured only per interface because the incoming interface must be known by the server to be able to send out DHCP replies.

NOTE: You do not need to configure Neighbor Discovery Protocol (NDP) on host-inbound traffic, because the NDP is enabled by default.

Configuration option for IPv6 Neighbor Discovery Protocol (NDP) is available. The configuration option is set `protocol neighbor-discovery onlink-subnet-only` command. This option will prevent the device from responding to a Neighbor Solicitation (NS) from a prefix which was not included as one of the device interface prefixes.

NOTE: The Routing Engine needs to be rebooted after setting this option to remove any possibility of a previous IPv6 entry from remaining in the forwarding-table.

Understanding How to Control Inbound Traffic Based on Traffic Types

This topic describes how to configure zones to specify the kinds of traffic that can reach the device from systems that are directly connected to its interfaces.

Note the following:

- You can configure these parameters at the zone level, in which case they affect all interfaces of the zone, or at the interface level. (Interface configuration overrides that of the zone.)
- You must enable all expected host-inbound traffic. Inbound traffic destined to this device is dropped by default.
- You can also configure a zone's interfaces to allow for use by dynamic routing protocols.

This feature allows you to protect the device against attacks launched from systems that are directly or indirectly connected to any of its interfaces. It also enables you to selectively configure the device so that administrators can manage it using certain applications on certain interfaces. You can prohibit use of other applications on the same or different interfaces of a zone. For example, most likely you would want to ensure that outsiders not use the Telnet application from the Internet to log in to the device because you would not want them connecting to your system.

Example: Controlling Inbound Traffic Based on Traffic Types

IN THIS SECTION

- Requirements | 15
- Overview | 15
- Configuration | 15
- Verification | 18

This example shows how to configure inbound traffic based on traffic types.

Requirements

Before you begin:

- Configure network interfaces. See [Interfaces User Guide for Security Devices](#).
- Understand Inbound traffic types. See "[Understanding How to Control Inbound Traffic Based on Traffic Types](#)" on page 14.

Overview

By allowing system services to run, you can configure zones to specify different types of traffic that can reach the device from systems that are directly connected to its interfaces. You can configure the different system services at the zone level, in which case they affect all interfaces of the zone, or at the interface level. (Interface configuration overrides that of the zone.)

You must enable all expected host-inbound traffic. Inbound traffic from devices directly connected to the device's interfaces is dropped by default.

Configuration

IN THIS SECTION

- Procedure | 16

Procedure

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the [edit] hierarchy level, and then enter `commit` from configuration mode.

```
set security zones security-zone ABC host-inbound-traffic system-services all
set security zones security-zone ABC interfaces ge-0/0/1.3 host-inbound-traffic system-services telnet
set security zones security-zone ABC interfaces ge-0/0/1.3 host-inbound-traffic system-services ftp
set security zones security-zone ABC interfaces ge-0/0/1.3 host-inbound-traffic system-services snmp
set security zones security-zone ABC interfaces ge-0/0/1.0 host-inbound-traffic system-services all
set security zones security-zone ABC interfaces ge-0/0/1.0 host-inbound-traffic system-services ftp except
set security zones security-zone ABC interfaces ge-0/0/1.0 host-inbound-traffic system-services http except
```

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode* in the CLI User guide.

To configure inbound traffic based on traffic types:

1. Configure a security zone.

```
[edit]
user@host# edit security zones security-zone ABC
```

2. Configure the security zone to support inbound traffic for all system services.

```
[edit security zones security-zone ABC]
user@host# set host-inbound-traffic system-services all
```

3. Configure the Telnet, FTP, and SNMP system services at the interface level (not the zone level) for the first interface.

```
[edit security zones security-zone ABC]
user@host# set interfaces ge-0/0/1.3 host-inbound-traffic system-services telnet
user@host# set interfaces ge-0/0/1.3 host-inbound-traffic system-services ftp
user@host# set interfaces ge-0/0/1.3 host-inbound-traffic system-services snmp
```

4. Configure the security zone to support inbound traffic for all system services for a second interface.

```
[edit security zones security-zone ABC]
user@host# set interfaces ge-0/0/1.0 host-inbound-traffic system-services all
```

5. Exclude the FTP and HTTP system services from the second interface.

```
[edit security zones security-zone ABC]
user@host# set interfaces ge-0/0/1.0 host-inbound-traffic system-services ftp except
user@host# set interfaces ge-0/0/1.0 host-inbound-traffic system-services http except
```

Results

From configuration mode, confirm your configuration by entering the `show security zones security-zone ABC`. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```
[edit]

user@host# show security zones security-zone ABC
host-inbound-traffic {
  system-services {
    all;
  }
}
interfaces {
  ge-0/0/1.3 {
    host-inbound-traffic {
      system-services {
        ftp;
        telnet;
      }
    }
  }
}
```

```
        snmp;  
    }  
}  
ge-0/0/1.0 {  
    host-inbound-traffic {  
        system-services {  
            all;  
            ftp {  
                except;  
            }  
            http {  
                except;  
            }  
        }  
    }  
}
```

If you are done configuring the device, enter `commit` from configuration mode.

Verification

IN THIS SECTION

- [Troubleshooting with Logs](#) | 18

Troubleshooting with Logs

Purpose

Use these logs to identify any issues.

Action

From operational mode, enter the `show log messages` command and the `show log dcd` command.

Understanding How to Control Inbound Traffic Based on Protocols

This topic describes the inbound system protocols on the specified zone or interface.

Any host-inbound traffic that corresponds to a protocol listed under the host-inbound traffic option is allowed. For example, if anywhere in the configuration, you map a protocol to a port number other than the default, you can specify the protocol in the host-inbound traffic option, and the new port number will be used. [Table 1 on page 19](#) lists the supported protocols. A value of `all` indicates that traffic from all of the following protocols is allowed inbound on the specified interfaces (of the zone, or a single specified interface).

Table 1: Supported Inbound System Protocols

Supported System Services			
all	igmp	pim	sap
bfd	ldp	rip	vrrp
bgp	msdp	ripng	nhrp
router-discovery	dvmrp	ospf	rsvp
pgm	ospf3		

NOTE: If DVMRP or PIM is enabled for an interface, IGMP and MLD host-inbound traffic is enabled automatically. Because IS-IS uses OSI addressing and should not generate any IP traffic, there is no host-inbound traffic option for the IS-IS protocol.

NOTE: You do not need to configure Neighbor Discovery Protocol (NDP) on host-inbound traffic, because the NDP is enabled by default.

Configuration option for IPv6 Neighbor Discovery Protocol (NDP) is available. The configuration option is set `protocol neighbor-discovery onlink-subnet-only` command. This option will prevent the device from responding to a Neighbor Solicitation (NS) from a prefix which was not included as one of the device interface prefixes.

NOTE: The Routing Engine needs to be rebooted after setting this option to remove any possibility of a previous IPv6 entry remaining in the forwarding-table.

Example: Controlling Inbound Traffic Based on Protocols

IN THIS SECTION

- [Requirements | 20](#)
- [Overview | 20](#)
- [Configuration | 21](#)
- [Verification | 22](#)

This example shows how to enable inbound traffic for an interface.

Requirements

Before you begin:

- Configure security zones. See ["Example: Creating Security Zones" on page 9](#).
- Configure network interfaces. See the [Interfaces User Guide for Security Devices](#).

Overview

Any host-inbound traffic that corresponds to a protocol listed under the host-inbound traffic option is allowed. For example, if anywhere in the configuration you map a protocol to a port number other than the default, you can specify the protocol in the host-inbound traffic option, and the new port number will be used.

A value of `all` indicates that traffic from all of the protocols is allowed inbound on the specified interfaces (of the zone, or a single specified interface).

Configuration

IN THIS SECTION

- [Procedure | 21](#)

Procedure

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the `[edit]` hierarchy level, and then enter `commit` from configuration mode.

```
set security zones security-zone ABC interfaces ge-0/0/1.0 host-inbound-traffic protocols ospf
set security zones security-zone ABC interfaces ge-0/0/1.0 host-inbound-traffic protocols ospf3
```

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode* in the CLI User guide.

To configure inbound traffic based on protocols:

1. Configure a security zone.

```
[edit]
user@host# edit security zones security-zone ABC
```

2. Configure the security zone to support inbound traffic based on the ospf protocol for an interface.

```
[edit security zones security-zone ABC]
user@host# set interfaces ge-0/0/1.0 host-inbound-traffic protocols ospf
```

3. Configure the security zone to support inbound traffic based on the ospf3 protocol for an interface.

```
[edit security zones security-zone ABC]
user@host# set interfaces ge-0/0/1.0 host-inbound-traffic protocols ospf3
```

Results

From configuration mode, confirm your configuration by entering the `show security zones security-zone ABC`. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```
[edit]
user@host# show security zones security-zone ABC
interfaces {
  ge-0/0/1.0 {
    host-inbound-traffic {
      protocols {
        ospf;
        ospf3;
      }
    }
  }
}
```

If you are done configuring the device, enter `commit` from configuration mode.

Verification

IN THIS SECTION

- [Troubleshooting with Logs](#) | 22

Troubleshooting with Logs

Purpose

Use these logs to identify any issues.

Action

From operational mode, enter the `show log messages` command and the `show log dcd` command.

Example: Configuring the TCP-Reset Parameter

IN THIS SECTION

- [Requirements | 23](#)
- [Overview | 23](#)
- [Configuration | 23](#)
- [Verification | 24](#)

This example shows how to configure the TCP-Reset parameter for a zone.

Requirements

Before you begin, configure security zones. See ["Example: Creating Security Zones" on page 9](#).

Overview

When the TCP-Reset parameter feature is enabled, the system sends a TCP segment with the RESET flag set when traffic arrives that does not match an existing session and does not have the SYN flag set.

Configuration

IN THIS SECTION

- [Procedure | 24](#)

Procedure

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode* in the CLI User guide.

To configure the TCP-Reset parameter for a zone:

1. Configure a security zone.

```
[edit]
user@host# edit security zones security-zone ABC
```

2. Configure the TCP-Reset parameter for the zone.

```
[edit security zones security-zone ABC]
user@host# set tcp-rst
```

3. If you are done configuring the device, commit the configuration.

```
[edit]
user@host# commit
```

Verification

To verify the configuration is working properly, enter the `show security zones` command.

RELATED DOCUMENTATION

| [Configuring Security Policies](#) | 95

3

CHAPTER

Address Books and Address Sets

[Address Books and Address Sets](#) | 26

Address Books and Address Sets

IN THIS SECTION

- [Understanding Address Books | 26](#)
- [Understanding Global Address Books | 29](#)
- [Understanding Address Sets | 29](#)
- [Configuring Addresses and Address Sets | 30](#)
- [Limitations of Addresses and Address Sets in a Security Policy | 34](#)
- [Using Addresses and Address Sets in NAT Configuration | 36](#)
- [Example: Configuring Address Books and Address Sets | 37](#)
- [Excluding Addresses from Policies | 45](#)
- [Example: Excluding Addresses from Policies | 46](#)

An address book is a collection of addresses and address sets. Address books are like components or building blocks, that are referenced in other configurations such as security policies and security zones. You can add addresses to address books or use the predefined addresses available to each address book by default

An address book within a zone can consist of individual addresses or address sets. An address set is a set of one or more addresses defined within an address book. Using address sets, you can organize addresses in logical groups. Address sets are useful when you must refer to a group of addresses more than once in a security policy, in a security zone, or NAT configuration.

Understanding Address Books

IN THIS SECTION

- [Predefined Addresses | 27](#)
- [Network Prefixes in Address Books | 27](#)
- [Wildcard Addresses in Address Books | 28](#)

An address book is a collection of addresses and address sets. Junos OS allows you to configure multiple address books. You can add addresses to address books or use the predefined addresses available to each address book by default.

Address book entries include addresses of hosts and subnets whose traffic is either allowed, blocked, encrypted, or user-authenticated. These addresses can be any combination of IPv4 addresses, IPv6 addresses, wildcard addresses, or Domain Name System (DNS) names.

Predefined Addresses

You can either create addresses or use any of the following predefined addresses that are available by default:

- Any—This address matches any IP address. When this address is used as a source or destination address in a policy configuration, it matches the source and destination address of any packet.
- Any-ipv4—This address matches any IPv4 address.
- Any-ipv6—This address matches any IPv6 address.

Network Prefixes in Address Books

You can specify addresses as network prefixes in the prefix/length format. For example, 203.0.113.0/24 is an acceptable address book address because it translates to a network prefix. However, 203.0.113.4/24 is not acceptable for an address book because it exceeds the subnet length of 24 bits. Everything beyond the subnet length must be entered as 0 (zero). In special scenarios, you can enter a hostname because it can use the full 32-bit address length.

An IPv6 address prefix is a combination of an IPv6 prefix (address) and a prefix length. The prefix takes the form `ipv6-prefix/prefix-length` and represents a block of address space (or a network). The `ipv6-prefix` variable follows general IPv6 addressing rules. The `/prefix-length` variable is a decimal value that indicates the number of contiguous, higher-order bits of the address that make up the network portion of the address. For example, 2001:db8::/32 is a possible IPv6 prefix. For more information on text representation of IPv6 addresses and address prefixes, see RFC 4291, *IP Version 6 Addressing Architecture*.

Wildcard Addresses in Address Books

Besides IP addresses and domain names, you can specify a wildcard address in an address book. A wildcard address is represented as A.B.C.D/wildcard-mask. The wildcard mask determines which of the bits in the IP address A.B.C.D should be ignored. For example, the source IP address 192.168.0.11/255.255.0.255 in a security policy implies that the security policy match criteria can discard the third octet in the IP address (symbolically represented as 192.168.*.11). Therefore, packets with source IP addresses such as 192.168.1.11 and 192.168.22.11 conform to the match criteria. However, packets with source IP addresses such as 192.168.0.1 and 192.168.1.21 do not satisfy the match criteria.

The wildcard address usage is not restricted to full octets only. You can configure any wildcard address. For example, the wildcard address 192.168.7.1/255.255.7.255 implies that you need to ignore only the first 5 bits of the third octet of the wildcard address while making the policy match. If the wildcard address usage is restricted to full octets only, then wildcard masks with either 0 or 255 in each of the four octets only will be permitted.

DNS Names in Address Books

By default, you can resolve IPv4 and IPv6 addresses for a DNS. If IPv4 or IPv6 addresses are designated, you can resolve only those addresses by using the keywords `ipv4-only` and `ipv6-only`, respectively.

For SRX5400, SRX5600, and SRX5800 devices and vSRX Virtual Firewall instances, starting with Junos OS 15.1X49-D60, management traffic can originate from a specific source address for Domain Name System (DNS) names.

Consider the following when you configure the source address for DNS:

- Only one source address can be configured as the source address for each DNS server name.
- IPv6 source addresses are supported for IPv6 DNS servers, and only IPv4 addresses are supported for IPv4 servers. You cannot configure an IPv4 address for an IPv6 DNS server or an IPv6 address for an IPv4 DNS server.

To have all management traffic originate from a specific source address, configure the system name server and the source address. For example:

```
user@host# set system name-server 10.5.0.1 source-address 10.4.0.1
```

Before you can use domain names for address entries, you must configure the security device for DNS services. For information about DNS, see [DNS Overview](#).

Understanding Global Address Books

An address book called “global” is always present on your system. Similar to other address books, the global address book can include any combination of IPv4 addresses, IPv6 addresses, wildcard addresses, or Domain Name System (DNS) names.

You can create addresses in the global address book or use the predefined addresses (any, any-ipv4, and any-ipv6). However, to use the addresses in the global address book, you do not need to attach the security zones to it. The global address book is available to all security zones that have no address books attached to them.

Global address books are used in the following cases:

- NAT configurations–NAT rules can use address objects only from the global address book. They cannot use addresses from zone-based address books.
- Global policies–Addresses used in a global policy must be defined in global address book. Global address book objects do not belong to any particular zone.

Understanding Address Sets

An address book can grow to contain large numbers of addresses and become difficult to manage. You can create groups of addresses called address sets to manage large address books. Using address sets, you can organize addresses in logical groups and use them to easily configure other features, such as policies and NAT rules.

The predefined address set, any, which contains both any-ipv4 and any-ipv6 addresses, is automatically created for each security zone.

You can create address sets with existing users, or create empty address sets and later fill them with users. When creating address sets, you can combine IPv4 and IPv6 addresses, but the addresses must be in the same security zone.

You can also create an address set within an address set. This allows you to apply policies more effectively. For example, if you want to apply a policy to two address sets, set1 and set2, instead of using two statements, you can use just one statement to apply the policy to a new address set, set3, that includes address sets set1 and set2.

When you add addresses to policies, sometimes the same subset of addresses can be present in multiple policies, making it difficult to manage how policies affect each address entry. Reference an address set entry in a policy like an individual address book entry to allow you to manage a small number of address sets, rather than manage a large number of individual address entries.

Configuring Addresses and Address Sets

IN THIS SECTION

- [Addresses and Address Sets | 30](#)
- [Address Books and Security Zones | 31](#)
- [Address Books and Security Policies | 31](#)

You can define addresses and address sets in an address book and then use them when configuring different features. You can also use predefined addresses `any`, `any-ipv4`, and `any-ipv6` that are available by default. However, you cannot add the predefined address `any` to an address book.

After address books and sets are configured, they are used in configuring different features, such as security policies, security zones, and NAT.

Addresses and Address Sets

You can define IPv4 addresses, IPv6 addresses, wildcard addresses, or Domain Name System (DNS) names as address entries in an address book.

The following sample address book called `book1` contains different types of addresses and address sets. Once defined, you can leverage these addresses and address sets when you configure security zones, policies, or NAT rules.

```
[edit security address-book book1]
user@host# set address a1 203.0.113.1
user@host# set address a2 203.0.113.4/30
user@host# set address a4 2001:db8::/32
user@host# set address a5 2001:db8:1::1/127
user@host# set address example dns-name www.example.com
user@host# set address-set set1 address a1
user@host# set address-set set1 address a2
user@host# set address-set set1 address a2
user@host# set address-set set2 address bbc
```

When defining addresses and address sets, follow these guidelines:

- Address sets can only contain address names that belong to the same security zone.

- Address names `any`, `any-ipv4` and `any-ipv6` are reserved; you cannot use them to create any addresses.
- Addresses and address sets in the same zone must have distinct names.
- Address names cannot be the same as address set names. For example, if you configure an address with the name `add1`, do not create the address set with the name `add1`.
- When deleting an individual address book entry from the address book, you must remove the address (wherever it is referred) from all the address sets; otherwise, the system will cause a commit failure.

Address Books and Security Zones

A security zone is a logical group of interfaces with identical security requirements. You attach security zones to address books that contain entries for the addressable networks and end hosts (and, thus, users) belonging to the zone.

A zone can use two address books at a time—the global address book and the address book that the zone is attached to. When a security zone is not attached to any address book, it automatically uses the global address book. Thus, when a security zone is attached to an address book, the system looks up addresses from this attached address book; otherwise, the system looks up addresses from the default global address book. The global address book is available to all security zones by default; you do not need to attach zones to the global address book.

The following guidelines apply when attaching security zones to address books:

- Addresses attached to a security zone conform to the security requirements of the zone.
- The address book that you attach to a security zone must contain all IP addresses that are reachable within that zone.
- When you configure policies between two zones, you must define the addresses for each of the zone's address books.
- Addresses in a user-defined address book have a higher lookup priority than addresses in the global address book. Thus, for a security zone that is attached to a user-defined address book, the system searches the user-defined address book first; if no address is found, then it searches the global address book.

Address Books and Security Policies

Addresses and address sets are used when specifying the match criteria for a policy. Before you can configure policies to permit, deny, or tunnel traffic to and from individual hosts and subnets, you must make entries for them in address books. You can define different types of addresses, such as IPv4 addresses, IPv6 addresses, wildcard addresses, and DNS names, as match criteria for security policies.

Policies contain both source and destination addresses. You can refer to an address or address set in a policy by the name you give to it in the address book attached to the zone specified in the policy.

- When traffic is sent to a zone, the zone and address to which the traffic is sent are used as the destination zone and address-matching criteria in policies.
- When traffic is sent from a zone, the zone and address from which the traffic is sent are used as the source zone and address-matching criteria in policies.

Addresses Available for Security Policies

When configuring the source and destination addresses for a policy rule, you can type a question mark in the CLI to list all the available addresses that you can choose from.

You can use the same address name for different addresses that are in different address books. However, the CLI lists only one of these addresses—the address that has the highest lookup priority.

For example, suppose you configure addresses in two address books—`global` and `book1`. Then, display the addresses that you can configure as source or destination addresses in a policy (see [Table 2 on page 32](#)).

Table 2: Available Addresses Displayed in the CLI

Addresses Configured	Addresses Displayed in the CLI
<pre>[edit security address-book] set global address a1 203.0.113.0/24; set global address a2 198.51.100.0/24; set global address a3 192.0.2.0/24; set book1 address a1 203.0.113.128/25;</pre>	<pre>[edit security policies from-zone trust to-zone untrust] user@host# set policy p1 match set match source-address ?</pre> <p>Possible completions:</p> <pre>[Open a set of values a1 The address in address book book1 a2 The address in address book global a3 The address in address book global any Any IPv4 or IPv6 address any-ipv4 Any IPv4 address any-ipv6 Any IPv6 address</pre>

The addresses displayed in this example illustrate:

- Addresses in a user-defined address book have a higher lookup priority than addresses in the global address book.
- Addresses in a global address book have a higher priority than the predefined addresses `any`, `any-ipv4`, and `any-ipv6`.

- When the same address name is configured for two or more different addresses, only the highest priority address, based on the address lookup, is available. In this example, the CLI displays address a1 from book1 (203.0.113.128/25) because that address has a higher lookup priority than the global address a1 (203.0.113.0/24).

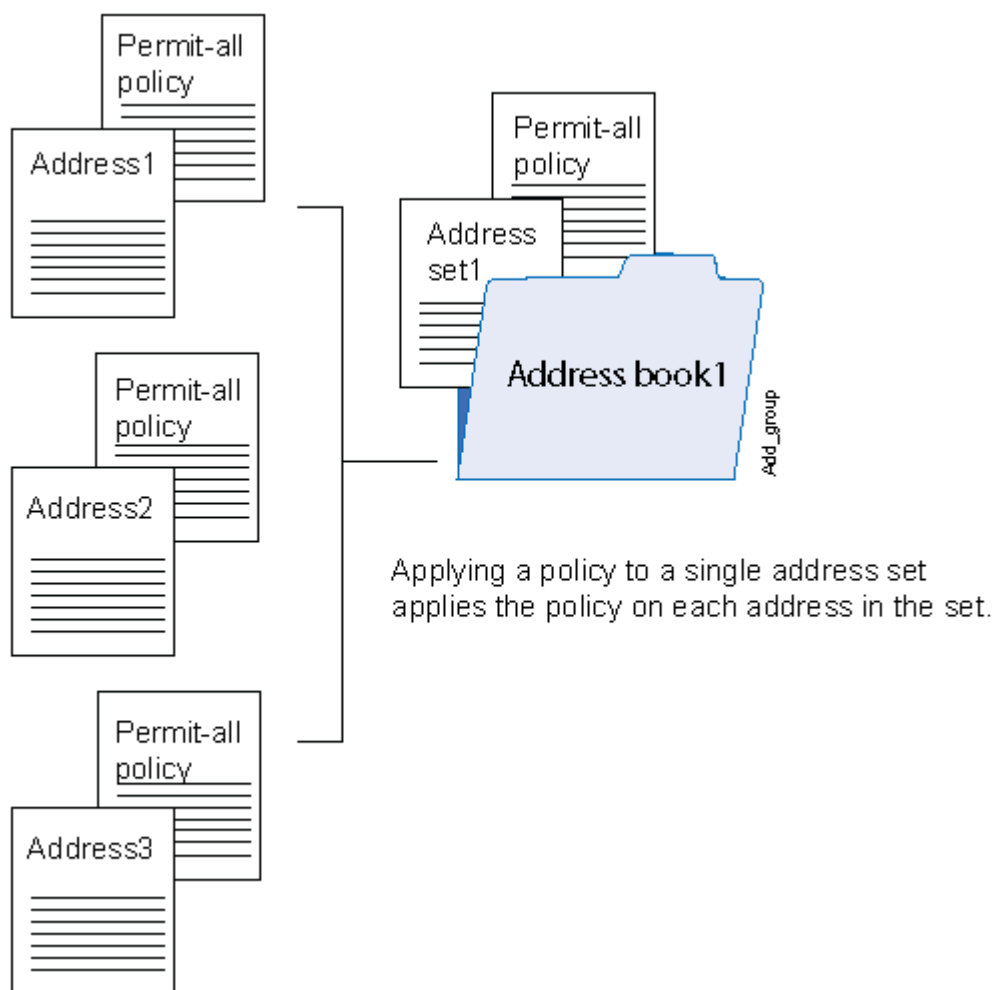
Applying Policies to Address Sets

When you specify an address set in policies, Junos OS applies the policies automatically to each address set member, so you do not have to create them one by one for each address. Also, if an address set is referenced in a policy, the address set cannot be removed without removing its reference in the policy. It can, however, be edited.

NOTE: Consider that for each address set, the system creates individual rules for its members. It creates an internal rule for each member in the group as well as for each service configured for each user. If you configure address books without taking this into account, you can exceed the number of available policy resources, especially if both the source and destination addresses are address groups and the specified service is a service group.

[Figure 2 on page 34](#) shows how policies are applied to address sets.

Figure 2: Applying Policies to Address Sets



Limitations of Addresses and Address Sets in a Security Policy

On SRX Series Firewalls, one policy can reference multiple address sets, multiple address entries, or both. One address set can reference a maximum of 16384 address entries and a maximum of 256 address sets.

There is a limit to the number of address objects that a policy can reference; the maximum number of address objects per policy is different for different platforms as shown in [Table 3 on page 35](#).

See [Best Practices for Defining Policies on SRX Series Devices](#) for details on the maximum number of policies per context for SRX Series Firewalls.

Table 3: Address Objects Per Security Policy

SRX Series Devices	Address Objects
SRX300 SRX320	2048
SRX340	2048
SRX345	2048
SRX380	2048
SRX550M	2048
SRX1500	4096
SRX4100	4096
SRX4200	4096
SRX4600	4096
SRX5400 SRX5600 SRX5800	16384

Every IPv6 address entry is equal to one address object per policy. Example: To configure an SRX345 device which has a limitation of 2048 address objects per policy, you can configure 2040 IPv4 entries and 8 IPv6 entries ($2040 + 8 = 2048$) and commit the configuration.

When you configure 2040 IPv4 address entries and 9 IPv6 address entries ($2040+9 = 2049$), you'll get the following error message when you attempt to commit the configuration:

"Error exceeding maximum limit of source addresses per policy (2048)"

Using Addresses and Address Sets in NAT Configuration

Once you define addresses in address books, you can specify them in the source, destination, or static NAT rules. It is simpler to specify meaningful address names instead of IP prefixes as source and destination addresses in the NAT rule configuration. For example, instead of specifying 10.208.16.0/22 as source address, you can specify an address called `local` that includes address 10.208.16.0/22.

You can also specify address sets in NAT rules, allowing you to add multiple addresses within an address set and therefore manage a small number of address sets, rather than manage a large number of individual address entries. When you specify an address set in a NAT rule, Junos OS applies the rule automatically to each address set member, so you do not have to specify each address one by one.

NOTE: The following address and address set types are not supported in NAT rules—wildcard addresses, DNS names, and a combination of IPv4 and IPv6 addresses.

When configuring address books with NAT, follow these guidelines:

- In a NAT rule, you can specify addresses from a global address book only. User-defined address books are not supported with NAT.
- You can configure an address set as a source address name in a source NAT rule. However, you cannot configure an address set as a destination address name in a destination NAT rule.

The following sample NAT statements show the address and address set types that are supported with source and destination NAT rules:

```
[edit security nat source rule-set src-nat rule src-rule1]
set match source-address 2001:db8:1::/64
set match source-address-name add1
set match source-address-name add-set1
set match destination-address 2001:db8::/64
set match destination-address-name add2
set match destination-address-name add-set2
```

```
[edit security nat destination rule-set dst-nat rule dst-rule1]
set match source-address 2001:db8::/64
set match source-address-name add2
set match source-address-name add-set2
set match destination-address-name add1
```


- In a static NAT rule, you cannot configure an address set as a source or destination address name. The following sample NAT statements show the types of address that are supported with static NAT rules:

```
[edit security nat static rule-set stat]
set rule stat-rule1 match destination-address 203.0.113.0/24
set rule stat-rule2 match destination-address-name add1
```

Example: Configuring Address Books and Address Sets

IN THIS SECTION

- [Requirements | 37](#)
- [Overview | 38](#)
- [Configuration | 39](#)
- [Verification | 43](#)

This example shows how to configure addresses and address sets in address books. It also shows how to attach address books to security zones.

Requirements

Before you begin:

- Configure the Juniper Networks security devices for network communication.
- Configure network interfaces on server and member devices. See the [Interfaces User Guide for Security Devices](#).
- Configure Domain Name System (DNS) services. For information about DNS, see [DNS Overview](#).

Overview

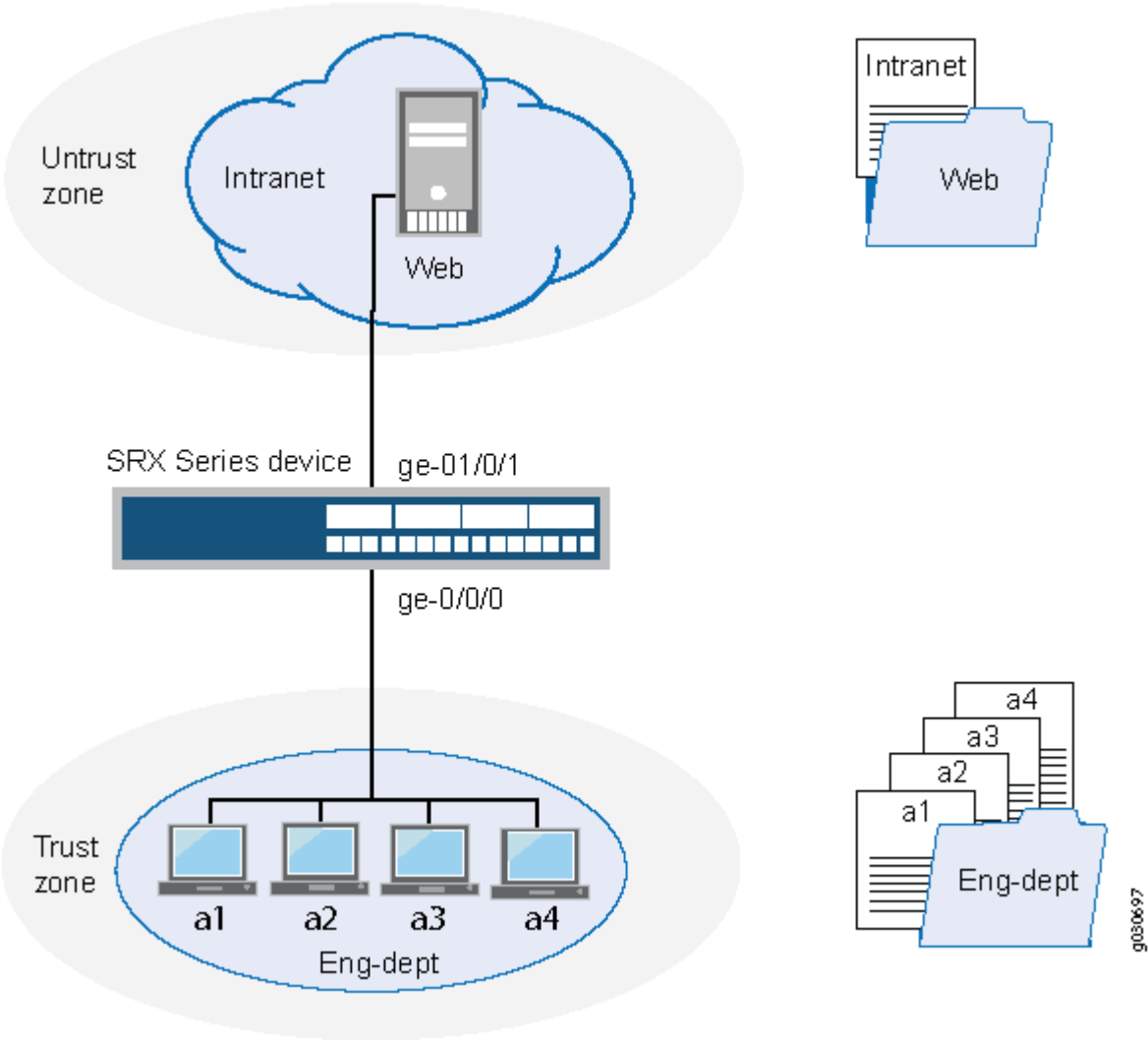
IN THIS SECTION

- [Topology | 39](#)

In this example, you configure an address book with addresses and address sets (see [Figure 3 on page 39](#)) to simplify configuring your company's network. You create an address book called `Eng-dept` and add addresses of members from the Engineering department. You create another address book called `Web` and add a DNS name to it. Then you attach a security zone trust to the `Eng-dept` address book and security zone untrust to the `Web` address book. You also create address sets to group software and hardware addresses in the Engineering department. You plan to use these addresses as source address and destination addresses in your future policy configurations.

In addition, you add an address to the global address book, to be available to any security zone that has no address book attached to it.

Figure 3: Configuring Addresses and Address Sets



Topology

Configuration

IN THIS SECTION

Procedure | 40

Procedure

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the [edit] hierarchy level, and then enter `commit` from configuration mode.

```
set interfaces ge-0/0/0 unit 0 family inet address 203.0.113.5
set interfaces ge-0/0/1 unit 0 family inet address 203.0.113.6
set security zones security-zone trust interfaces ge-0/0/0
set security zones security-zone untrust interfaces ge-0/0/1
set security address-book Eng-dept address a1 203.0.113.1
set security address-book Eng-dept address a2 203.0.113.2
set security address-book Eng-dept address a3 203.0.113.3
set security address-book Eng-dept address a4 203.0.113.4
set security address-book Eng-dept address-set sw-eng address a1
set security address-book Eng-dept address-set sw-eng address a2
set security address-book Eng-dept address-set hw-eng address a3
set security address-book Eng-dept address-set hw-eng address a4
set security address-book Eng-dept attach zone trust
set security address-book Web address Intranet dns-name www-int.device1.example.com
set security address-book Web attach zone untrust
set security address-book global address g1 198.51.100.2
```

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode* in the CLI User guide.

To configure addresses and address sets:

1. Configure Ethernet interfaces and assign IPv4 addresses to them.

```
[edit]
user@host# set interfaces ge-0/0/0 unit 0 family inet address 203.0.113.5
user@host# set interfaces ge-0/0/1 unit 0 family inet address 203.0.113.6
```

2. Create security zones and assign interfaces to them.

```
[edit]
user@host# set security zones security-zone trust interfaces ge-0/0/0
user@host# set security zones security-zone untrust interfaces ge-0/0/1
```

3. Create an address book and define addresses in it.

```
[edit security address-book Eng-dept ]
user@host# set address a1 203.0.113.1
user@host# set address a2 203.0.113.2
user@host# set address a3 203.0.113.3
user@host# set address a4 203.0.113.4
```

4. Create address sets.

```
[edit security address-book Eng-dept]
user@host# set address-set sw-eng address a1
user@host# set address-set sw-eng address a2
user@host# set address-set hw-eng address a3
user@host# set address-set hw-eng address a4
```

5. Attach the address book to a security zone.

```
[edit security address-book Eng-dept]
user@host# set attach zone trust
```

6. Create another address book and attach it to a security zone.

```
[edit security address-book Web ]
user@host# set address Intranet dns-name www-int.device1.example.com
user@host# set attach zone untrust
```

7. Define an address in the global address book.

```
[edit]
user@host# set security address-book global address g1 198.51.100.2
```

Results

From configuration mode, confirm your configuration by entering the `show security zones` and `show security address-book` commands. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```
[edit]
user@host# show security zones
security-zone trust {
    interfaces {
        ge-0/0/0.0;
    }
}
security-zone untrust {
    interfaces {
        ge-0/0/1.0;
    }
}
[edit]
user@host# show security address-book
Eng-dept {
    address a1 203.0.113.1/32;
    address a2 203.0.113.2/32;
    address a3 203.0.113.3/32;
    address a4 203.0.113.4/32;
    address-set sw-eng {
        address a1;
        address a2;
    }
    address-set hw-eng {
        address a3;
        address a4;
    }
    attach {
```

```

        zone trust;
    }
}
Web {
    address Intranet {
        dns-name www-int.device1.example.com;
    }
    attach {
        zone untrust;
    }
}
global {
    address g1 198.51.100.2/32;
}

```

If you are done configuring the device, enter `commit` from configuration mode.

Verification

IN THIS SECTION

- [Verifying Address Book Configuration | 43](#)
- [Verifying Global Address Book Configuration | 44](#)

Confirm that the configuration is working properly.

Verifying Address Book Configuration

Purpose

Display information about configured address books and addresses.

Action

From configuration mode, enter the `show security address-book` command.

```

user@host# show security address-book
Eng-dept {

```

```

address a1 203.0.113.1/32;
address a2 203.0.113.2/32;
address a3 203.0.113.3/32;
address a4 203.0.113.4/32;
address-set sw-eng {
    address a1;
    address a2;
}
address-set hw-eng {
    address a3;
    address a4;
}
attach {
    zone trust;
}
}
Web {
    address Intranet {
        dns-name www-int.device1.example.com;
    }
    attach {
        zone untrust;
    }
}
global {
    address g1 198.51.100.2/32;
}

```

Verifying Global Address Book Configuration

Purpose

Display information about configured addresses in the global address book.

Action

From configuration mode, enter the `show security address-book global` command.

```

user@host# show security address-book global
address g1 198.51.100.2/32;

```


Excluding Addresses from Policies

Junos OS allows users to add any number of source and destination addresses to a policy. If you need to exclude certain addresses from a policy, you can configure them as negated addresses. When an address is configured as a negated address, it is excluded from a policy. You cannot, however, exclude the following IP addresses from a policy:

- Wildcard
- IPv6
- any
- any-ipv4
- any-ipv6
- 0.0.0.0

When a range of addresses or a single address is negated, it can be divided into multiple addresses. These negated addresses are shown as a prefix or a length that requires more memory for storage on a Packet Forwarding Engine.

Each platform has a limited number of policies with negated addresses. A policy can contain 10 source or destination addresses. The capacity of the policy depends on the maximum number of policies that the platform supports.

Before you configure a negated source address, destination address, or both, perform the following tasks:

1. Create a source, destination, or both address book.
2. Create address names and assign source and destination addresses to the address names.
3. Create address sets to group source, destination, or both address names.
4. Attach source and destination address books to security zones. For example, attach the source address book to the from-zone **trust** and the destination address book to the to-zone **untrust**.
5. Specify the match source, destination, or both address names.
6. Execute source-address-excluded, destination-address excluded, or both commands. A source, destination, or both addresses added in the source, destination, or both address books will be excluded from the policy.

NOTE: The global address book does not need to be attached to any security zone.

Example: Excluding Addresses from Policies

IN THIS SECTION

- Requirements | 46
- Overview | 46
- Configuration | 47
- Verification | 51

This example shows how to configure negated source and destination addresses. It also shows how to configure address books and address sets.

Requirements

This example uses the following hardware and software components:

- An SRX Series Firewall
- A PC
- Junos OS Release 12.1X45-D10

Before you begin, configure address books and address sets. See ["Example: Configuring Address Books and Address Sets" on page 37](#).

Overview

In this example, you create source and destination address books, SOUR-ADDR and DES-ADDR, and add source and destination addresses to it. You create source and destination address sets, as1 and as2, and group source and destination addresses to them. Then you attach source address book to the security zone trust and the destination address book to the security zone untrust.

You create security zones from-zone trust and to-zone untrust. You specify the policy name to p1 and then you set the name of the match source address to as1 and the match destination address to as2.

You specify the commands **source -address-excluded** and **destination -address-excluded** to exclude source and destination addresses configured in the policy p1. Finally, you set the policy p1 to permit traffic from-zone trust to to-zone untrust.

Configuration

IN THIS SECTION

- [Procedure | 47](#)

Procedure

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the [edit] hierarchy level, and then enter `commit` from configuration mode.

```
set security address-book SOU-ADDR address ad1 255.255.255.255/32
set security address-book SOU-ADDR address ad2 203.0.113.130/25
set security address-book SOU-ADDR address ad3 range-address 192.0.2.6 to 192.0.2.116
set security address-book SOU-ADDR address ad4 192.0.2.128/25
set security address-book SOU-ADDR address-set as1 address ad1
set security address-book SOU-ADDR address-set as1 address ad2
set security address-book SOU-ADDR address-set as1 address ad3
set security address-book SOU-ADDR address-set as1 address ad4
set security address-book SOU-ADDR attach zone trust
set security address-book DES-ADDR address ad8 198.51.100.1/24
set security address-book DES-ADDR address ad9 range-address 192.0.2.117 to 192.0.2.199
set security address-book DES-ADDR address ad10 198.51.100.0/24
set security address-book DES-ADDR address ad11 range-address 192.0.2.199 to 192.0.2.250
set security address-book DES-ADDR address-set as2 address ad8
set security address-book DES-ADDR address-set as2 address ad9
set security address-book DES-ADDR address-set as2 address ad10
set security address-book DES-ADDR address-set as2 address ad11
set security address-book DES-ADDR attach zone untrust
set security policies from-zone trust to-zone untrust policy p1 match source-address as1
set security policies from-zone trust to-zone untrust policy p1 match source-address-excluded
set security policies from-zone trust to-zone untrust policy p1 match destination-address as2
```

```

set security policies from-zone trust to-zone untrust policy p1 match destination-address-excluded
set security policies from-zone trust to-zone untrust policy p1 match application any
set security policies from-zone trust to-zone untrust policy p1 then permit

```

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode* in the CLI User guide.

To configure negated addresses:

1. Create a source address book and address names. Add the source addresses to the address book.

```

[edit security address book ]
user@host#set SOU-ADDR address ad1 255.255.255.255/32
user@host#set SOU-ADDR address ad2 203.0.113.130/25
user@host#set SOU-ADDR ad3 range-address 192.0.2.6 to 192.0.2.116
user@host#set SOU-ADDR address ad4 192.0.2.128/25

```

2. Create an address set to group source address names.

```

[edit security address book ]
user@host# set SOU-ADDR address-set as1 address ad1
user@host# set SOU-ADDR address-set as1 address ad2
user@host# set SOU-ADDR address-set as1 address ad3
user@host# set SOU-ADDR address-set as1 address ad4

```

3. Attach the source address book to the security from zone.

```

[edit security address book ]
user@host# set SOU-ADDR attach zone trust

```

4. Create a destination address book and address names. Add the destination addresses to the address book.

```

[edit security address book ]
user@host#set DES-ADDR address ad8 198.51.100.1/24
user@host#set DES-ADDR address ad9 range-address 192.0.2.117 to 192.0.2.199

```

```
user@host#set DES-ADDR address ad10 198.51.100.0/24
user@host#set DES-ADDR address ad11 range-address 192.0.2.199 to 192.0.2.250
```

5. Create another address set to group destination address names.

```
[edit security address book ]
user@host# set DES-ADDR address-set as1 address ad8
user@host# set DES-ADDR address-set as1 address ad9
user@host# set DES-ADDR address-set as1 address ad10
user@host# set DES-ADDR address-set as1 address ad11
```

6. Attach the destination address book to the security to zone.

```
[edit security address book ]
user@host# set DES-ADDR attach zone untrust
```

7. Specify the policy name and source address.

```
[edit security policies]
user@host# set from-zone trust to-zone untrust policy p1 match source-address as1
```

8. Exclude source addresses from the policy.

```
[edit security policies]
user@host# set from-zone trust to-zone untrust policy p1 match source-address-excluded
```

9. Specify the destination address.

```
[edit security policies]
user@host# set from-zone trust to-zone untrust policy p1 match destination-address as2
```

10. Exclude destination addresses from the policy.

```
[edit security policies]
user@host# set from-zone trust to-zone untrust policy p1 match destination-address-
excluded
```

11. Configure the security policy application.

```
[edit security policies]
user@host# set from-zone trust to-zone untrust policy p1 match application any
```

12. Permit the traffic from-zone trust to to-zone untrust.

```
[edit security policies]
user@host# set from-zone trust to-zone untrust policy p1 then permit
```

Results

From configuration mode, confirm your configuration by entering the `show security policies` command. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```
[edit]
user@host# show security policies
  from-zone trust to-zone untrust {
    policy p1 {
      match {
        source-address as1;
        destination-address as2;
        source-address-excluded;
        destination-address-excluded;
        application any;
      }
      then {
        permit;
      }
    }
  }
}
```

If you are done configuring the device, enter `commit` from configuration mode.

Verification

IN THIS SECTION

- [Verifying the Policy Configuration | 51](#)
- [Verifying the Policy Configuration Detail | 51](#)

Confirm that the configuration is working properly.

Verifying the Policy Configuration

Purpose

Verify that the policy configuration is correct.

Action

From operational mode, enter the `show security policies policy-name p1` command.

```
user@host>show security policies policy-name p1
node0:
-----
From zone: trust, To zone: untrust
Policy: p1, State: enabled, Index: 4, Scope Policy: 0, Sequence number: 1
Source addresses(excluded): as1
Destination addresses(excluded): as2
Applications: any
Action: permit
```

This output summarizes the policy configuration.

Verifying the Policy Configuration Detail

Purpose

Verify that the policy and the negated source and destination address configurations are correct.

Action

From operational mode, enter the `show security policies policy-name p1 detail` command.

```
user@host>show security policies policy-name p1 detail
Policy: p1, action-type: permit, State: enabled, Index: 4, Scope Policy: 0
  Policy Type: Configured
  Sequence number: 1
  From zone: trust, To zone: untrust
  Source addresses(excluded):
    ad1(SOU-ADDR): 255.255.255.255/32
    ad2(SOU-ADDR): 203.0.113.130/25
    ad3(SOU-ADDR): 192.0.2.6 ~ 192.0.2.116
    ad4(SOU-ADDR): 192.0.2.128/25
  Destination addresses(excluded):
    ad8(DES-ADDR): 198.51.100.1/24
    ad9(DES-ADDR): 192.0.2.117 ~ 192.0.2.199
    ad10(DES-ADDR): 198.51.100.0/24
    ad11(DES-ADDR): 192.0.2.199 to 192.0.2.250
  Application: any
  IP protocol: 0, ALG: 0, Inactivity timeout: 0
  Source port range: [0-0]
  Destination port range: [0-0]
  Per policy TCP Options: SYN check: No, SEQ check: No
```

This output summarizes the policy configuration and shows the names of negated source and destination addresses excluded from the policy.

SEE ALSO

[Predefined Policy Applications | 61](#)

[Custom Policy Applications | 85](#)

4

CHAPTER

Security Policy Applications and Application Sets

Security Policy Applications and Application Sets | 54

Predefined Policy Applications | 61

Custom Policy Applications | 85

Security Policy Applications and Application Sets

IN THIS SECTION

- [Security Policy Applications Overview | 54](#)
- [Security Policy Application Sets Overview | 55](#)
- [Example: Configuring Security Policy Applications and Application Sets | 55](#)
- [Understanding Policy Application Timeout Configuration and Lookup | 58](#)
- [Understanding Policy Application Timeouts Contingencies | 59](#)
- [Example: Setting a Policy Application Timeout | 59](#)

Policy applications are types of traffic for which protocol standards exist. The policy application set is a group of policy applications. Junos OS simplifies the process by allowing you to manage a small number of policy application sets, rather than a large number of individual policy application entries.

The policy application or application set is referred by security policies as match criteria for packets initiating sessions. Junos OS allows you to configure policy applications and application sets. You can create an application set that contains all the approved applications.

Security Policy Applications Overview

Applications are types of traffic for which protocol standards exist. Each application has a transport protocol and destination port number(s) associated with it, such as TCP/port 21 for FTP and TCP/port 23 for Telnet. When you create a policy, you must specify an application for it.

You can select one of the predefined applications from the application book, or a custom application or application set that you created. You can see which application you can use in a policy by using the `show applications` CLI command.

NOTE: Each predefined application has a source port range of 1-65535, which includes the entire set of valid port numbers. This prevents potential attackers from gaining access by using a source port outside of the range. If you need to use a different source port range for any predefined

application, create a custom application. For information, see "[Understanding Custom Policy Applications](#)" on page 85.

SEE ALSO

| [Understanding Security Policy Elements](#) | 95

Security Policy Application Sets Overview

When you create a policy, you must specify an application, or service, for it to indicate that the policy applies to traffic of that type. Sometimes the same applications or a subset of them can be present in multiple policies, making it difficult to manage. Junos OS allows you to create groups of applications called application sets. Application sets simplify the process by allowing you to manage a small number of application sets, rather than a large number of individual application entries.

The application (or application set) is referred to by security policies as match criteria for packets initiating sessions. If the packet matches the application type specified by the policy and all other criteria match, then the policy action is applied to the packet.

You can specify the name of an application set in a policy. In this case, if all of the other criteria match, any one of the applications in the application set serves as valid matching criteria; any is the default application name that indicates all possible applications.

Applications are created in the `.../applications/application/application-name` directory. You do not need to configure an application for any of the services that are predefined by the system.

In addition to predefined services, you can configure a custom service. After you create a custom service, you can refer to it in a policy.

Example: Configuring Security Policy Applications and Application Sets

IN THIS SECTION

- [Requirements](#) | 56
- [Overview](#) | 56

●	Configuration 57
●	Verification 57

This example shows how to configure applications and application sets.

Requirements

Before you begin, configure the required applications. See ["Security Policy Application Sets Overview" on page 55](#).

Overview

IN THIS SECTION

●	Topology 56
---	---------------

Rather than creating or adding multiple individual application names to a policy, you can create an application set and refer to the name of the set in a policy. For example, for a group of employees, you can create an application set that contains all the approved applications.

In this example, you create an application set that are used to log in to the servers in the ABC (intranet) zone, to access the database, and to transfer files.

- Define the applications in the configured application set.
- Managers in zone A and managers in zone B use these services. Therefore, give the application set a generic name, such as MgrAppSet.
- Create an application set for the applications that are used for e-mail and Web-based applications that are delivered by the two servers in the external zone.

Topology

Configuration

IN THIS SECTION

- [Procedure | 57](#)

Procedure

Step-by-Step Procedure

To configure an application and application set:

1. Create an application set for managers.

```
[edit applications]
user@host# set application-set MgrAppSet application junos-ssh
user@host# set application-set MgrAppSet application junos-telnet
```

2. Create another application set for e-mail and Web-based applications.

```
[edit applications]
user@host# set application-set WebMailApps application junos-smtp
user@host# set application-set WebMailApps application junos-pop3
```

3. If you are done configuring the device, commit the configuration.

```
[edit]
user@host# commit
```

Verification

To verify the configuration is working properly, enter the `show applications` command in configuration mode.

Understanding Policy Application Timeout Configuration and Lookup

The application timeout value you set for an application determines the session timeout. You can set the timeout threshold for a predefined or custom application; you can use the application default timeout, specify a custom timeout, or use no timeout at all.

Application timeout values are stored in the root TCP and UDP port-based timeout table and in the protocol-based default timeout table. When you set an application timeout value, Junos OS updates these tables with the new value. There are also default timeout values in the applications entry database, which are taken from predefined applications. You can set a timeout, but you cannot alter a default value.

Each custom application can be configured with its own custom application timeout. If multiple custom applications are configured with custom timeouts, then each application will have its own custom application timeout.

If the application that is matched for the traffic has a timeout value, that timeout value is used. Otherwise, the lookup proceeds in the following order until an application timeout value is found:

1. The root TCP and UDP port-based timeout table is searched for a timeout value.
2. The protocol-based default timeout table is searched for a timeout value. See [Table 4 on page 58](#).

Table 4: Protocol-Based Default Timeout

Protocol	Default Timeout (seconds)
TCP	1800
UDP	60
ICMP	60
OSPF	60
Other	1800

Understanding Policy Application Timeouts Contingencies

When setting timeouts, be aware of the following contingencies:

- If an application contains several application rule entries, all rule entries share the same timeout. You need to define the application timeout only once. For example, if you create an application with two rules, the following commands will set the timeout to **20** seconds for both rules:

```
user@host# set applications application test term test protocol tcp destination-port
1035-1035 inactivity-timeout 20
user@host# set applications application test term test protocol udp
user@host# set applications application test term test source-port 1-65535
user@host# set applications application test term test destination-port 1111-1111
```

- If multiple custom applications are configured with custom timeouts, then each application will have its own custom application timeout. For example:

```
user@host# set applications application ftp-1 protocol tcp source-port 0-65535 destination-
port 2121-2121 inactivity-timeout 10
user@host# set applications application telnet-1 protocol tcp source-port 0-65535 destination-
port 2300-2348 inactivity-timeout 20
```

With this configuration, Junos OS applies a 10-second timeout for destination port **2121** and a 20-second timeout for destination port **2300** in an application group.

Example: Setting a Policy Application Timeout

IN THIS SECTION

- [Requirements | 60](#)
- [Overview | 60](#)
- [Configuration | 60](#)
- [Verification | 61](#)

This example shows how to set a policy application timeout value.

Requirements

Before you begin, understand policy application timeouts. See ["Understanding Policy Application Timeout Configuration and Lookup" on page 58](#).

Overview

Application timeout values are stored in the application entry database and in the corresponding vsys TCP and UDP port-based timeout tables. In this example, you set the device for a policy application timeout to 75 minutes (4500 seconds) for the FTP predefined application.

When you set an application timeout value, Junos OS updates these tables with the new value.

Configuration

IN THIS SECTION

- [Procedure | 60](#)

Procedure

Step-by-Step Procedure

To set a policy application timeout:

1. Set the inactivity timeout value.

```
[edit applications application ftp]
user@host# set inactivity-timeout 4500
```

2. Commit the configuration if you are done configuring the device.

```
[edit]
user@host# commit
```


Verification

To verify the configuration is working properly, enter the `show applications` command.

RELATED DOCUMENTATION

| [Custom Policy Applications](#) | 85

Predefined Policy Applications

IN THIS SECTION

- [Understanding Internet-Related Predefined Policy Applications](#) | 62
- [Understanding Microsoft Predefined Policy Applications](#) | 64
- [Understanding Dynamic Routing Protocols Predefined Policy Applications](#) | 66
- [Understanding Streaming Video Predefined Policy Applications](#) | 67
- [Understanding Sun RPC Predefined Policy Applications](#) | 68
- [Understanding Security and Tunnel Predefined Policy Applications](#) | 69
- [Understanding IP-Related Predefined Policy Applications](#) | 70
- [Understanding Instant Messaging Predefined Policy Applications](#) | 70
- [Understanding Management Predefined Policy Applications](#) | 71
- [Understanding Mail Predefined Policy Applications](#) | 73
- [Understanding UNIX Predefined Policy Applications](#) | 74
- [Understanding Miscellaneous Predefined Policy Applications](#) | 74
- [Understanding ICMP Predefined Policy Applications](#) | 75
- [Example: Defining a Custom ICMP Application](#) | 82

Predefined policy allows you to choose the applications to permit or deny. You can specify the predefined applications for the policy, depending on your network requirements.

Understanding Internet-Related Predefined Policy Applications

When you create a policy, you can specify predefined Internet-related applications for the policy.

[Table 5 on page 62](#) lists Internet-related predefined applications. Depending on your network requirements, you can choose to permit or deny any or all of these applications. Each entry lists the application name, default receiving port, and application description.

Table 5: Predefined Applications

Application Name	Port(s)	Application Description
AOL	5190-5193	America Online Internet service provider (ISP) provides Internet, chat, and instant messaging applications.
DHCP relay	67 (default)	Dynamic Host Configuration Protocol.
DHCP	68 client 67 server	Dynamic Host Configuration Protocol allocates network addresses and delivers configuration parameters from server to hosts.
DNS	53	Domain Name System translates domain names into IP addresses.
FTP	20 data 21 control	File Transfer Protocol (FTP) allows the sending and receiving of files between machines. You can choose to deny or permit ANY or to selectively permit or deny. We recommend denying FTP applications from untrusted sources (Internet).
Gopher	70	Gopher organizes and displays Internet servers' contents as a hierarchically structured list of files. We recommend denying Gopher access to avoid exposing your network structure.

Table 5: Predefined Applications (Continued)

Application Name	Port(s)	Application Description
HTTP	80	<p>HyperText Transfer Protocol is the underlying protocol used by the World Wide Web (WWW).</p> <p>Denying HTTP application disables your users from viewing the Internet.</p> <p>Permitting HTTP application allows your trusted hosts to view the Internet.</p>
HTTP-EXT	—	Hypertext Transfer Protocol with extended nonstandard ports
HTTPS	443	<p>Hypertext Transfer Protocol with Secure Sockets Layer (SSL) is a protocol for transmitting private documents through the Internet.</p> <p>Denying HTTPS disables your users from shopping on the Internet and from accessing certain online resources that require secure password exchange.</p> <p>Permitting HTTPS allows your trusted hosts to participate in password exchange, shop online, and visit various protected online resources that require user login.</p>
Internet Locator Service	—	Internet Locator Service includes LDAP, User Locator Service, and LDAP over TSL/SSL.
IRC	6665-6669	Internet Relay Chat (IRC) allows people connected to the Internet to join live discussions.
LDAP	389	Lightweight Directory Access Protocol is a set of protocols used to access information directories.
PC-Anywhere	—	PC-Anywhere is a remote control and file transfer software.
TFTP	69	Trivial File transfer Protocol (TFTP) is a protocol for simple file transfer.

Table 5: Predefined Applications (Continued)

Application Name	Port(s)	Application Description
WAIS	—	Wide Area Information Server is a program that finds documents on the Internet.

NOTE: Starting in Junos OS Release Junos OS Release 18.4R1, encrypted applications such as HTTP, SMTP, IMAP and POP3 over SSL are identified as junos:HTTPS, junos:SMTPS, junos:IMAPS, and junos:POP3S in Junos OS predefined applications and application sets. For example: If you configure a security policy to allow or deny HTTPS traffic, you must specify application matching criteria as junos:HTTPS. In previous Junos OS Releases, both HTTP and encrypted HTTP (HTTPS) applications can be configured using a same application matching criteria as junos:HTTP.

Understanding Microsoft Predefined Policy Applications

When you create a policy, you can specify predefined Microsoft applications for the policy.

Table 6 on page 64 lists predefined Microsoft applications, parameters associated with each application, and a brief description of each application. Parameters include universal unique identifiers (UUIDs) and TCP/UDP source and destination ports. A UUID is a 128-bit unique number generated from a hardware address, a timestamp, and seed values.

Table 6: Predefined Microsoft Applications

Application	Parameter/UUID	Description
Junos MS-RPC-EPM	135 e1af8308-5d1f-11c9-91a4-08002b14a0fa	Microsoft remote procedure call (RPC) Endpoint Mapper (EPM) Protocol.
Junos MS-RPC	—	Any Microsoft remote procedure call (RPC) applications.

Table 6: Predefined Microsoft Applications *(Continued)*

Application	Parameter/UUID	Description
Junos MS-RPC-MSEXCHANGE	3 members	Microsoft Exchange application group includes: <ul style="list-style-type: none"> • Junos-MS-RPC-MSEXCHANGE-DATABASE • Junos-MS-RPC-MSEXCHANGE-DIRECTORY • Junos-MS-RPC-MSEXCHANGE-INFO-STORE
Junos-MS-RPC-MSEXCHANGE-DATABASE	1a190310-bb9c-11cd-90f8-00aa00466520	Microsoft Exchange Database application.
Junos-MS-RPC-MSEXCHANGE-DIRECTORY	f5cc5a18-4264-101a-8c59-08002b2f8426 f5cc5a7c-4264-101a-8c59-08002b2f8426 f5cc59b4-4264-101a-8c59-08002b2f8426	Microsoft Exchange Directory application.
Junos-MS-RPC-MSEXCHANGE-INFO-STORE	0e4a0156-dd5d-11d2-8c2f-00c04fb6bcde 1453c42c-0fa6-11d2-a910-00c04f990f3b 10f24e8e-0fa6-11d2-a910-00c04f990f3b 1544f5e0-613c-11d1-93df-00c04fd7bd09	Microsoft Exchange Information Store application.
Junos-MS-RPC-TCP	—	Microsoft Transmission Control Protocol (TCP) application.

Table 6: Predefined Microsoft Applications (Continued)

Application	Parameter/UUID	Description
Junos-MS-RPC-UDP	—	Microsoft User Datagram Protocol (UDP) application.
Junos-MS-SQL	—	Microsoft Structured Query Language (SQL).
Junos-MSN	—	Microsoft Network Messenger application.

Understanding Dynamic Routing Protocols Predefined Policy Applications

When you create a policy, you can specify predefined dynamic routing protocol applications for the policy.

Depending on your network requirements, you can choose to permit or deny messages generated from these dynamic routing protocols and packets of these dynamic routing protocols. [Table 7 on page 66](#) lists each supported dynamic routing protocol by name, port, and description.

Table 7: Dynamic Routing Protocols

Dynamic Routing Protocol	Port	Description
RIP	520	RIP is a common distance-vector routing protocol.
OSPF	89	OSPF is a common link-state routing protocol.
BGP	179	BGP is an exterior/interdomain routing protocol.

Understanding Streaming Video Predefined Policy Applications

When you create a policy, you can specify predefined streaming video applications for the policy.

[Table 8 on page 67](#) lists each supported streaming video application by name and includes the default port and description. Depending on your network requirements, you can choose to permit or deny any or all of these applications.

Table 8: Supported Streaming Video Applications

Application	Port	Description
H.323	TCP source 1-65535; TCP destination 1720, 1503, 389, 522, 1731 UDP source 1-65535; UDP source 1719	H.323 is a standard approved by the International Telecommunication Union (ITU) that defines how audiovisual conference data is transmitted across networks.
NetMeeting	TCP source 1-65535; TCP destination 1720, 1503, 389, 522 UDP source 1719	Microsoft NetMeeting uses TCP to provide teleconferencing (video and audio) applications over the Internet.
Real media	TCP source 1-65535; TCP destination 7070	Real Media is streaming video and audio technology.
RTSP	554	Real-Time Streaming Protocol (RTSP) is for streaming media applications
SIP	5056	Session Initiation Protocol (SIP) is an Application-Layer control protocol for creating, modifying, and terminating sessions.
VDO Live	TCP source 1-65535; TCP destination 7000-7010	VDOLive is a scalable, video streaming technology.

Understanding Sun RPC Predefined Policy Applications

When you create a policy, you can specify predefined Sun RPC applications for the policy.

[Table 9 on page 68](#) lists each Sun remote procedure call Application Layer Gateway (RPC ALG) application name, parameters, and full name.

Table 9: RPC ALG Applications

Application	Program Numbers	Full Name
SUN-RPC-PORTMAPPER	111100000	Sun RPC Portmapper protocol
SUN-RPC-ANY	ANY	Any Sun RPC applications
SUN-RPC-PROGRAM-MOUNTD	100005	Sun RPC Mount Daemon
SUN-RPC-PROGRAM-NFS	100003 100227	Sun RPC Network File System
SUN-RPC-PROGRAM-NLOCKMGR	100021	Sun RPC Network Lock Manager
SUN-RPC-PROGRAM-RQUOTAD	100011	Sun RPC Remote Quota Daemon
SUN-RPC-PROGRAM-RSTATD	100001	Sun RPC Remote Status Daemon
SUN-RPC-PROGRAM-RUSERD	100002	Sun RPC Remote User Daemon
SUN-RPC-PROGRAM-SADMIND	100232	Sun RPC System Administration Daemon
SUN-RPC-PROGRAM-SPRAYD	100012	Sun RPC Spray Daemon
SUN-RPC-PROGRAM-STATUS	100024	Sun RPC Status
SUN-RPC-PROGRAM-WALLD	100008	Sun RPC Wall Daemon

Table 9: RPC ALG Applications (Continued)

Application	Program Numbers	Full Name
SUN-RPC-PROGRAM-YPBIND	100007	SUN RPC Yellow Page Bind application

Understanding Security and Tunnel Predefined Policy Applications

When you create a policy, you can specify predefined security and tunnel applications for the policy.

[Table 10 on page 69](#) lists each supported application and gives the default port(s) and a description of each entry.

Table 10: Supported Applications

Application	Port	Description
IKE	UDP source 1-65535; UDP destination 500	Internet Key Exchange is the protocol that sets up a security association in the IPsec protocol suite. Internet Key protocol (IKE) is a protocol to obtain authenticated keying material for use with ISAKMP.
IKE-NAT	4500	IKE-Network Address Translation (NAT) performs Layer 3 NAT for S2C IKE traffic.
L2TP	1701	L2TP combines PPTP with Layer 2 Forwarding (L2F) for remote access.
PPTP	1723	Point-to-Point Tunneling Protocol allows corporations to extend their own private network through private <i>tunnels</i> over the public Internet.

Understanding IP-Related Predefined Policy Applications

When you create a policy, you can specify predefined IP-related applications for the policy.

[Table 11 on page 70](#) lists the predefined IP-related applications. Each entry includes the default port and a description of the application.

TCP-ANY means any application that is using TCP, so there is no default port for it. The same is true for UDP-ANY.

Table 11: Predefined IP-Related Applications

Application	Port	Description
Any	—	Any application
TCP-ANY	0-65,535	Any protocol using the TCP
UDP-ANY	0-65,535	Any protocol using the UDP

Understanding Instant Messaging Predefined Policy Applications

When you create a policy, you can specify predefined instant messaging applications for the policy.

[Table 12 on page 70](#) lists predefined Internet-messaging applications. Each entry includes the name of the application, the default or assigned port, and a description of the application.

Table 12: Predefined Internet-Messaging Applications

Application	Port	Description
Gnutella	6346 (default)	Gnutella is a public domain file sharing protocol that operates over a distributed network. You can assign any port, but the default is 6346.
MSN	1863	Microsoft Network Messenger is a utility that allows you to send instant messages and talk online.

Table 12: Predefined Internet-Messaging Applications (Continued)

Application	Port	Description
NNTP	119	Network News Transport Protocol is a protocol used to post, distribute, and retrieve USENET messages.
SMB	445	Server Message Block (SMB) over IP is a protocol that allows you to read and write files to a server on a network.
YMSG	5010	Yahoo! Messenger is a utility that allows you to check when others are online, send instant messages, and talk online.

Understanding Management Predefined Policy Applications

When you create a policy, you can specify predefined management applications for the policy.

[Table 13 on page 71](#) lists the predefined management applications. Each entry includes the name of the application, the default or assigned port, and a description of the application.

Table 13: Predefined Management Applications

Application	Port	Description
NBNAME	137	NetBIOS Name application displays all NetBIOS name packets sent on UDP port 137.
NDBDS	138	NetBIOS Datagram application, published by IBM, provides connectionless (datagram) applications to PCs connected with a broadcast medium to locate resources, initiate sessions, and terminate sessions. It is unreliable and the packets are not sequenced.
NFS	—	Network File System uses UDP to allow network users to access shared files stored on computers of different types. SUN RPC is a building block of NFS.

Table 13: Predefined Management Applications *(Continued)*

Application	Port	Description
NS Global	—	NS-Global is the central management protocol for Juniper Networks Firewall/VPN devices.
NS Global PRO	—	NS Global-PRO is the scalable monitoring system for the Juniper Networks Firewall/VPN device family.
NSM	—	Network and Security Manager
NTP	123	Network Time Protocol provides a way for computers to synchronize to a time reference.
RLOGIN	513	RLOGIN starts a terminal session on a remote host.
RSH	514	RSH executes a shell command on a remote host.
SNMP	161	Simple Network Management Protocol is a set of protocols for managing complex networks.
SQL*Net V1	66	SQL*Net Version 1 is a database language that allows for the creation, access, modification, and protection of data.
SQL*Net V2	66	SQL*Net Version 2 is a database language that allows for the creation, access, modification, and protection of data.
MSSQL	1433 (default instance)	Microsoft SQL is a proprietary database server tool that allows for the creation, access, modification, and protection of data.
SSH	22	SSH is a program to log in to another computer over a network through strong authentication and secure communications on an unsecure channel.
SYSLOG	514	Syslog is a UNIX program that sends messages to the system logger.

Table 13: Predefined Management Applications *(Continued)*

Application	Port	Description
Talk	517-518	Talk is a visual communication program that copies lines from your terminal to that of another user.
Telnet	23	Telnet is a UNIX program that provides a standard method of interfacing terminal devices and terminal-oriented processes to each other.
WinFrame	—	WinFrame is a technology that allows users on non-Windows machines to run Windows applications.
X-Windows	—	X-Windows is the windowing and graphics system that Motif and OpenLook are based on.

Understanding Mail Predefined Policy Applications

When you create a policy, you can specify predefined mail applications for the policy.

[Table 14 on page 73](#) lists the predefined mail applications. Each includes the name of the application, the default or assigned port number, and a description of the application.

Table 14: Predefined Mail Applications

Application	Port	Description
IMAP	143	Internet Message Access Protocol is used for retrieving messages.
Mail (SMTP)	25	Simple Mail Transfer Protocol is used to send messages between servers.
POP3	110	Post Office Protocol is used for retrieving e-mail.

Understanding UNIX Predefined Policy Applications

When you create a policy, you can specify predefined UNIX applications for the policy.

[Table 15 on page 74](#) lists the predefined UNIX applications. Each entry includes the name of the application, the default or assigned port, and a description of the application.

Table 15: Predefined UNIX Applications

Application	Port	Description
FINGER	79	Finger is a UNIX program that provides information about the users.
UUCP	117	UNIX-to-UNIX Copy Protocol (UUCP) is a UNIX utility that enables file transfers between two computers over a direct serial or modem connection.

Understanding Miscellaneous Predefined Policy Applications

When you create a policy, you can specify miscellaneous predefined applications for the policy.

[Table 16 on page 74](#) lists predefined miscellaneous applications. Each entry includes the application name, default or assigned port, and a description of the application.

Table 16: Predefined Miscellaneous Applications

Application	Port	Description
CHARGEN	19	Character Generator Protocol is a UDP- or TCP-based debugging and measurement tool.
DISCARD	9	Discard protocol is an Application Layer protocol that describes a process for discarding TCP or UDP data sent to port 9.
IDENT	113	Identification protocol is a TCP/IP Application Layer protocol used for TCP client authentication.

Table 16: Predefined Miscellaneous Applications (Continued)

Application	Port	Description
LPR	515 listen; 721-731 source range (inclusive)	Line Printer Daemon protocol is a TCP-based protocol used for printing applications.
RADIUS	1812	Remote Authentication Dial-In User Service application is a server program used for authentication and accounting purposes.
RADIUS Accounting	1813	A RADIUS Accounting server receives statistical data about users logging in to or out of a LAN.
SQLMON	1434 (SQL Monitor Port)	SQL monitor (Microsoft)
VNC	5800	Virtual Network Computing facilitates viewing and interacting with another computer or mobile Juniper Networks device connected to the Internet.
WHOIS	43	Network Directory Application Protocol is a way to look up domain names.
SCCP	2000	Cisco Station Call Control Protocol (SCCP) uses the signaling connection control port to provide high availability and flow control.

Understanding ICMP Predefined Policy Applications

IN THIS SECTION

- [Default Behavior of ICMP Unreachable Errors | 81](#)

When you create a policy, you can specify the ICMP predefined application for the policy.

Internet Control Message Protocol (ICMP) is a part of IP and provides a way to query a network (ICMP query messages) and to receive feedback from the network for error patterns (ICMP error messages). ICMP does not, however, guarantee error message delivery or report all lost datagrams; and it is not a reliable protocol. ICMP codes and type codes describe ICMP query messages and ICMP error messages.

You can choose to permit or deny any or specific types of ICMP messages to improve network security. Some types of ICMP messages can be exploited to gain information about your network that might compromise security. For example, ICMP, TCP, or UDP packets can be constructed to return ICMP error messages that contain information about a network, such as its topology, and access list filtering characteristics. [Table 17 on page 76](#) lists ICMP message names, the corresponding code, type, and description.

Table 17: ICMP Messages

ICMP Message Name	Type	Code	Description
ICMP-ANY	all	all	<p>ICMP-ANY affects any protocol using ICMP.</p> <p>Denying ICMP-ANY impairs any attempt to ping or monitor a network using ICMP.</p> <p>Permitting ICMP-ANY allows all ICMP messages.</p>
ICMP-ADDRESS-MASK <ul style="list-style-type: none"> Request Reply 	17 18	0 0	<p>ICMP address mask query is used for systems that need the local subnet mask from a bootstrap server.</p> <p>Denying ICMP address mask request messages can adversely affect diskless systems.</p> <p>Permitting ICMP address mask request messages might allow others to fingerprint the operating system of a host in your network.</p>

Table 17: ICMP Messages *(Continued)*

ICMP Message Name	Type	Code	Description
ICMP-DEST-UNREACH	3	0	<p>ICMP destination unreachable error message indicates that the destination host is configured to reject the packets.</p> <p>Codes 0, 1, 4, or 5 can be from a gateway. Codes 2 or 3 can be from a host (RFC 792).</p> <p>Denying ICMP destination unreachable error messages can remove the assumption that a host is up and running behind an SRX Series Firewall.</p> <p>Permitting ICMP destination unreachable error messages can allow some assumptions, such as security filtering, to be made about the network.</p>
ICMP Fragment Needed	3	4	<p>ICMP fragmentation error message indicates that fragmentation is needed but the don't fragment flag is set.</p> <p>We recommend denying these messages from the Internet to an internal network.</p>
ICMP FragmentReassembly	11	1	<p>ICMP fragment reassembly time exceeded error indicates that a host reassembling a fragmented message ran out of time and dropped the packet. This message is sometimes sent.</p> <p>We recommend denying these messages from the Internet (external) to the trusted (internal) network.</p>

Table 17: ICMP Messages *(Continued)*

ICMP Message Name	Type	Code	Description
ICMP-HOST-UNREACH	3	1	<p>ICMP host unreachable error messages indicate that routing table entries do not list or list as infinity a particular host. Sometimes this error is sent by gateways that cannot fragment when a packet requiring fragmentation is received.</p> <p>We recommend denying these messages from the Internet to a trusted network.</p> <p>Permitting these messages allows others to be able to determine your internal hosts IP addresses by a process of elimination or make assumptions about gateways and fragmentation.</p>
ICMP-INFO <ul style="list-style-type: none"> • Request • Reply 	15 16	0 0	<p>ICMP-INFO query messages allow diskless host systems to query the network and self-configure.</p> <p>Denying ICMP address mask request messages can adversely affect diskless systems.</p> <p>Permitting ICMP address mask request messages might allow others to broadcast information queries to a network segment to determine computer type.</p>
ICMP-PARAMETER-PROBLEM	12	0	<p>ICMP parameter problem error messages notify you when incorrect header parameters are present and have caused a packet to be discarded</p> <p>We recommend denying these messages from the Internet to a trusted network.</p> <p>Permitting ICMP parameter problem error messages allows others to make assumptions about your network.</p>

Table 17: ICMP Messages *(Continued)*

ICMP Message Name	Type	Code	Description
ICMP-PORT-UNREACH	3	3	<p>ICMP port unreachable error messages indicate that gateways processing datagrams requesting certain ports are unavailable or unsupported in the network.</p> <p>We recommend denying these messages from the Internet to a trusted network.</p> <p>Permitting ICMP port unreachable error messages can allow others to determine which ports you use for certain protocols.</p>
ICMP-PROTOCOL-UNREACH	3	2	<p>ICMP protocol unreachable error messages indicate that gateways processing datagrams requesting certain protocols are unavailable or unsupported in the network.</p> <p>We recommend denying these messages from the Internet to a trusted network.</p> <p>Permitting ICMP protocol unreachable error messages can allow others to determine what protocols your network is running.</p>
ICMP-REDIRECT	5	0	<p>ICMP redirect network error messages are sent by an SRX Series Firewall.</p> <p>We recommend denying these messages from the Internet to a trusted network.</p>
ICMP-REDIRECT-HOST	5	1	<p>ICMP redirect messages indicate datagrams destined for the specified host to be sent along another path.</p>
ICMP-REDIRECT-TOS-HOST	5	3	<p>ICMP redirect type of service (TOS) and host error is a type of message.</p>

Table 17: ICMP Messages *(Continued)*

ICMP Message Name	Type	Code	Description
ICMP-REDIRECT-TOS-NET	5	2	ICMP redirect TOS and network error is a type of message.
ICMP-SOURCE-QUENCH	4	0	<p>ICMP source quench error message indicates that a device does not have the buffer space available to accept, queue, and send the packets on to the next hop.</p> <p>Denying these messages will not help or impair internal network performance.</p> <p>Permitting these messages can allow others to know that a device is congested, making it a viable attack target.</p>
ICMP-SOURCE-ROUTE-FAIL	3	5	<p>ICMP source route failed error message</p> <p>We recommend denying these messages from the Internet (external).</p>
ICMP-TIME-EXCEEDED	11	0	<p>ICMP time-to-live (TTL) exceeded error message indicates that a packet's TTL setting reached zero before the packet reached its destination. This ensures that older packets are discarded before resent ones are processed.</p> <p>We recommend denying these messages from a trusted network out to the Internet.</p>
ICMP-TIMESTAMP <ul style="list-style-type: none"> • Request • Reply 	13 14	0 0	<p>ICMP-TIMESTAMP query messages provide the mechanism to synchronize time and coordinate time distribution in a large, diverse network.</p>

Table 17: ICMP Messages (Continued)

ICMP Message Name	Type	Code	Description
Ping (ICMP ECHO)	8	0	<p>Ping is a utility to determine whether a specific host is accessible by its IP address.</p> <p>Denying ping functionality removes your ability to check to see if a host is active.</p> <p>Permitting ping can allow others to execute a denial-of-service (DoS) or Smurf attack.</p>
ICMP-ECHO-FRAGMENT-ASSEMBLY-EXPIRE	11	1	<p>ICMP fragment echo reassembly time expired error message indicates that the reassembly time was exceeded.</p> <p>We recommend denying these messages.</p>
Traceroute <ul style="list-style-type: none"> • Forward • Discard 	30 30	0 1	<p>Traceroute is a utility to indicate the path to access a specific host.</p> <p>We recommend denying this utility from the Internet (external) to your trusted network (internal).</p>

Default Behavior of ICMP Unreachable Errors

For different levels of security, the default behavior for ICMP unreachable errors is handled as follows:

- Sessions are closed for ICMP type-3, code-0, code-1, code-2, and code-3 messages only when the following conditions are met:
 - The ICMP unreachable message is received in the server-to-client direction.
 - No normal packet is received in the server-to-client direction.

Otherwise, sessions do not close.

- Sessions do not close for ICMP type-3, code-4 messages.

Example: Defining a Custom ICMP Application

IN THIS SECTION

- [Requirements | 82](#)
- [Overview | 82](#)
- [Configuration | 83](#)
- [Verification | 84](#)

This example shows how to define a custom ICMP application.

Requirements

Before you begin:

- Understand custom policy application. See ["Understanding Custom Policy Applications" on page 85](#).
- Understand the ICMP predefined policy application. See ["Understanding ICMP Predefined Policy Applications" on page 75](#).

Overview

Junos OS supports ICMP—as well as several ICMP messages—as predefined or custom applications. When configuring a custom ICMP application, you define a type and code.

- There are different message types within ICMP. For example:
 - type 0 = Echo Request message
 - type 3 = Destination Unreachable message
- An ICMP message type can also have a message code. The code provides more specific information about the message, as shown in [Table 18 on page 82](#).

Table 18: Message Descriptions

Message Type	Message Code
5 = Redirect	0 = Redirect datagram for the network (or subnet)

Table 18: Message Descriptions *(Continued)*

Message Type	Message Code
	1 = Redirect datagram for the host
	2 = Redirect datagram for the type of application and network
	3 = Redirect datagram for the type of application and host
11 = Time Exceeded Codes	0 = Time to live exceeded in transit
	1 = Fragment reassembly time exceeded

Junos OS supports any type or code within the range of 0 through 55 .

In this example, you define a custom application named host-unreachable using ICMP as the transport protocol. The type is 3 (for destination unreachable) and the code is 1 (for host unreachable). You set the timeout value at 4 minutes.

NOTE: For more information about ICMP types and codes, refer to RFC 792, *Internet Control Message Protocol*.

Configuration

IN THIS SECTION

- Procedure | 84

Procedure

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode* in the [Junos OS CLI User Guide](#).

To define a custom ICMP application:

1. Set the application type and code.

```
[edit applications application host-unreachable]
user@host# set icmp-type 5 icmp-code 0
```

2. Set the inactivity timeout value.

```
[edit applications application host-unreachable]
user@host# set inactivity-timeout 4
```

3. If you are done configuring the device, commit the configuration.

```
[edit]
user@host# commit
```

Verification

To verify the configuration is working properly, enter the `show applications` command.

RELATED DOCUMENTATION

| [Address Books and Address Sets](#) | 26

Custom Policy Applications

IN THIS SECTION

- [Understanding Custom Policy Applications | 85](#)
- [Custom Application Mappings | 85](#)
- [Example: Adding and Modifying Custom Policy Applications | 86](#)
- [Example: Configuring Custom Policy Application Term Options | 89](#)

Custom policy application is an alternate feature for predefined policy applications. If you do not want to use predefined policy applications in your policy, you can create custom applications. Junos OS allows you to configure custom applications for your policy.

Understanding Custom Policy Applications

If you do not want to use predefined applications in your policy, you can easily create custom applications.

You can assign each custom application the following attributes:

- Name
- Transport protocol
- Source and destination port numbers for applications using TCP or UDP
- Type and code values for applications using ICMP
- Timeout value

Custom Application Mappings

The application option specifies the Layer 7 application that maps to the Layer 4 application that you reference in a policy. A predefined application already has a mapping to a Layer 7 application. However,

for custom applications, you must link the application to a policy explicitly, especially if you want the policy to apply an Application Layer Gateway (ALG) or deep inspection to the custom application.

NOTE: Junos OS supports ALGs for numerous applications, including DNS, FTP, H.323, HTTP, RSH, SIP, Telnet, and TFTP.

Applying an ALG to a custom application involves the following two steps:

- Define a custom application with a name, timeout value, transport protocol, and source and destination ports.
- When configuring a policy, reference that application and the application type for the ALG that you want to apply.

Example: Adding and Modifying Custom Policy Applications

IN THIS SECTION

- [Requirements | 86](#)
- [Overview | 86](#)
- [Configuration | 87](#)
- [Verification | 88](#)

This example shows how to add and modify custom policy applications.

Requirements

Before you begin, create addresses and security zones. See ["Example: Creating Security Zones" on page 9](#).

Overview

In this example, you create a custom application using the following information:

- A name for the application: `cust-telnet`.
- A range of source port numbers: 1 through 65535.

- A destination port number: 23000.
- The protocol used by the application: TCP.

Once the custom application `cust-telnet` is created the following information is modified:

- The protocol used by the application is modified to : TCP.
- A range of source port numbers: 1 through 51100.
- A destination port number: 11000.

Configuration

IN THIS SECTION

- [Procedure | 87](#)

Procedure

Step-by-Step Procedure

The following example requires you to navigate through various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode*.

To add and modify a custom policy application:

1. Configure TCP and specify the source port and destination port.

```
[edit applications application cust-telnet]
user@host# set protocol tcp source-port 65535 destination-port 23000
```

2. Specify the length of time that the application is inactive.

```
[edit applications application cust-telnet]
user@host# set inactivity-timeout 1800
```

3. Modify the custom policy application `cust-telnet` :

- Delete the source and destination ports configured for TCP.

- Configure UDP and specify the source port and destination port.
- Specify the length of time that UDP is inactive.

```
[edit]
user@host# delete applications application cust-telnet source-port
user@host# delete applications application cust-telnet destination-port
user@host# set applications application cust-telnet protocol udp source-port 51100
destination-port 11000
user@host# set inactivity-timeout 1500
```

4. If you are done configuring the device, commit the configuration.

```
[edit]
user@host# commit
```

Verification

IN THIS SECTION

- [Verifying The Modified Custom Policy Application | 88](#)

Verifying The Modified Custom Policy Application

Purpose

To verify if the custom policy application has been modified successfully.

Action

From operational mode, enter the `show applications application cust-telnet` command to display the details of the custom policy application - `cust-telnet`.

```
user@host> show applications application cust-telnet

protocol udp;
source-port 51100;
```

```
destination-port 11000;
inactivity-timeout 1500;
```

NOTE: The timeout value is in seconds. If you do not set it, the timeout value of a custom application is 1800 seconds. If you do not want an application to time out, type *never*.

Meaning

The output displays information about the *cust-telnet* application. Verify the following information:

- Configured policy name.
- Source and destination ports.
- Length of time (in seconds) that the application is inactive.

SEE ALSO

[Security Policies Overview | 2](#)

[Security Policy Applications Overview | 54](#)

[Understanding Custom Policy Applications | 85](#)

[Example: Defining a Custom ICMP Application | 82](#)

Example: Configuring Custom Policy Application Term Options

IN THIS SECTION

- [Requirements | 90](#)
- [Overview | 90](#)
- [Configuration | 90](#)
- [Verification | 92](#)

This example shows how to configure applications properties and term options for application protocols.

Requirements

This example uses the following hardware and software components:

- An SRX Series Firewall
- A PC

Before you begin:

- Configure the required applications. See ["Example: Adding and Modifying Custom Policy Applications" on page 86](#).

Overview

In this example, you create an application name, app-name, and a term called custom-options to define your custom policy application term options.

You configure Domain Name Service (DNS) as the Application Layer Gateway (ALG) type and UDP as the networking protocol type. You set the source port to 24000 and the destination port to 23000. Then you set the Internet Control Message Protocol (ICMP) packet type value to 5 and the ICMP code value to 0. You set the remote procedure call (RPC) program number value to 50 and the Universal Unique Identifier (UUID) value to 1be617c0-31a5-11cf-a7d8-00805f48a135. Finally, you set the inactivity-timeout value to 60.

Configuration

IN THIS SECTION

- [Procedure | 90](#)

Procedure

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the [edit] hierarchy level, and then enter `commit` from configuration mode.

```
user@host# set applications application app-name term custom-options
user@host# set applications application app-name term custom-options alg dns
```

```

user@host#set applications application app-name term custom-options protocol udp
user@host#set applications application app-name term custom-options source-port 24000
user@host#set applications application app-name term custom-options destination-port 23000
user@host#set applications application app-name term custom-options inactivity-timeout 60

```

Step-by-Step Procedure

To configure custom policy application term options:

1. Configure the term name.

```

[edit applications]
user@host# set application app-name term custom-options

```

2. Configure the ALG type.

```

[edit applications]
user@host# set application app-name term custom-options alg dns

```

3. Configure the networking protocol type.

```

[edit applications]
user@host# set application app-name term custom-options protocol udp

```

4. Configure the source port number.

```

[edit applications]
user@host#set application app-name term custom-options source-port 24000

```

5. Configure the TCP or UDP destination port number.

```

[edit applications]
user@host# set application app-name term custom-options destination-port 23000

```

6. Specify the inactivity timeout value.

```
[edit applications]
user@host# set application app-name term custom-options inactivity-timeout 60
```

Results

From configuration mode, confirm your configuration by entering the `show applications` command. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```
[edit]
user@host# show applications
application app-name {
  term custom-options alg dns protocol udp source-port 24000 inactivity-timeout 60;
}
```

If you are done configuring the device, enter `commit` from configuration mode.

Verification

IN THIS SECTION

- [Verifying the Configuration | 92](#)

Verifying the Configuration

Purpose

Verify that the configuration is correct.

Action

From operational mode, enter the `show applications` command.

```
user@host> show applications
  application app-name {
    term custom-options alg dns protocol udp source-port 24000 inactivity-timeout 60;
  }
```

RELATED DOCUMENTATION

| [Security Policy Applications and Application Sets](#) | 54

5

CHAPTER

Security Policies

[Configuring Security Policies | 95](#)

[Unified Security Policies | 167](#)

[Global Security Policies | 198](#)

[User Role Firewall Security Policies | 210](#)

[Reordering Security Policies | 237](#)

[Scheduling Security Policies | 241](#)

[Threat Profiling Support in Security Policy | 248](#)

[Configuring Security Policies for a VRF Routing Instance | 249](#)

[Configuring Security Policies Using VRF Group | 282](#)

[Explicit Web Proxy | 296](#)

[Monitoring and Troubleshooting Security Policies | 317](#)

Configuring Security Policies

IN THIS SECTION

- [Understanding Security Policy Elements | 95](#)
- [Understanding Security Policy Rules | 96](#)
- [Understanding Security Policies for Self Traffic | 100](#)
- [Security Policies Configuration Overview | 101](#)
- [Best Practices for Defining Policies on SRX Series Devices | 102](#)
- [Configuring Policies Using the Firewall Wizard | 105](#)
- [Example: Configuring a Security Policy to Permit or Deny All Traffic | 106](#)
- [Example: Configuring a Security Policy to Permit or Deny Selected Traffic | 111](#)
- [Example: Configuring a Security Policy to Permit or Deny Wildcard Address Traffic | 118](#)
- [Example: Configuring a Security Policy to Redirect Traffic Logs to an External System Log Server | 123](#)
- [TAP Mode for Security Zones and Policies | 127](#)
- [Dynamic Address Groups in Security Policies | 133](#)
- [Configure Security Policies for VXLAN | 140](#)
- [Enable Security Policies for Geneve Packet Flow Tunnel Inspection | 151](#)

To secure a network, a network administrator must create a security policy that outlines all of the network resources within that business and the required security level for those resources. Junos OS allows you to configure security policies. Security policies enforce rules for transit traffic, in terms of what traffic can pass through the firewall, and the actions that need to take place on traffic as it passes through the firewall.

Understanding Security Policy Elements

A security policy is a set of statements that controls traffic from a specified source to a specified destination using a specified service. A policy permits, denies, or tunnels specified types of traffic unidirectionally between two points.

Each policy consists of:

- A unique name for the policy.
- A from-zone and a to-zone, for example: `user@host# set security policies from-zone untrust to-zone untrust`
- A set of match criteria defining the conditions that must be satisfied to apply the policy rule. The match criteria are based on a source IP address, destination IP address, and applications. The user identity firewall provides greater granularity by including an additional tuple, source-identity, as part of the policy statement.
- A set of actions to be performed in case of a match—permit, deny, or reject.
- Accounting and auditing elements—counting, logging, or structured system logging.

If the SRX Series receives a packet that matches those specifications, it performs the action specified in the policy.

Security policies enforce a set of rules for transit traffic, identifying which traffic can pass through the firewall and the actions taken on the traffic as it passes through the firewall. Actions for traffic matching the specified criteria include permit, deny, reject, log, or count.

For SRX300, SRX320, SRX340, SRX345, SRX380, and SRX550M devices, a factory default security policy is provided that:

- Allows all traffic from the trust zone to the untrust zone.
- Allows all traffic between trusted zones, that is from the trust zone to intrazone trusted zones.
- Denies all traffic from the untrust zone to the trust zone.

Understanding Security Policy Rules

IN THIS SECTION

- [Understanding Wildcard Addresses](#) | 99

The security policy applies the security rules to the transit traffic within a context (from-zone to to-zone). Each policy is uniquely identified by its name. The traffic is classified by matching its source and destination zones, the source and destination addresses, and the application that the traffic carries in its protocol headers with the policy database in the data plane.

Each policy is associated with the following characteristics:

- A source zone
- A destination zone
- One or many source address names or address set names
- One or many destination address names or address set names
- One or many application names or application set names

These characteristics are called the *match criteria*. Each policy also has actions associated with it: permit, deny, reject, count, log, and VPN tunnel. You have to specify the match condition arguments when you configure a policy, source address, destination address, and application name.

You can specify to configure a policy with IPv4 or IPv6 addresses using the wildcard entry `any`. When flow support is not enabled for IPv6 traffic, any matches IPv4 addresses. When flow support is enabled for IPv6 traffic, any matches both IPv4 and IPv6 addresses. To enable flow-based forwarding for IPv6 traffic, use the set `security forwarding-options family inet6 mode flow-based` command. You can also specify the wildcard `any-ipv4` or `any-ipv6` for the source and destination address match criteria to include only IPv4 or only IPv6 addresses, respectively.

When flow support for IPv6 traffic is enabled, the maximum number of IPv4 or IPv6 addresses that you can configure in a security policy is based on the following match criteria:

- $\text{Number_of_src_IPv4_addresses} + \text{number_of_src_IPv6_addresses} * 4 \leq 1024$
- $\text{Number_of_dst_IPv4_addresses} + \text{number_of_dst_IPv6_addresses} * 4 \leq 1024$

The reason for the match criteria is that an IPv6 address uses four times the memory space that an IPv4 address uses.

NOTE: You can configure a security policy with IPv6 addresses only if flow support for IPv6 traffic is enabled on the device.

If you do not want to specify a specific application, enter `any` as the default application. To look up the default applications, from configuration mode, enter `show groups junos-defaults | find applications` (predefined applications). For example, if you do not supply an application name, the policy is installed with the application as a wildcard (default). Therefore, any data traffic that matches the rest of the parameters in a given policy would match the policy regardless of the application type of the data traffic.

NOTE: If a policy is configured with multiple applications, and more than one of the applications match the traffic, then the application that best meets the match criteria is selected.

The action of the first policy that the traffic matches is applied to the packet. If there is no matching policy, the packet is dropped. Policies are searched from top to bottom, so it is a good idea to place more specific policies near the top of the list. You should also place IPsec VPN tunnel policies near the top. Place the more general policies, such as one that would allow certain users access to all Internet applications, at the bottom of the list. For example, place deny-all or reject-all policies at the bottom after all of the specific policies have been parsed before and legitimate traffic has been allowed/count/logged.

NOTE: Support for IPv6 addresses is added in Junos OS Release 10.2. Support for IPv6 addresses in active/active chassis cluster configurations (in addition to the existing support of active/passive chassis cluster configurations) is added in Junos OS Release 10.4.

Policies are looked up during flow processing after firewall filters and screens have been processed and route look up has been completed by the Services Processing Unit (SPU) (for SRX5400, SRX5600, and SRX5800 devices). Policy look up determines the destination zone, destination address, and egress interface.

When you are creating a policy, the following policy rules apply:

- Security policies are configured in a *from-zone* to *to-zone* direction. Under a specific zone direction, each security policy contains a name, match criteria, an action, and miscellaneous options.
- The policy name, match criteria, and action are required.
- The policy name is a keyword.
- The source address in the match criteria is composed of one or more address names or address set names in the *from-zone*.
- The destination address of the match criteria is composed of one or more address names or address set names in the *to-zone*.
- The application name in the match criteria is composed of the name of one or more applications or application sets.
- One of the following actions is required: permit, deny, or reject.
- Accounting and auditing elements can be specified: count and log.
- You can enable logging at the end of a session with the `session-close` command, or at the beginning of the session with the `session-init` command.
- When the count alarm is turned on, specify alarm thresholds in bytes per second or kilobytes per minute.

- You cannot specify `global` as either the `from-zone` or the `to-zone` except under following condition:
Any policy configured with the `to-zone` as a global zone must have a single destination address to indicate that either static NAT or incoming NAT has been configured in the policy.
- In SRX Series Firewalls, the policy permit option with NAT is simplified. Each policy will optionally indicate whether it allows NAT translation, does not allow NAT translation, or does not care.
- Address names cannot begin with the following reserved prefixes. These are used only for address NAT configuration:
 - `static_nat_`
 - `incoming_nat_`
 - `junos_`
- Application names cannot begin with the `junos_` reserved prefix.

Understanding Wildcard Addresses

Source and destination addresses are two of the five match criteria that should be configured in a security policy. You can now configure wildcard addresses for the source and destination address match criteria in a security policy. A wildcard address is represented as `A.B.C.D/wildcard-mask`. The wildcard mask determines which of the bits in the IP address `A.B.C.D` should be ignored by the security policy match criteria. For example, the source IP address `192.168.0.11/255.255.0.255` in a security policy implies that the security policy match criteria can discard the third octet in the IP address (symbolically represented as `192.168.*.11`). Therefore, packets with source IP addresses such as `192.168.1.11` and `192.168.22.11` conform to the match criteria. However, packets with source IP addresses such as `192.168.0.1` and `192.168.1.21` do not satisfy the match criteria.

The wildcard address usage is not restricted to full octets only. You can configure any wildcard address. For example, the wildcard address `192.168. 7.1/255.255.7.255` implies that you need to ignore only the first 5 bits of the third octet of the wildcard address while making the policy match. If the wildcard address usage is restricted to full octets only, then wildcard masks with either 0 or 255 in each of the four octets only will be permitted.

NOTE: The first octet of the wildcard mask should be greater than 128. For example, a wildcard mask represented as `0.255.0.255` or `1.255.0.255` is invalid.

A wildcard security policy is a simple firewall policy that allows you to permit, deny, and reject the traffic trying to cross from one security zone to another. You should not configure security policy rules using wildcard addresses for services such as Content Security .

NOTE: Only Intrusion and Prevention (IDP) for IPv6 sessions is supported for all SRX5400, SRX5600, and SRX5800 devices. Content Security for IPv6 sessions is not supported. If your current security policy uses rules with the IP address wildcard any, and Content Security features are enabled, you will encounter configuration commit errors because Content Security features do not yet support IPv6 addresses. To resolve the errors, modify the rule returning the error so that the any-ipv4 wildcard is used; and create separate rules for IPv6 traffic that do not include Content Security features.

Configuring wildcard security policies on a device affects performance and memory usage based on the number of wildcard policies configured per from-zone and to-zone context. Therefore, you can only configure a maximum of 480 wildcard policies for a specific from-zone and to-zone context.

SEE ALSO

[Understanding Security Policy Ordering](#) | 237

Understanding Security Policies for Self Traffic

Security policies are configured on the devices to apply services to the traffic flowing through the device. For example UAC and Content Security policies are configured to apply services to the transient traffic.

Self-traffic or host traffic, is the host-inbound traffic; that is, the traffic terminating on the device or the host-outbound traffic that is the traffic originating from the device. You can now configure policies to apply services on self traffic. Services like the SSL stack service that must terminate the SSL connection from a remote device and perform some processing on that traffic, IDP services on host-inbound traffic, or IPsec encryption on host-outbound traffic must be applied through the security policies configured on self-traffic.

When you configure a security policy for self-traffic, the traffic flowing through the device is first checked against the policy, then against the host-inbound-traffic option configured for the interfaces bound to the zone.

You can configure the security policy for self-traffic to apply services to self-traffic. The host-outbound policies will work only in cases where the packet that originated in the host device goes through the flow and the incoming interface of this packet is set to local.

The advantages of using the self-traffic are:

- You can leverage most of the existing policy or flow infrastructure used for the transit traffic.
- You do not need a separate IP address to enable any service.
- You can apply services or policies to any host-inbound traffic with the destination IP address of any interface on the device.

NOTE: On SRX Series Firewalls, the default security policy rules do not affect self-traffic.

NOTE: You can configure the security policy for self-traffic with relevant services only. For example, it is not relevant to configure the fwauth service on host-outbound traffic, and gprs-gtp services are not relevant to the security policies for self-traffic.

The security policies for the self traffic are configured under the new default security zone called the *junos-host* zone. The *junos-host* zone will be part of the *junos-defaults* configuration, so users cannot delete it. The existing zone configurations such as interfaces, screen, tcp-rst, and host-inbound-traffic options are not meaningful to the *junos-host* zone. Therefore there is no dedicated configuration for the *junos-host* zone.

NOTE: You can use host-inbound-traffic to control incoming connections to a device; however it does not restrict traffic going out of the device. Whereas, *junos-host-zone* allows you to select the application of your choice and also restrict outgoing traffic. For example, services like NAT, IDP, Content Security, and so forth can now be enabled for traffic going in or out of the SRX Series Firewall using *junos-host-zone*.

Security Policies Configuration Overview

You must complete the following tasks to create a security policy:

1. Create zones. See ["Example: Creating Security Zones" on page 9](#).
2. Configure an address book with addresses for the policy. See ["Example: Configuring Address Books and Address Sets" on page 37](#).
3. Create an application (or application set) that indicates that the policy applies to traffic of that type. See ["Example: Configuring Security Policy Applications and Application Sets" on page 55](#).

4. Create the policy. See ["Example: Configuring a Security Policy to Permit or Deny All Traffic" on page 106](#), ["Example: Configuring a Security Policy to Permit or Deny Selected Traffic" on page 111](#), and ["Example: Configuring a Security Policy to Permit or Deny Wildcard Address Traffic" on page 118](#).
5. Create schedulers if you plan to use them for your policies. See ["Example: Configuring Schedulers for a Daily Schedule Excluding One Day" on page 242](#).

The Firewall Policy Wizard enables you to perform basic security policy configuration. For more advanced configuration, use the J-Web interface or the CLI.

SEE ALSO

[Troubleshooting Security Policies | 330](#)

Best Practices for Defining Policies on SRX Series Devices

A secure network is vital to a business. To secure a network, a network administrator must create a security policy that outlines all of the network resources within that business and the required security level for those resources. The security policy applies the security rules to the transit traffic within a context (from-zone to to-zone) and each policy is uniquely identified by its name. The traffic is classified by matching the source and destination zones, the source and destination addresses, and the application that the traffic carries in its protocol headers with the policy database in the data plane.

[Table 19 on page 103](#) provides the policy limitations for SRX300, SRX320, SRX340, SRX345, SRX380, SRX550, SRX650, SRX550M, SRX1400, SRX1500, SRX3400, SRX3600, SRX4100, SRX4200, SRX4600, SRX5400, SRX5600, and SRX5800 devices. Platform support depends on the Junos OS release in your installation.

NOTE: Starting with Junos OS Release 12.3X48-D15 and Junos OS Release 17.3R1, the maximum number of address objects per policy for SRX5400, SRX5600, and SRX5800 devices increases from 1024 to 4096, and the maximum number of policies per context increases from 10240 to 80,000.

Starting with Junos OS Release 17.3R1, the number of security policies and the maximum number of policies per context for SRX5400, SRX5600, and SRX5800 devices increases from 80,000 to 100,000.

Starting with Junos OS Release 15.1X49-D120, the number of address objects per policy for SRX5400, SRX5600, and SRX5800 increases from 4096 to 16,000.

Table 19: Policy Limitations for SRX Series Devices

SRX Series Devices	Address Objects	Application objects	Security policies	Policy contexts (zone pairs)	Policies per context	Policies with counting enabled
SRX300 SRX320	2048	128	1024	256	1024	256
SRX340	2048	128	2048	512	2048	256
SRX345	2048	128	4096	1024	4096	256
SRX380	2048	128	4096	1024	4096	256
SRX550M	2048	128	10240	2048	10240	1024
SRX1500	4096	3072	16000	4096	16000	1024
SRX4100	4096	3072	60000	4096	60000	1024
SRX4200	4096	3072	60000	4096	60000	1024
SRX4600	4096	3072	80000	8192	80000	1024
SRX5400 SRX5600 SRX5800	16384	3072	100000	8192	100000	1024

Therefore, as you increase the number of addresses and applications in each rule, the amount of memory that is used by the policy definition increases, and sometimes the system runs out of memory with fewer than 80,000 policies.

To get the actual memory utilization of a policy on the Packet Forwarding Engine (PFE) and the Routing Engine (RE), you need to take various components of the memory tree into consideration. The memory tree includes the following two components:

- Policy context—Used to organize all policies in this context. Policy context includes variables such as source and destination zones.

- Policy entity—Used to hold the policy data. Policy entity calculates memory using parameters such as policy name, IP addresses, address count, applications, firewall authentication, WebAuth, IPsec, count, application services, and Junos Services Framework (JSF).

Additionally, the data structures used to store policies, rule sets, and other components use different memory on the Packet Forwarding Engine and on the Routing Engine. For example, address names for each address in the policy are stored on the Routing Engine, but no memory is allocated at the Packet Forwarding Engine level. Similarly, port ranges are expanded to prefix and mask pairs and are stored on the Packet Forwarding Engine, but no such memory is allocated on the Routing Engine.

Accordingly, depending on the policy configuration, the policy contributors to the Routing Engine are different from those to the Packet Forwarding Engine, and memory is allocated dynamically.

Memory is also consumed by the “deferred delete” state. In the deferred delete state, when an SRX Series Firewall applies a policy change, there is transitory peak usage whereby both the old and new policies are present. So for a brief period, both old and new policies exist on the Packet Forwarding Engine, taking up twice the memory requirements.

Therefore, there is no definitive way to infer clearly how much memory is used by either component (Packet Forwarding Engine or Routing Engine) at any given point in time, because memory requirements are dependent on specific configurations of policies, and memory is allocated dynamically.

The following best practices for policy implementation enable you to better use system memory and to optimize policy configuration:

- Use single prefixes for source and destination addresses. For example, instead of using /32 addresses and adding each address separately, use a large subnet that covers most of the IP addresses you require.
- Use application “any” whenever possible. Each time you define an individual application in the policy, you can use an additional 52 bytes.
- Use fewer IPv6 addresses because IPv6 addresses consume more memory.
- Use fewer zone pairs in policy configurations. Each source or destination zone uses about 16,048 bytes of memory.
- The following parameters can change how memory is consumed by the bytes as specified:
 - Firewall authentication—About 16 bytes or more (unfixed)
 - Web authentication—About 16 bytes or more (unfixed)
 - IPsec—12 bytes
 - Application services—28 bytes
 - Count—64 bytes

- Check memory utilization before and after compiling policies.

NOTE: The memory requirement for each device is different. Some devices support 512,000 sessions by default, and the bootup memory is usually at 72 to 73 percent. Other devices can have up to 1 million sessions and the bootup memory can be up to 83 to 84 percent. In the worst-case scenario, to support about 80,000 policies in the SPU, the SPU should boot with a flowd kernel memory consumption of up to 82 percent, and with at least 170 megabytes of memory available.

SEE ALSO

[Understanding Global Address Books | 29](#)

[Global Policy Overview | 198](#)

[Checking Memory Usage on SRX Series Devices | 324](#)

Configuring Policies Using the Firewall Wizard

The Firewall Policy Wizard enables you to perform basic security policy configuration on SRX300, SRX320, SRX340, SRX345, SRX380, and SRX550M devices.. For more advanced configuration, use the J-Web interface or the CLI.

To configure policies using the Firewall Policy Wizard:

1. Select Configure>Tasks>Configure FW Policy in the J-Web interface.
2. Click the Launch Firewall Policy Wizard button to launch the wizard.
3. Follow the prompts in the wizard.

The upper-left area of the wizard page shows where you are in the configuration process. The lower-left area of the page shows field-sensitive help. When you click a link under the Resources heading, the document opens in your browser. If the document opens in a new tab, be sure to close only the tab (not the browser window) when you close the document.

Example: Configuring a Security Policy to Permit or Deny All Traffic

IN THIS SECTION

- Requirements | 106
- Overview | 106
- Configuration | 107
- Verification | 111

This example shows how to configure a security policy to permit or deny all traffic.

Requirements

Before you begin:

- Create zones. See ["Example: Creating Security Zones" on page 9](#).
- Configure an address book and create addresses for use in the policy. See ["Example: Configuring Address Books and Address Sets" on page 37](#).
- Create an application (or application set) that indicates that the policy applies to traffic of that type. See ["Example: Configuring Security Policy Applications and Application Sets" on page 55](#).

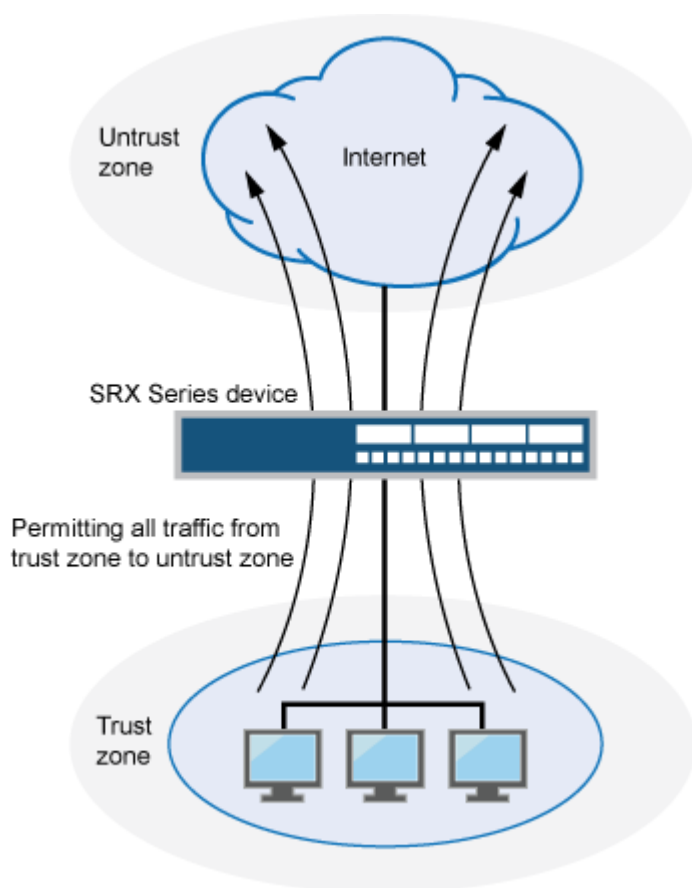
Overview

IN THIS SECTION

- Topology | 107

In the Junos OS, security policies enforce rules for transit traffic, in terms of what traffic can pass through the device, and the actions that need to take place on traffic as it passes through the device. From the perspective of security policies, the traffic enters one security zone and exits another security zone. In this example, you configure the trust and untrust interfaces, ge-0/0/2 and ge-0/0/1. See [Figure 4 on page 107](#).

Figure 4: Permitting All Traffic



This configuration example shows how to:

- Permit or deny all traffic from the trust zone to the untrust zone but block everything from the untrust zone to the trust zone.
- Permit or deny selected traffic from a host in the trust zone to a server in the untrust zone at a particular time.

Topology

Configuration

IN THIS SECTION

- [Procedure | 108](#)

Procedure

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the [edit] hierarchy level, and then enter `commit` from configuration mode.

```
set security zones security-zone trust interfaces ge-0/0/2 host-inbound-traffic system-services
all
set security zones security-zone untrust interfaces ge-0/0/1 host-inbound-traffic system-
services all
set security policies from-zone trust to-zone untrust policy permit-all match source-address any
set security policies from-zone trust to-zone untrust policy permit-all match destination-
address any
set security policies from-zone trust to-zone untrust policy permit-all match application any
set security policies from-zone trust to-zone untrust policy permit-all then permit
set security policies from-zone untrust to-zone trust policy deny-all match source-address any
set security policies from-zone untrust to-zone trust policy deny-all match destination-address
any
set security policies from-zone untrust to-zone trust policy deny-all match application any
set security policies from-zone untrust to-zone trust policy deny-all then deny
```

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode* in the CLI User guide.

To configure a security policy to permit or deny all traffic:

1. Configure the interfaces and security zones.

```
[edit security zones]
user@host# set security-zone trust interfaces ge-0/0/2 host-inbound-traffic system-services
all
user@host# set security-zone untrust interfaces ge-0/0/1 host-inbound-traffic system-services
all
```


2. Create the security policy to permit traffic from the trust zone to the untrust zone.

```
[edit security policies from-zone trust to-zone untrust]
user@host# set policy permit-all match source-address any
user@host# set policy permit-all match destination-address any
user@host# set policy permit-all match application any
user@host# set policy permit-all then permit
```

3. Create the security policy to deny traffic from the untrust zone to the trust zone.

```
[edit security policies from-zone untrust to-zone trust]
user@host# set policy deny-all match source-address any
user@host# set policy deny-all match destination-address any
user@host# set policy deny-all match application any
user@host# set policy deny-all then deny
```

Results

From configuration mode, confirm your configuration by entering the `show security policies` and `show security zones` commands. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

NOTE: The configuration example is a default permit-all from the trust zone to the untrust zone.

```
[edit]
user@host# show security policies
from-zone trust to-zone untrust {
  policy permit-all {
    match {
      source-address any;
      destination-address any;
      application any;
    }
    then {
      permit;
    }
  }
}
```

```

from-zone untrust to-zone trust {
  policy deny-all {
    match {
      source-address any;
      destination-address any;
      application any;
    }
    then {
      deny;
    }
  }
}

```

```

user@host# show security zones
security-zone trust {
  interfaces {
    ge-0/0/2.0 {
      host-inbound-traffic {
        system-services {
          all;
        }
      }
    }
  }
}
security-zone untrust {
  interfaces {
    ge-0/0/1.0 {
      host-inbound-traffic {
        system-services {
          all;
        }
      }
    }
  }
}

```

If you are done configuring the device, enter `commit` from configuration mode.

Verification

IN THIS SECTION

- [Verifying Policy Configuration | 111](#)

Verifying Policy Configuration

Purpose

Verify information about security policies.

Action

From operational mode, enter the `show security policies detail` command to display a summary of all security policies configured on the device.

Meaning

The output displays information about policies configured on the system. Verify the following information:

- From and to zones
- Source and destination addresses
- Match criteria

Example: Configuring a Security Policy to Permit or Deny Selected Traffic

IN THIS SECTION

- [Requirements | 112](#)
- [Overview | 112](#)
- [Configuration | 113](#)

This example shows how to configure a security policy to permit or deny selected traffic.

Requirements

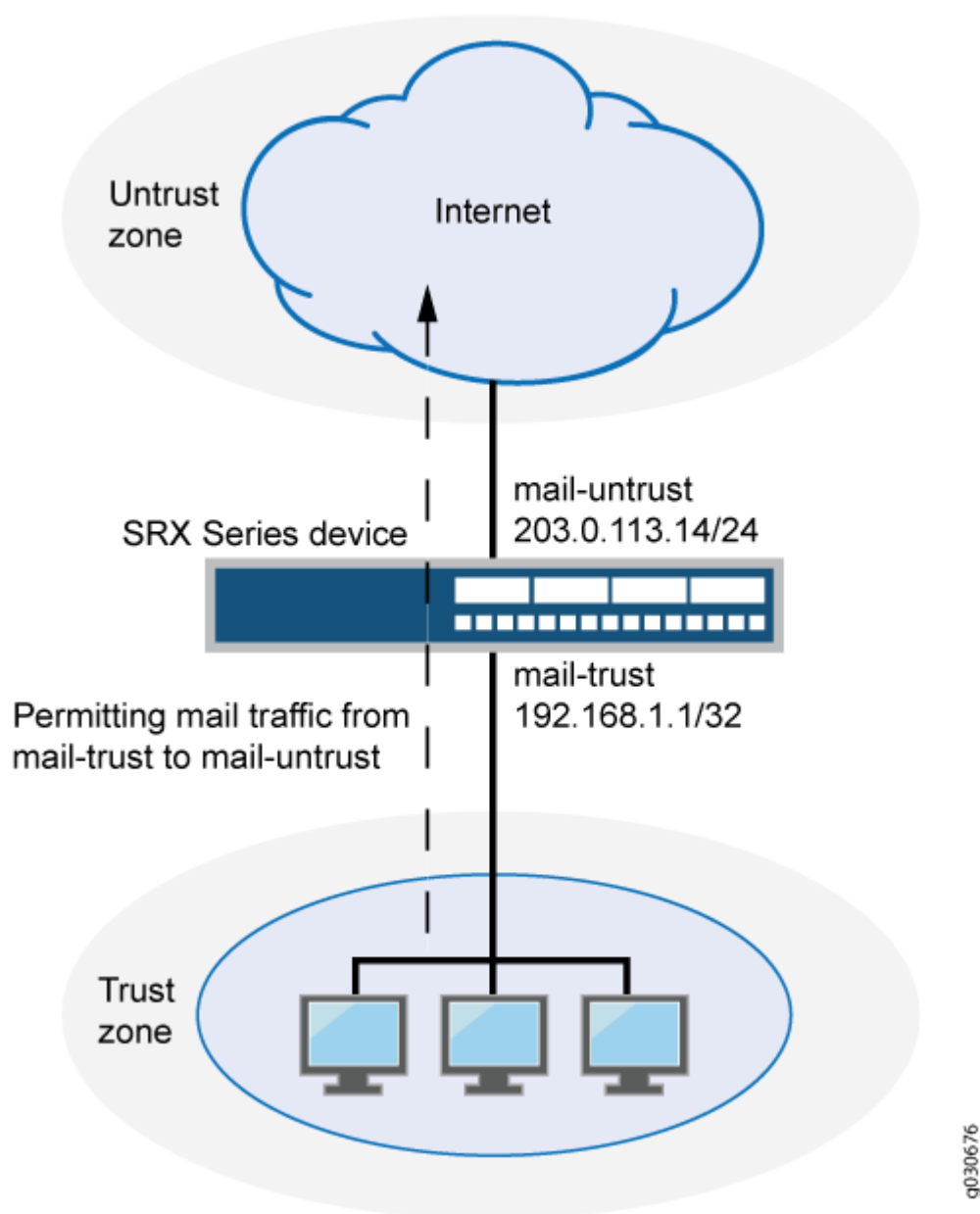
Before you begin:

- Create zones. See ["Example: Creating Security Zones" on page 9](#).
- Configure an address book and create addresses for use in the policy. See ["Example: Configuring Address Books and Address Sets" on page 37](#).
- Create an application (or application set) that indicates that the policy applies to traffic of that type. See ["Example: Configuring Security Policy Applications and Application Sets" on page 55](#).
- Permit traffic to and from trust and untrust zones. See ["Example: Configuring a Security Policy to Permit or Deny All Traffic" on page 106](#).

Overview

In Junos OS, security policies enforce rules for the transit traffic, in terms of what traffic can pass through the device, and the actions that need to take place on the traffic as it passes through the device. From the perspective of security policies, the traffic enters one security zone and exits another security zone. In this example, you configure a specific security policy to allow only e-mail traffic from a host in the trust zone to a server in the untrust zone. No other traffic is allowed. See [Figure 5 on page 113](#).

Figure 5: Permitting Selected Traffic



Configuration

IN THIS SECTION

- Procedure | 114

Procedure

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the [edit] hierarchy level, and then enter `commit` from configuration mode.

```
set security zones security-zone trust interfaces ge-0/0/2 host-inbound-traffic system-services
all
set security zones security-zone untrust interfaces ge-0/0/1 host-inbound-traffic system-
services all
set security address-book book1 address mail-untrust 203.0.113.14/24
set security address-book book1 attach zone untrust
set security address-book book2 address mail-trust 192.168.1.1/32
set security address-book book2 attach zone trust
set security policies from-zone trust to-zone untrust policy permit-mail match source-address
mail-trust
set security policies from-zone trust to-zone untrust policy permit-mail match destination-
address mail-untrust
set security policies from-zone trust to-zone untrust policy permit-mail match application junos-
mail
set security policies from-zone trust to-zone untrust policy permit-mail then permit
```

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode* in the CLI User guide.

To configure a security policy to allow selected traffic:

1. Configure the interfaces and security zones.

```
[edit security zones]
user@host# set security-zone trust interfaces ge-0/0/2 host-inbound-traffic system-services
all
user@host# set security-zone untrust interfaces ge-0/0/1 host-inbound-traffic system-services
all
```

2. Create address book entries for both the client and the server. Also, attach security zones to the address books.

```
[edit security address-book book1]
user@host# set address mail-untrust 203.0.113.14/24
user@host# set attach zone untrust
```

```
[edit security address-book book2]
user@host# set address mail-trust 192.168.1.1/32
user@host# set attach zone trust
```

3. Define the policy to permit mail traffic.

```
[edit security policies from-zone trust to-zone untrust]
user@host# set policy permit-mail match source-address mail-trust
user@host# set policy permit-mail match destination-address mail-untrust
user@host# set policy permit-mail match application junos-mail
user@host# set policy permit-mail then permit
```

Results

From configuration mode, confirm your configuration by entering the `show security policies` and `show security zones` commands. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```
[edit]
user@host# show security policies
from-zone trust to-zone untrust {
  policy permit-mail {
    match {
      source-address mail-trust;
      destination-address mail-untrust;
      application junos-mail;
    }
    then {
      permit;
    }
  }
}
```

```

    }
}

```

```

user@host# show security zones
security-zone trust {
  host-inbound-traffic {
    system-services {
      all;
    }
    interfaces {
      ge-0/0/2 {
        host-inbound-traffic {
          system-services {
            all;
          }
        }
      }
    }
  }
}
security-zone untrust {
  interfaces {
    ge-0/0/1 {
      host-inbound-traffic {
        system-services {
          all;
        }
      }
    }
  }
}

```

```

user@host# show security address-book
book1 {
  address mail-untrust 203.0.113.14/24;
  attach {
    zone untrust;
  }
}
book2 {
  address mail-trust 192.168.1.1/32;
}

```



```
attach {  
    zone trust;  
}  
}
```

If you are done configuring the device, enter `commit` from configuration mode.

Verification

IN THIS SECTION

- [Verifying Policy Configuration | 117](#)

Verifying Policy Configuration

Purpose

Verify information about security policies.

Action

From operational mode, enter the `show security policies detail` command to display a summary of all security policies configured on the device.

Meaning

The output displays information about policies configured on the system. Verify the following information:

- From and to zones
- Source and destination addresses
- Match criteria

Example: Configuring a Security Policy to Permit or Deny Wildcard Address Traffic

IN THIS SECTION

- [Requirements | 118](#)
- [Overview | 118](#)
- [Configuration | 119](#)
- [Verification | 122](#)

This example shows how to configure a security policy to permit or deny wildcard address traffic.

Requirements

Before you begin:

- Understand wildcard addresses. See ["Understanding Security Policy Rules" on page 96](#).
- Create zones. See ["Example: Creating Security Zones" on page 9](#).
- Configure an address book and create addresses for use in the policy. See ["Example: Configuring Address Books and Address Sets" on page 37](#).
- Create an application (or application set) that indicates that the policy applies to traffic of that type. See ["Example: Configuring Security Policy Applications and Application Sets" on page 55](#).
- Permit traffic to and from trust and untrust zones. See ["Example: Configuring a Security Policy to Permit or Deny All Traffic" on page 106](#).
- Permit e-mail traffic to and from trust and untrust zones. See ["Example: Configuring a Security Policy to Permit or Deny Selected Traffic" on page 111](#).

Overview

In the Junos operating system (Junos OS), security policies enforce rules for the transit traffic, in terms of what traffic can pass through the device, and the actions that need to take place on the traffic as it passes through the device. From the perspective of security policies, the traffic enters one security zone and exits another security zone. In this example, you configure a specific security to allow only wildcard address traffic from a host in the trust zone to the untrust zone. No other traffic is allowed.

Configuration

IN THIS SECTION

- [Procedure](#) | 119

Procedure

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the [edit] hierarchy level, and then enter `commit` in configuration mode.

```
set security zones security-zone trust interfaces ge-0/0/2 host-inbound-traffic system-services
all
set security zones security-zone untrust interfaces ge-0/0/1 host-inbound-traffic system-
services all
set security address-book book1 address wildcard-trust wildcard-address
192.168.0.11/255.255.0.255
set security address-book book1 attach zone trust
set security policies from-zone trust to-zone untrust policy permit-wildcard match source-
address wildcard-trust
set security policies from-zone trust to-zone untrust policy permit-wildcard match destination-
address any
set security policies from-zone trust to-zone untrust policy permit-wildcard match application
any
set security policies from-zone trust to-zone untrust policy permit-wildcard then permit
```

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode* in the CLI User guide.

To configure a security policy to allow selected traffic:

1. Configure the interfaces and security zones.

```
[edit security zones]
user@host# set security-zone trust interfaces ge-0/0/2 host-inbound-traffic system-services
all
user@host# set security-zone untrust interfaces ge-0/0/1 host-inbound-traffic system-services
all
```

2. Create an address book entry for the host and attach the address book to a zone.

```
[edit security address-book book1]
user@host# set address wildcard-trust wildcard-address 192.168.0.11/255.255.0.255
user@host# set attach zone trust
```

3. Define the policy to permit wildcard address traffic.

```
[edit security policies from-zone trust to-zone untrust]
user@host# set policy permit-wildcard match source-address wildcard-trust
user@host# set policy permit-wildcard match destination-address any
user@host# set policy permit-wildcard match application any
user@host# set policy permit-wildcard then permit
```

Results

From configuration mode, confirm your configuration by entering the `show security policies` and `show security zones` commands. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```
[edit]
user@host# show security policies
from-zone trust to-zone untrust {
  policy permit-wildcard {
    match {
      source-address wildcard-trust;
      destination-address any;
      application any;
    }
    then {
```

```

        permit;
    }
}
}

```

```

user@host# show security zones
security-zone trust {
    host-inbound-traffic {
        system-services {
            all;
        }
        interfaces {
            ge-0/0/2 {
                host-inbound-traffic {
                    system-services {
                        all;
                    }
                }
            }
        }
    }
}
security-zone untrust {
    interfaces {
        ge-0/0/1 {
            host-inbound-traffic {
                system-services {
                    all;
                }
            }
        }
    }
}
user@host# show security address-book
book1 {
    address wildcard-trust {
        wildcard-address 192.168.0.11/255.255.0.255;
    }
    attach {
        zone trust;
    }
}

```

```
}
}
```

If you are done configuring the device, enter `commit` from configuration mode.

Verification

IN THIS SECTION

- [Verifying Policy Configuration | 122](#)

Verifying Policy Configuration

Purpose

Verify information about security policies.

Action

From operational mode, enter the `show security policies policy-name permit-wildcard detail` command to display details about the permit-wildcard security policy configured on the device.

Meaning

The output displays information about the permit-wildcard policy configured on the system. Verify the following information:

- From and To zones
- Source and destination addresses
- Match criteria

Example: Configuring a Security Policy to Redirect Traffic Logs to an External System Log Server

IN THIS SECTION

- [Requirements | 123](#)
- [Overview | 123](#)
- [Configuration | 124](#)
- [Verification | 127](#)

This example shows how to configure a security policy to send traffic logs generated on the device to an external system log server.

Requirements

This example uses the following hardware and software components:

- A client connected to an SRX5600 device at the interface ge-4/0/5
- A server connected to the SRX5600 device at the interface ge-4/0/1

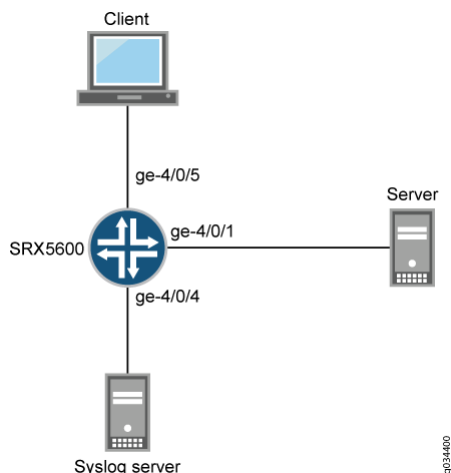
The logs generated on the SRX5600 device are stored in a Linux-based system log server.

- An SRX5600 device connected to the Linux-based server at interface ge-4/0/4

No special configuration beyond device initialization is required before configuring this feature.

Overview

In this example, you configure a security policy on the SRX5600 device to send traffic logs, generated by the device during data transmission, to a Linux-based server. Traffic logs record details of every session. The logs are generated during session establishment and termination between the source and the destination device that are connected to the SRX5600 device.



Configuration

IN THIS SECTION

- [Procedure | 124](#)

Procedure

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the [edit] hierarchy level, and then enter `commit` in configuration mode.

```

set security log source-address 127.0.0.1
set security log stream trafficlogs severity debug
set security log stream trafficlogs host 203.0.113.2
set security zones security-zone client host-inbound-traffic system-services all
set security zones security-zone client host-inbound-traffic protocols all
set security zones security-zone client interfaces ge-4/0/5.0
set security zones security-zone server host-inbound-traffic system-services all
set security zones security-zone server interfaces ge-4/0/4.0
set security zones security-zone server interfaces ge-4/0/1.0
set security policies from-zone client to-zone server policy policy-1 match source-address any
set security policies from-zone client to-zone server policy policy-1 match destination-address
any

```



```

set security policies from-zone client to-zone server policy policy-1 match application any
set security policies from-zone client to-zone server policy policy-1 then permit
set security policies from-zone client to-zone server policy policy-1 then log session-init
set security policies from-zone client to-zone server policy policy-1 then log session-close

```

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode* in the CLI User guide.

To configure a security policy to send traffic logs to an external system log server:

1. Configure security logs to transfer traffic logs generated at the SRX5600 device to an external system log server with the IP address 203.0.113.2. The IP address 127.0.0.1 is the loopback address of the SRX5600 device.

```

[edit security log]
user@host# set source-address 127.0.0.1
user@host# set stream trafficlogs severity debug
user@host# set stream trafficlogs host 203.0.113.2

```

2. Configure a security zone and specify the types of traffic and protocols that are allowed on interface ge-4/0/5.0 of the SRX5600 device.

```

[edit security zones]
user@host# set security-zone client host-inbound-traffic system-services all
user@host# set security-zone client host-inbound-traffic protocols all
user@host# set security-zone client interfaces ge-4/0/5.0

```

3. Configure another security zone and specify the types of traffic that are allowed on the interfaces ge-4/0/4.0 and ge-4/0/1.0 of the SRX5600 device.

```

[edit security zones]
user@host# set security-zone server host-inbound-traffic system-services all
user@host# set security-zone server interfaces ge-4/0/4.0
user@host# set security-zone server interfaces ge-4/0/1.0

```

4. Create a policy and specify the match criteria for that policy. The match criteria specifies that the device can allow traffic from any source, to any destination, and on any application.

```
[edit security policies from-zone client to-zone server]
user@host# set policy policy-1 match source-address any
user@host# set policy policy-1 match destination-address any
user@host# set policy policy-1 match application any
user@host# set policy policy-1 match then permit
```

5. Enable the policy to log traffic details at the beginning and at the end of the session.

```
[edit security policies from-zone client to-zone server]
user@host# set policy policy-1 then log session-init
user@host# set policy policy-1 then log session-close
```

Results

From configuration mode, confirm your configuration by entering the `show security log` command. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```
[edit]
user@host# show security log
format syslog;
source-address 127.0.0.1;
stream trafficlogs {
    severity debug;
    host {
        203.0.113.2;
    }
}
```

If you are done configuring the device, enter `commit` from the configuration mode.

Verification

IN THIS SECTION

- [Verifying Zones | 127](#)
- [Verifying Policies | 127](#)

Confirm that the configuration is working properly.

Verifying Zones

Purpose

Verify that the security zone is enabled or not.

Action

From operational mode, enter the `show security zones` command.

Verifying Policies

Purpose

Verify that the policy is working.

Action

From operational mode, enter the `show security policies` command on all the devices.

TAP Mode for Security Zones and Policies

IN THIS SECTION

- [Understanding TAP Mode Support for Security Zones and Policies | 128](#)

- [Example: Configuring Security Zones and Policies in TAP mode | 128](#)

The Terminal Access Point (TAP) mode for security zones and policy allows you to passively monitor traffic flows across a network by way of a switch SPAN or mirror port.

Understanding TAP Mode Support for Security Zones and Policies

The Terminal Access Point (TAP) mode is a standby device, which checks the mirrored traffic through switch. If security zones and policies are configured, then the TAP mode inspects the incoming and outgoing traffic by configuring the TAP interface and generating a security log report to display the number of threats detected and the user usage. If some packet gets lost in the tap interface, the security zones and policies terminates the connection, as a result no report generates for this connection. The security zone and policy configuration remains the same as non-TAP mode.

When you configure an SRX Series Firewall to operate in TAP mode, the device generates security log information to display the information on threats detected, application usage, and user details. When the device is configured to operate in TAP mode, the SRX Series Firewall receives packets only from the configured TAP interface. Except the configured TAP interface, other interface are configured to normal interface that is used as management interface or connected to the outside server. The SRX Series Firewall will generate security report or log according to the incoming traffic.

The security zone and default security policy will be configured after TAP interface is configured. You can configure other zones or policies if required. If one interface is used to connect a server then the IP address, routing-interface, and security configuration also need be configured.

NOTE: You can configure only one TAP interface when you operate the device in TAP mode.

Example: Configuring Security Zones and Policies in TAP mode

IN THIS SECTION

- [Requirements | 129](#)
- [Overview | 129](#)
- [Configuration | 129](#)
- [Verification | 132](#)

This example shows how to configure security zones, and policies when the SRX Series Firewall is configured in TAP (Terminal Access Point) mode.

Requirements

This example uses the following hardware and software components:

- An SRX Series Firewall
- Junos OS Release 19.1R1

Before you begin:

- Read the Understanding TAP Mode Support for Security Zones and Policies to understand how and where this procedure fits in the overall support for Security Zones and Policies.

Overview

In this example, you configure the SRX Series Firewall to operate in TAP mode. When you configure the SRX Series Firewall to operate in TAP mode, the device generates security log information to display the information on threats detected, application usage, and user details.

Configuration

IN THIS SECTION

- [CLI Quick Configuration | 129](#)
- [Procedure | 130](#)
- [Results | 131](#)

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the [edit] hierarchy level, and then enter commit from configuration mode.

```
set security zones security-zone tap-zone interfaces ge-0/0/0.0
set security zones security-zone tap-zone application-tracking
set security policies from-zone tap-zone to-zone tap-zone policy tap-policy match source-address
```

```

any
set security policies from-zone tap-zone to-zone tap-zone policy tap-policy match destination -
address any
set security policies from-zone tap-zone to-zone tap-zone policy tap-policy match application any
set security policies from-zone tap-zone to-zone tap-zone policy tap-policy then permit
set security policies from-zone tap-zone to-zone tap-zone policy tap-policy then log session-init
set security policies from-zone tap-zone to-zone tap-zone policy tap-policy then log session-
close

```

Procedure

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode* in the Junos OS CLI User Guide.

To configure zones in TAP mode:

1. Configure security zone tap-zone interface.

```

user@host# set security zones security-zone tap-zone interfaces ge-0/0/0.0

```

2. Configure security zone tap-zone application-tracking.

```

user@host# set security zones security-zone tap-zone application-tracking

```

3. Configure security policy that permits traffic from zone tap-zone to zone tap-zone policy tap and configure the match condition.

```

user@host# set security policies from-zone tap-zone to-zone tap-zone policy tap-policy match
source-address any
user@host# set security policies from-zone tap-zone to-zone tap-zone policy tap-policy match
destination -address any
user@host# set security policies from-zone tap-zone to-zone tap-zone policy tap-policy match
application any
user@host# set security policies from-zone tap-zone to-zone tap-zone policy tap-policy then
permit
user@host# set security policies from-zone tap-zone to-zone tap-zone policy tap-policy then
log session-init

```

```
user@host# set security policies from-zone tap-zone to-zone tap-zone policy tap-policy then
log session-close
```

Results

From configuration mode, confirm your configuration by entering the `show security zones` and `show security policies` commands. If the output does not display the intended configuration, repeat the instructions in this example to correct the configuration.

```
[edit]
user@host#show security zones
  security-zone tap-zone {
    interfaces {
      ge-0/0/0.0;
    }
    application-tracking;
  }
[edit]
user@host#show security policies
  from-zone tap-zone to-zone tap-zone {
    policy tap-policy {
      match {
        source-address any;
        destination-address any;
        application any;
      }
      then {
        permit;
        log {
          session-init;
          session-close;
        }
      }
    }
  }
}
```

If you are done configuring the device, enter `commit` from configuration mode.

Verification

IN THIS SECTION

- [Verifying Policy Configuration in TAP Mode | 132](#)

To confirm that the configuration is working properly, perform these tasks:

Verifying Policy Configuration in TAP Mode

Purpose

Verify information about security policies.

Action

From operational mode, enter the `show security policies detail` command.

```
user@host> show security policies detail
node0:
-----
Default policy: permit-all
Pre ID default policy: permit-all
Policy: Trust_to_Untrust, action-type: permit, State: enabled, Index: 4, Scope Policy: 0
Policy Type: Configured
Sequence number: 1
From zone: izeone, To zone: ozone
Source addresses:
  any-ipv4(global): 0.0.0.0/0
  any-ipv6(global): ::/0
Destination addresses:
  any-ipv4(global): 0.0.0.0/0
  any-ipv6(global): ::/0
Application: any
IP protocol: 0, ALG: 0, Inactivity timeout: 0
Source port range: [0-0]
Destination port range: [0-0]
Per policy TCP Options: SYN check: No, SEQ check: No, Window scale: No
```



```

Session log: at-create, at-close
Policy: Untrust_to_Trust, action-type: permit, State: enabled, Index: 5, Scope Policy: 0
Policy Type: Configured
Sequence number: 1
From zone: ozone, To zone: izeone
Source addresses:
  any-ipv4(global): 0.0.0.0/0
  any-ipv6(global): ::/0
Destination addresses:
  any-ipv4(global): 0.0.0.0/0
  any-ipv6(global): ::/0
Application: any
IP protocol: 0, ALG: 0, Inactivity timeout: 0
Source port range: [0-0]
Destination port range: [0-0]
Per policy TCP Options: SYN check: No, SEQ check: No, Window scale: No
Session log: at-create, at-close

```

Meaning

Displays a summary of all security policies configured on the device in TAP mode.

Dynamic Address Groups in Security Policies

IN THIS SECTION

- [Feed Servers | 136](#)
- [Bundle Feeds | 137](#)
- [Feed Server Support for SRX Series Firewalls | 139](#)

Manually adding address entries into a policy can be time consuming. There are external sources that provide lists of IP addresses that have a specific purpose (such as a blocklist) or that have a common attribute (such as a particular location or behavior that might pose a threat). You can use the external source to identify threat sources by their IP address, then group those addresses into a dynamic address entry, and reference that entry in a security policy. Thereby you can control the traffic to and from those addresses. Each such group of IP addresses is referred to as a dynamic address entry.

The following types of IP addresses are supported:

- Single IP. For example : 192.0.2.0
- IP range. For example : 192.0.2.0- 192.0.2.10
- CIDR. For example : 192.0.2.0/24

Each entry occupies one line. Starting in Junos OS Release 19.3R1, IP address ranges do not need to be sorted in ascending order and the value of the IP entries can overlap in the same feed file. In Junos OS Releases before 19.3R1, IP address ranges need to be sorted in ascending order and the value of the IP entries cannot overlap in the same feed file.

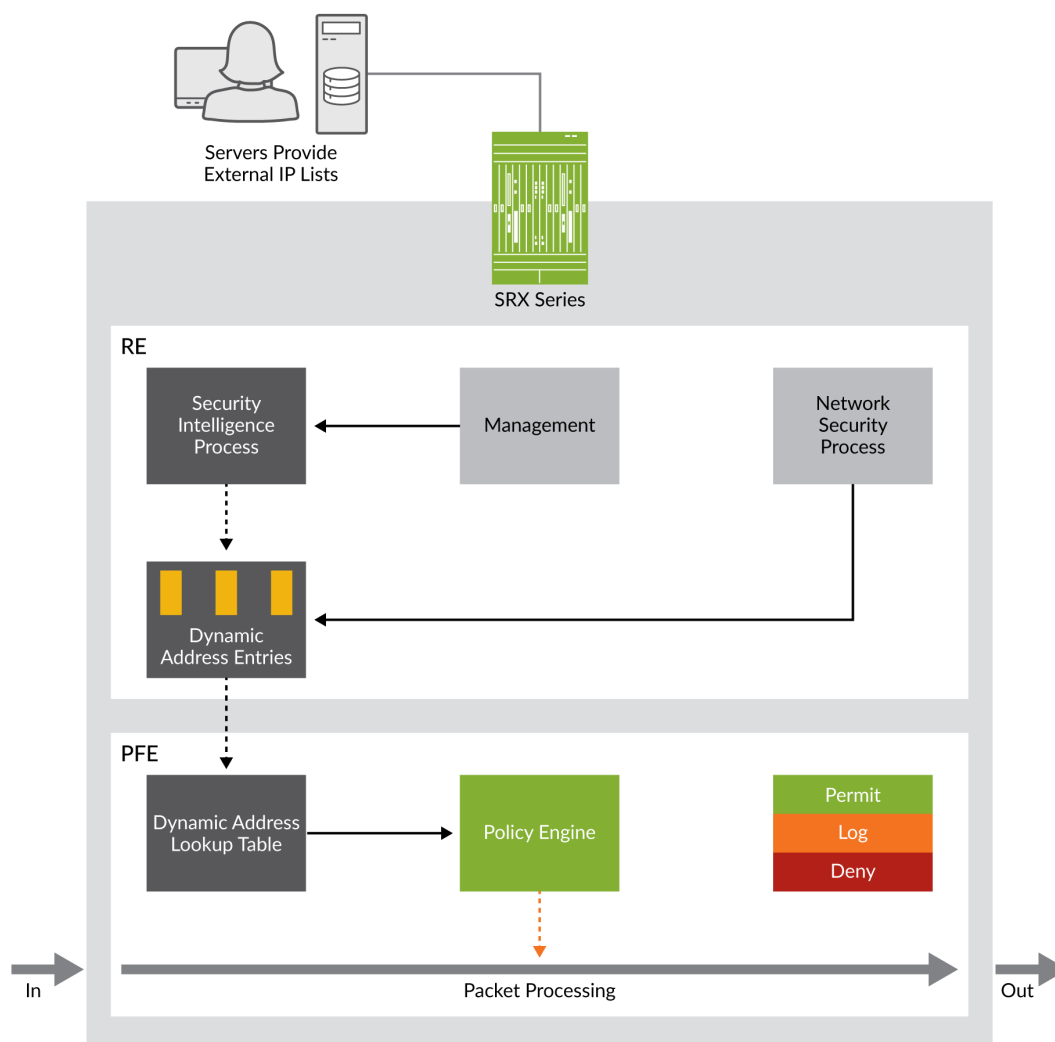
NOTE: A dynamic address entry is a group of IP addresses, not a single IP prefix. A dynamic address entry is different from the security address concepts of address books and address entry addresses.

The following are the benefits of deploying dynamic address entries in security policies:

- The network administrator has more control over the traffic to and from groups of IP addresses.
- The external server provides updated IP address feeds to the SRX Series Firewall.
- The administrator's efforts are dramatically reduced. For example, in a legacy security policy configuration, adding 1000 address entries for a policy to reference would require some 2000 lines of configuration. By defining a dynamic address entry and referencing it in a security policy, up to millions of entries could flow into the SRX Series Firewall without much additional configuration effort.
- No commit process is required to add new addresses. Adding thousands of addresses to a configuration through a legacy method takes a long time to commit. Alternatively, IP addresses in a dynamic address entry come from an external feed, so no commit process is required when the addresses in an entry change.

[Figure 6 on page 135](#) illustrates a functional overview of how the dynamic address entry in a security policy works.

Figure 6: Functional Components of the Dynamic Address Entry in a Security Policy



A security policy references the dynamic address entry in a source address or destination address field (in much the same way that a security policy references a legacy address entry).

[Figure 7 on page 136](#) illustrates a policy that uses a dynamic address entry in the Destination-address field.

Figure 7: A Dynamic Address Entry in a Security Policy

POLICY	MATCHING CRITERIA					ACTION
	From-zone	To-zone	Source-address	Destination-address	application	
1	untrust	dmz	any	10.10.1.1	web	Auth
2	untrust	engineer	any	Vendor blocklist	mail	Deny & Log



Feed server

8041548

In [Figure 7 on page 136](#), Policy 1 uses the destination address 10.10.1.1, which is a legacy security address entry. Policy 2 uses the destination address Vendor blocklist, which is a dynamic address entry named by the network administrator. Its content is the list of IP addresses retrieved from an external feed file. Packets that match all five criteria (the From-zone named untrust, the To-zone named engineer, any source address, a destination IP address that belongs to the Vendor blocklist dynamic address entry, and the mail application) are handled according to the policy actions, which are to deny and log the packet.

NOTE: The dynamic address entry names share the same name space as legacy security address entries, so do not use the same name for more than one entry. The Junos OS commit process checks that names are not duplicated to avoid a conflict.

Dynamic address groups support the following data feeds:

- Custom lists (allowlists and blocklists)
- GeoIP

Feed Servers

- Feed servers contain dynamic address entries in a feed file. You can create custom feeds which can be local or remote. For custom feeds creation, see, [Creating Custom Feeds](#)

- Configure the SRX Series Firewall for using the feeds. See, *feed-server* to configure SRX Series Firewall.

Bundle Feeds

IP addresses, IP prefixes or IP ranges contained in a dynamic address entry can be updated periodically by downloading an external feed. SRX Series Firewalls periodically initiate a connection to the feed server to download and update the IP lists which contain the updated dynamic addresses.

Starting in Junos OS Release 19.3R1, you can download a single *tgz* file from server and extract it into multiple children feed files. Each individual file corresponds to one feed. Let individual dynamic-addresses reference the feed inside the bundle file. The bundle file reduces the CPU overhead when too many feeds are configured, where multiple child feeds are compressed into one *.tgz* file

The following bundle feed modes are supported:

Archive Mode

In the archive mode, you need to compress all feed files for the SRX Series Firewall into one *tgz* file. The SRX Series Firewall downloads this file and extract all the feeds after extraction. This process is explained below:

- When the feed server's url is a url of a file with the suffix *.tgz* instead of original url of folder, this means this server uses a single file to carry all its feeds for SRX Series dynamic-address deployment. In this case, feeds under this server inherit the update-interval or hold-interval from the server. Any user configuration of the update-interval or hold-interval for this feed is ignored.
- After this change, follow the steps below to maintain server feeds as below example.

The example below shows the steps required to maintain the server feeds:

1. Place all feed files for the SRX Series Firewall under the folder *feeds-4-srx*
 2. Generate all feed files *fd1 fd2 fd3 ..fdN* in the folder *feeds-4-srx*
 3. Add or remove the IP ranges from the feeds
 4. Access the files by running the following command: `cd feeds-4-srx;tar -zcvf ../feeds-4-srx.tgz *;cd-`
- Post Step 4, the file *feeds-4-srx.tgz* is ready for download on the SRX Series Firewall containing the same folder which contains the *feeds-4-srx.tgz* file. After the download, the extracted files are placed

in the same folder as *feeds-4-srx.tgz*. The following example shows a sample configuration on an SRX Series Firewall:

```
[edit]
set security dynamic-address feed-server server-4-srx url 10.170.40.50/feeds-4-srx.tgz
set security dynamic-address feed-server server-4-srx feed-name feed1 path fd1
set security dynamic-address feed-server server-4-srx feed-name feed2 path fd2
set security dynamic-address feed-server server-4-srx feed-name feed3 path fdN
```

The *path* parameter requires the relative path of the feed inside the bundle archive.

- If the *tar -zxf feeds-4-srx.tgz* file generates a folder *feeds-4-srx* and this folder holds the feed file *fd1*, then use the following command to configure the feed:

```
[edit]
set security dynamic-address feed-server server-4-srx feed fd1 path feeds-4-srx/fd1
```

- If the *tar -zxf feeds-4-srx.tgz* file extracts the file *fd1* directly, then use the following command to configure the feed:

```
[edit]
set security dynamic-address feed-server server-4-srx feed fd1 path fd1
```

Flat File Mode

Flat file mode offers ultimate simplicity for user by introducing one syntax change in existing feed file format. The content of all the feed files are compiled into a single file, with *.bundle* as a suffix. This allows you to manage a single file. The SRX Series Firewall classifies IP ranges in this bundle file into numerous feed files. You can gzip this file as *.bundle.gz* if you can save some bandwidth for transmission. In addition to file format defined earlier, an upper case tag *FEED:* followed by the feed name is introduced. The lines below this tag are regarded as IP ranges belonging to the feed. An example of the file format looks is given below:

```
root>cat feeds-4-srx.bundle
FEED:fd1
```

```
12.1.1.1-12.1.1.2
11.1.1.1-11.1.1.2
```

```
FEED:fd2
14.1.1.1-14.1.1.2
```

The configuration on an SRX Series Firewall is similar to archive mode and is given below:

```
[edit]
set security dynamic-address feed-server server-4-srx url 10.170.40.50/feeds-4-srx.bundle
set security dynamic-address feed-server server-4-srx feed-name fd1 path fd1
set security dynamic-address feed-server server-4-srx feed-name fd2 path fd2
```

The difference between flat mode and archive mode is the file’s suffix and the layout inside the file. You can select the mode that is most convenient for you.

As the feed files are in the plaintext format, gzip can reduce the file size. If a server and an SRX Series Firewall has WAN link in between, use a smaller sized file to be transmitted on the network, in this case, gzip the bundle file and configure the following commands:

```
[edit]
set security dynamic-address feed-server server-4-srx url 10.170.40.50/feeds-4-srx.bundle.gz
set security dynamic-address feed-server server-4-srx feed-name fd1 path fd1
set security dynamic-address feed-server server-4-srx feed-name fd2 path fd2
```

Feed Server Support for SRX Series Firewalls

Table 20:

Platform	Maximum Number of Feed Servers	Maximum Number of Feeds	Maximum Number of Dynamic Addresses entries

SRX300 SRX320 SRX340 SRX345 SRX550 SRX550M SRX650	10	500	500
SRX4100 SRX4200 SRX4600 SRX5400 SRX5600 SRX5800 vSRX Virtual Firewall vSRX Virtual Firewall 3.0	100	5000	5000
SRX1500	40	2000	2000

SEE ALSO

[url](#)

Configure Security Policies for VXLAN

SUMMARY

Use this example to configure security policies for EVPN (Ethernet VPN) Virtual Extensible LAN (VXLAN) tunnel inspection.

IN THIS SECTION

- [Requirements | 141](#)
- [Overview | 141](#)
- [Configuration | 142](#)
- [Verification | 146](#)

Requirements

VXLAN support on SRX Series Firewalls provides the flexibility to bring an enterprise grade firewall to connect end points in their campus, data center, branch and public cloud environments while providing embedded security.

This example uses the following hardware and software components:

- SRX4600 device
- Junos OS Release 20.4R1

Before you begin:

- Make sure you understand how EVPN and VXLAN works.

Overview

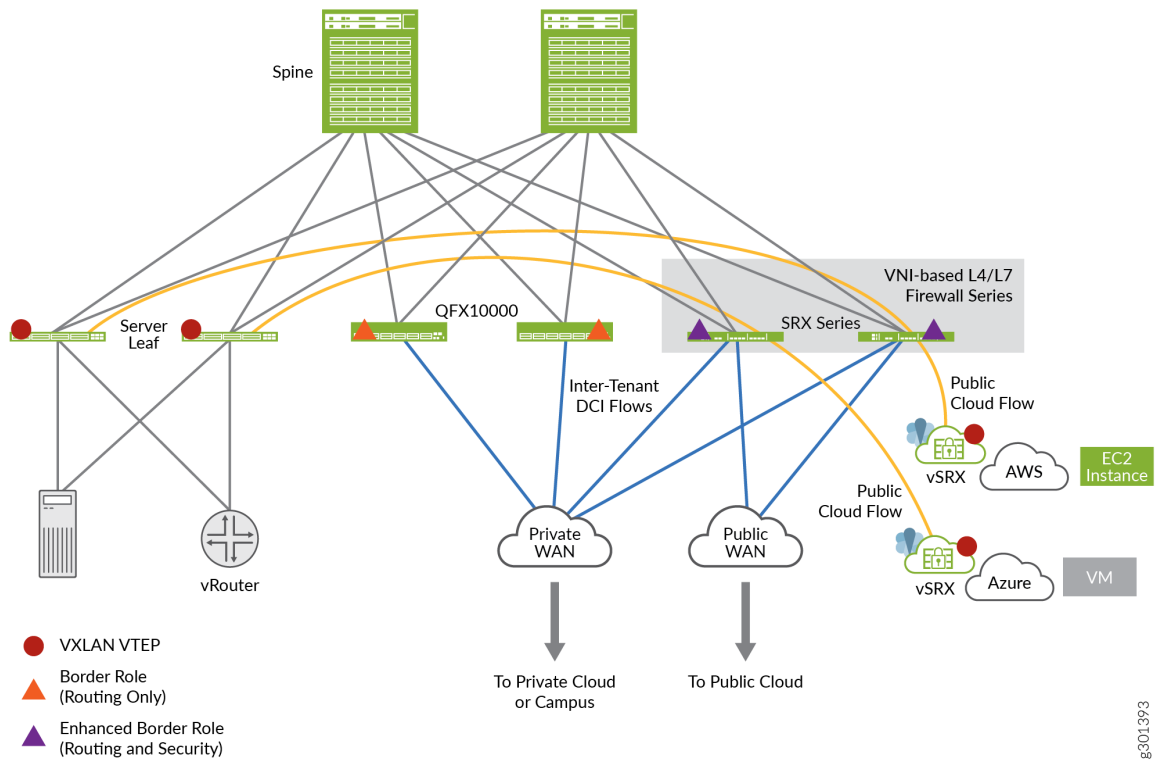
IN THIS SECTION

- [Topology | 142](#)

The EVPN solution provides large enterprises a common framework used to manage their campus and data center networks. An EVPN-VxLAN architecture supports efficient Layer 2 and Layer 3 network connectivity with scale, simplicity, and agility. [Figure 8 on page 142](#) shows an simplified VXLAN traffic flow topology.

Topology

Figure 8: Simplified VXLAN Traffic Flow Topology



Configuration

IN THIS SECTION

- [CLI Quick Configuration | 143](#)
- [Procedure | 143](#)
- [Results | 145](#)

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the [edit] hierarchy level, and then enter `commit` from configuration mode.

```
set security zones security-zone cloud-1
set security zones security-zone dc
set security tunnel-inspection inspection-profile ins-pf1 vxlan vx1 vni r1
set security tunnel-inspection inspection-profile ins-pf1 vxlan vx1 vni r2
set security tunnel-inspection inspection-profile ins-pf1 vxlan vx1 vni r3
set security tunnel-inspection inspection-profile ins-pf1 vxlan vx1 vni r4
set security tunnel-inspection inspection-profile ins-pf1 vxlan vx1 policy-set pset1
set security tunnel-inspection vni r1 vni-range 160 to 200
set security tunnel-inspection vni r2 vni-id 155
set security tunnel-inspection vni r3 vni-range 300 to 399
set security tunnel-inspection vni r4 vni-range 100 to 120
set security tunnel-inspection vni v1 vni-range 1 to 100
set security policies from-zone dc to-zone cloud-1 policy p1 match source-address any
set security policies from-zone dc to-zone cloud-1 policy p1 match destination-address any
set security policies from-zone dc to-zone cloud-1 policy p1 match application junos-vxlan
set security policies from-zone dc to-zone cloud-1 policy p1 then permit tunnel-inspection ins-
pf1
set security policies from-zone cloud-1 to-zone dc policy p1 match source-address any
set security policies from-zone cloud-1 to-zone dc policy p1 match destination-address any
set security policies from-zone cloud-1 to-zone dc policy p1 match application junos-vxlan
set security policies from-zone cloud-1 to-zone dc policy p1 then permit tunnel-inspection ins-
pf1
set security policies policy-set pset1 policy pset_p1 match source-address any
set security policies policy-set pset1 policy pset_p1 match destination-address any
set security policies policy-set pset1 policy pset_p1 match application any
set security policies policy-set pset1 policy pset_p1 then permit
set security policies default-policy deny-all
```

Procedure

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode* in the *Junos OS CLI User Guide*.

To configure VXLAN:

1. Define Security Zones.

```
[edit security zones]
user@host# set security-zone cloud-1
user@host# set zones security-zone dc
```

2. Define tunnel-inspection profile.

```
[edit security tunnel-inspection]
user@host# set inspection-profile ins-pf1 vxlan vx1 vni r1
user@host# set inspection-profile ins-pf1 vxlan vx1 vni r2
user@host# set inspection-profile ins-pf1 vxlan vx1 vni r3
user@host# set inspection-profile ins-pf1 vxlan vx1 vni r4
user@host# set inspection-profile ins-pf1 vxlan vx1 policy-set pset1
user@host# set vni r1 vni-range 160 to 200
user@host# set vni r2 vni-id 155
user@host# set vni r3 vni-range 300 to 399
user@host# set vni r4 vni-range 100 to 120
user@host# set vni v1 vni-range 1 to 100
```

3. Define outer session policies.

```
[edit security policies]
user@host# set from-zone dc to-zone cloud-1 policy p1 match source-address any
user@host# set from-zone dc to-zone cloud-1 policy p1 match destination-address any
user@host# set from-zone dc to-zone cloud-1 policy p1 match application junos-vxlan
user@host# set from-zone dc to-zone cloud-1 policy p1 then permit tunnel-inspection profile-1
user@host# set from-zone cloud-1 to-zone dc policy p1 match source-address any
user@host# set from-zone cloud-1 to-zone dc policy p1 match destination-address any
user@host# set from-zone cloud-1 to-zone dc policy p1 match application junos-vxlan
user@host# set from-zone cloud-1 to-zone dc policy p1 then permit tunnel-inspection ins-pf1
```

4. Define policy-set.

```
[edit security policies]
user@host# set policy-set pset1 policy pset_p1 match source-address any
user@host# set policy-set pset1 policy pset_p1 destination-address any
```

```

user@host# set policy-set pset1 policy pset_p1 match application any
user@host# set policy-set pset1 policy pset_p1 then permit
user@host# set default-policy deny-all

```

Results

From configuration mode, confirm your configuration by entering the `show security policies` command. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```

user@host# show security policies

```

```

from-zone dc to-zone cloud-1 {
  policy p1 {
    match {
      source-address any;
      destination-address any;
      application junos-vxlan;
    }
    then {
      permit {
        tunnel-inspection {
          ins-pf1;
        }
      }
    }
  }
}
from-zone cloud-1 to-zone dc {
  policy p1 {
    match {
      source-address any;
      destination-address any;
      application junos-vxlan;
    }
    then {
      permit {
        tunnel-inspection {
          ins-pf1;
        }
      }
    }
  }
}

```

```

    }
  }
}
policy-set pset1 {
  policy pset_p1 {
    match {
      source-address any;
      destination-address any;
      application any;
    }
    then {
      permit;
    }
  }
}
default-policy {
  deny-all;
}

```

If you are done configuring the feature on your device, enter `commit` from configuration mode.

Verification

IN THIS SECTION

- [Verify tunnel inspection profiles and VNI | 146](#)
- [Verify Safe Search Function | 148](#)

Verify tunnel inspection profiles and VNI

Purpose

Verify that the tunnel inspection profile and VNI are configured..

Action

From operational mode, enter the `show security tunnel-inspection profiles ins-pf1` and `show security tunnel-inspection vnis` commands.

```
user@host> show security tunnel-inspection profiles ins-pf1
```

```
node0:
```

```
-----  
Logical system: root-logical-system
```

```
Profile count: 1
```

```
Profile: ins-pf1
```

```
Type: VXLAN
```

```
Vxlan count: 1
```

```
Vxlan name: vx1
```

```
VNI count: 4
```

```
VNI:r1, r2, r3, r4
```

```
Policy set: pset1
```

```
Inspection level: 1
```

```
user@host> show security tunnel-inspection vnis
```

```
node0:
```

```
-----  
Logical system: root-logical-system
```

```
VNI count: 5
```

```
VNI name: r1
```

```
VNI id count: 1
```

```
[160 - 200]
```

```
VNI name: r2
```

```
VNI id count: 1
```

```
[155 - 155]
```

```
VNI name: r3
```

```
VNI id count: 1
```

```
[300 - 399]
```

```
VNI name: r4
```

```
VNI id count: 1
```

```
[100 - 120]
```

```
VNI name: v1
```

```
VNI id count: 1
```

```
[1 - 100]
```

Meaning

The output displays that the VXLAN feature is enabled and there are no safe search redirects and safe search rewrites.

Verify Safe Search Function

Purpose

Verify that the safe search feature is enabled for Content Security Web filtering solutions.

Action

From operational mode, enter the `Show security flow tunnel-inspection statistic` command to view the tunnel-inspection statistics.

```
user@host> show security flow tunnel-inspection statistics
```

```
node0:
```

```
-----
```

```
Flow Tunnel-inspection statistics:
```

```
Tunnel-inspection statistics of FPC4 PIC1:
```

```
Tunnel-inspection type VXLAN:
```

```
overlay session active:      0
overlay session create:     269
overlay session close:      269
underlay session active:     0
underlay session create:     566
underlay session close:     566
input packets:              349717
input bytes:                 363418345
output packets:              348701
output bytes:                363226339
bypass packets:              501
bypass bytes:                50890
```

```
Tunnel-inspection statistics of FPC4 PIC2:
```

```
Tunnel-inspection type VXLAN:
```

```
overlay session active:      0
overlay session create:     270
overlay session close:      270
underlay session active:     0
```



```

underlay session create:      586
underlay session close:      586
input packets:               194151
input bytes:                  200171306
output packets:               193221
output bytes:                 199987258
bypass packets:               617
bypass bytes:                 92902

```

Tunnel-inspection statistics of FPC4 PIC3:

Tunnel-inspection type VXLAN:

```

overlay session active:      0
overlay session create:      275
overlay session close:       275
underlay session active:     0
underlay session create:     615
underlay session close:      615
input packets:               216486
input bytes:                  222875066
output packets:               213827
output bytes:                 222460378
bypass packets:               2038
bypass bytes:                 270480

```

Tunnel-inspection statistics summary:

Tunnel-inspection type VXLAN:

```

overlay session active:      0
overlay session create:      814
overlay session close:       814
underlay session active:     0
underlay session create:     1767
underlay session close:      1767
input packets:               760354
input bytes:                  786464717
output packets:               755749
output bytes:                 785673975
bypass packets:               3156
bypass bytes:                 414272

```

node1:

Flow Tunnel-inspection statistics:

Tunnel-inspection statistics of FPC4 PIC1:

Tunnel-inspection type VXLAN:

overlay session active:	0
overlay session create:	269
overlay session close:	269
underlay session active:	0
underlay session create:	566
underlay session close:	566
input packets:	0
input bytes:	0
output packets:	0
output bytes:	0
bypass packets:	0
bypass bytes:	0

Tunnel-inspection statistics of FPC4 PIC2:

Tunnel-inspection type VXLAN:

overlay session active:	0
overlay session create:	270
overlay session close:	270
underlay session active:	0
underlay session create:	586
underlay session close:	586
input packets:	0
input bytes:	0
output packets:	0
output bytes:	0
bypass packets:	0
bypass bytes:	0

Tunnel-inspection statistics of FPC4 PIC3:

Tunnel-inspection type VXLAN:

overlay session active:	0
overlay session create:	275
overlay session close:	275
underlay session active:	0
underlay session create:	615
underlay session close:	615
input packets:	0
input bytes:	0
output packets:	0
output bytes:	0
bypass packets:	0

```
bypass bytes:          0
```

```
Tunnel-inspection statistics summary:
```

```
Tunnel-inspection type VXLAN:
```

```
overlay session active:      0
```

```
overlay session create:     814
```

```
overlay session close:      814
```

```
underlay session active:     0
```

```
underlay session create:    1767
```

```
underlay session close:     1767
```

```
input packets:              0
```

```
input bytes:                0
```

```
output packets:             0
```

```
output bytes:               0
```

```
bypass packets:             0
```

```
bypass bytes:               0
```

Meaning

The output displays that the VXLAN feature is enabled and there are no safe search redirects and safe search rewrites.

SEE ALSO

[tunnel-inspection](#)

Enable Security Policies for Geneve Packet Flow Tunnel Inspection

SUMMARY

Use this configuration to enable security policies on vSRX Virtual Firewall 3.0 for Geneve packet flow tunnel inspection.

IN THIS SECTION

- [Requirements | 152](#)
- [Overview | 152](#)
- [Configuration \(vSRX Virtual Firewall 3.0 as Tunnel Endpoint\) | 153](#)

- [Configuration \(vSRX Virtual Firewall 3.0 as Transit Router\) | 160](#)

With Geneve support on vSRX Virtual Firewall 3.0 instances, you can use vSRX3.0 to:

- Connect end points in a campus, data center, and public cloud environments and their branches.
- Secure these environments with embedded security.

Requirements

This example uses the following hardware and software components:

- vSRX Virtual Firewall 3.0
- Junos OS Release 23.1R1

Before you begin:

- Make sure you understand how the Geneve protocol works.

Overview

Geneve flow support on vSRX Virtual Firewall 3.0 instances provides large enterprises a common framework to manage their campus and data center networks. The Geneve-based architecture supports efficient Layer 3 (L3) and Layer 4 (L4) network connectivity by ensuring scalability, simplicity, and agility.

Using this configuration you can:

- Enable the security policies to process the Geneve tunnel encapsulated L3 packets.
- Create distinct profiles for Geneve traffic based on VNI and vendor TLV attributes-Policy once attached with an inspection profile dictates the type of Geneve traffic to be processed and policies to be applied to the inner traffic.
- Configure the regular security policy on vSRX Virtual Firewall 3.0 to apply L4 and L7 services on the inner traffic.

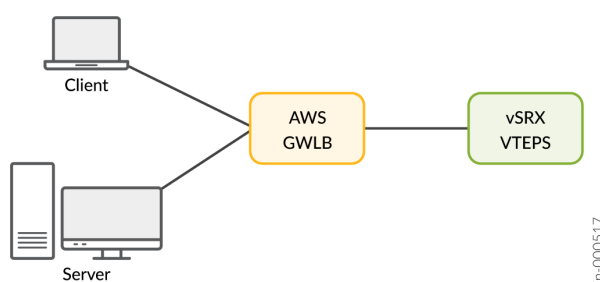
Configuration (vSRX Virtual Firewall 3.0 as Tunnel Endpoint)

IN THIS SECTION

- [Simplified Geneve Traffic Flow Topology with AWS GWLB and vSRX Virtual Firewall 3.0 as Tunnel End-point | 153](#)
- [CLI Quick Configuration | 153](#)
- [Procedure | 154](#)
- [Results | 156](#)
- [Verify Tunnel Inspection Profile and VNI | 158](#)
- [Verify Tunnel Inspection Profile and VNI | 159](#)

Simplified Geneve Traffic Flow Topology with AWS GWLB and vSRX Virtual Firewall 3.0 as Tunnel End-point

Figure 9: AWS GWLB and vSRX Virtual Firewall 3.0 as Tunnel End-point



CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the [edit] hierarchy level, and then enter `commit` from configuration mode.

NOTE: Define a trust and untrust zone to permit all host traffic.

```

set security tunnel-inspection inspection-profile ti-vendor geneve g-rule policy-set ps-vendor
set security tunnel-inspection inspection-profile ti-vendor geneve g-rule vni vni-vendor
set security tunnel-inspection vni vni-vendor vni-id 0

set security policies from-zone vtepc to-zone junos-host policy self match application junos-geneve
set security policies from-zone vtepc to-zone junos-host policy self match source-address any
set security policies from-zone vtepc to-zone junos-host policy self match destination-address any
set security policies from-zone vtepc to-zone junos-host policy self then permit tunnel-inspection ti-vendor
set security policies default-policy deny-all
set security policies policy-set ps-vendor policy self match source-address any
set security policies policy-set ps-vendor policy self match destination-address any
set security policies policy-set ps-vendor policy self match application any
set security policies policy-set ps-vendor policy self then permit
set interfaces ge-0/0/1 mtu 9000
set interfaces ge-0/0/1 unit 0 family inet address any
set interfaces ge-0/0/1 unit 0 family inet6 address any

```

Procedure

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode* in the *Junos OS CLI User Guide*.

To configure Geneve flow support for tunnel inspection on vSRX Virtual Firewall 3.0:

1. Define a trust and untrust zone to permit all host traffic under the **[edit security zones]** hierarchy.
2. Define the tunnel-inspection profile.

```

[edit security tunnel-inspection]
user@host# set security tunnel-inspection inspection-profile ti-vendor geneve g-rule policy-
set ps-vendor

user@host# set security tunnel-inspection inspection-profile ti-vendor geneve g-rule vni vni-

```

vendor

```
user@host# set security tunnel-inspection vni vni-vendor vni-id 0
```

3. Define outer session policies to the outer packets and attach the referenced tunnel inspection profile

NOTE: In the policy configuration, the to-zone for the outer policy in case of vSRX Virtual Firewall 3.0 as tunnel endpoint must be junos-host, which is an inbuilt (reserved identifier) zone to process traffic.

```
[edit security policies]
user@host# set security policies from-zone vtepc to-zone junos-host policy self match source-address any
user@host# set security policies from-zone vtepc to-zone junos-host policy self match destination-address any
user@host# set security policies from-zone vtepc to-zone junos-host policy self match application junos-geneve
user@host# set security policies from-zone vtepc to-zone junos-host policy self then permit tunnel-inspection ti-vendor
user@host# set security policies default-policy deny-all
```

4. Define an inner policy under policy-set to process the decapsulated packet.

```
[edit security policies]
user@host# set security policies policy-set ps-vendor policy self match source-address any
user@host# set security policies policy-set ps-vendor policy self match destination-address any
user@host# set security policies policy-set ps-vendor policy self match application any
user@host# set security policies policy-set ps-vendor policy self then permit
```

5. Configure the interface associated with from-zone of the virtual tunnel endpoint client (VTEPC) to receive the Geneve-encapsulated packets and the health-check packets.

```
[edit]
user@host# set interfaces ge-0/0/1 mtu 9000
user@host# set interfaces ge-0/0/1 unit 0 family inet address any
user@host# set interfaces ge-0/0/1 unit 0 family inet6 address any
```

Results

From the configuration mode, confirm your configuration by entering the `show security policies` command. If the output does not display the intended configuration, repeat the instructions in this example to correct the configuration.

```
user@host# show security policies
```

```
from-zone trust to-zone untrust {
  policy p1 {
    match {
      source-address any;
      destination-address any;
      application any;
    }
    then {
      permit {
        application-services {
          application-traffic-control {
            rule-set ftp-test1;
          }
        }
      }
    }
  }
}
policy internet-access {
  match {
    source-address any;
    destination-address any;
    application any;
  }
  then {
    permit;
  }
}
}
from-zone untrust to-zone trust {
  policy dst-nat-pool-access {
    match {
      source-address any;
      destination-address 233.252.0.1/21;
```



```

        application any;
    }
    then {
        permit;
    }
}
}
from-zone vtepc to-zone junos-host {
    policy self {
        match {
            source-address any;
            destination-address any;
            application junos-geneve;
        }
        then {
            permit {
                tunnel-inspection {
                    ti-vendor;
                }
            }
        }
    }
}
policy-set ps-vendor {
    policy self {
        match {
            source-address any;
            destination-address any;
            application any;
        }
        then {
            permit;
        }
    }
}
default-policy {

```

```
deny-all;
}
```

```
user@host# show security tunnel-inspection
```

```
inspection-profile ti-vendor {
  geneve g-rule {
    policy-set ps-vendor;
    vni vni-vendor;
  }
}
vni v1 {
  vni-id 0;
}
vni vni-vendor {
  vni-id 0;
}
```

After you complete configuring the feature on your device, enter `commit` from the configuration mode.

Verify Tunnel Inspection Profile and VNI

Purpose

Verify that you have configured the `tunnel-inspection` profile and the VXLAN network identifier (VNI).

Action

From operational mode, enter the `show security tunnel-inspection profiles ti-vendor` and `show security tunnel-inspection vnis` commands.

```
user@host> show security tunnel-inspection profiles ti-vendor
```

```
-----
Logical system: root-logical-system
```

```
Profile count: 1
```

```
Profile: ti-vendor
```

```
Type: Geneve
```

```
geneve count: 1
```

```
geneve name: g-rule
```

```
VNI count: 1
VNI: vni-vendor
Policy set: ps-vendor
Inspection level: 1
```

```
user@host> show security tunnel-inspection vnis
```

```
-----
Logical system: root-logical-system
VNI count: 1
VNI name: vni-vendor
VNI id count: 0
```

Meaning

The output displays that the Geneve tunnel-inspection profile is enabled and the VXLAN network identifier (VNI) is configured.

Verify Tunnel Inspection Profile and VNI

Purpose

Verify that you have configured the tunnel-inspection profile and the VXLAN network identifier (VNI).

Action

From operational mode, enter the `show security tunnel-inspection profiles ti-vendor` and `show security tunnel-inspection vnis` commands.

```
user@host> show security tunnel-inspection profiles ti-vendor
```

```
-----
Logical system: root-logical-system
Profile count: 1
Profile: ti-vendor
Type: Geneve
geneve count: 1
geneve name: g-rule
VNI count: 1
VNI: vni-vendor
```

```
Policy set: ps-vendor  
Inspection level: 1
```

```
user@host> show security tunnel-inspection vnis
```

```
-----  
Logical system: root-logical-system  
VNI count: 1  
VNI name: vni-vendor  
VNI id count: 0
```

Meaning

The output displays that the Geneve tunnel-inspection profile is enabled and the VXLAN network identifier (VNI) is configured.

Configuration (vSRX Virtual Firewall 3.0 as Transit Router)

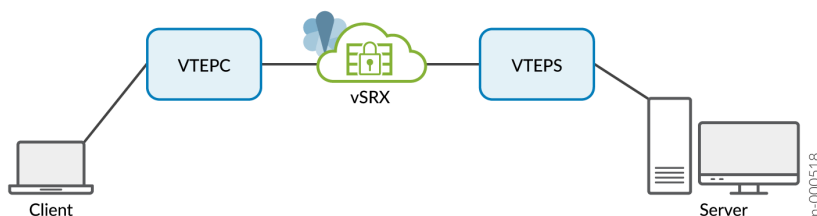
IN THIS SECTION

- [Simplified Geneve Traffic Flow Topology vSRX Virtual Firewall 3.0 as Transit Router | 160](#)
- [CLI Quick Configuration | 161](#)
- [Procedure | 162](#)
- [Results | 164](#)

Simplified Geneve Traffic Flow Topology vSRX Virtual Firewall 3.0 as Transit Router

In this deployment mode the virtual tunnel endpoint client (vtepc) (Geneve tunnel endpoint) must ensure that packets destined to both the client and the server pass through virtual tunnel endpoint server (vteps) (vSRX Virtual Firewall 3.0). The source port is selected by the virtual tunnel endpoint (vtep).

Figure 10: Simplified Topology of vSRX Virtual Firewall 3.0 as Transit Router



CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the [edit] hierarchy level, and then enter `commit` from configuration mode.

```
set security tunnel-inspection vni r1 vni-range 1 to 100
set security tunnel-inspection vni r1 vni-id 500
set security tunnel-inspection profile inspection-profile ti-vendor geneve geneve1 vni r1
set security tunnel-inspection profile inspection-profile ti-vendor geneve geneve1 policy-set pset1
set security tunnel-inspection vni r2 vni-range 200 to 400
set security tunnel-inspection vni r2 vni-id 500
set security tunnel-inspection profile inspection-profile ti-vendor geneve geneve2 vni r2
set security tunnel-inspection profile inspection-profile ti-vendor geneve geneve2 policy-set pset2
set security policies from-zone vtepc to-zone vteps policy p1 match application junos-geneve

set security policies from-zone vtepc to-zone vteps policy p1 match source-address any

set security policies from-zone vtepc to-zone vteps policy p1 match destination-address any

set security policies from-zone vtepc to-zone vteps policy p1 then permit tunnel-inspection ti-vendor

set security policies from-zone vteps to-zone vtepc policy p1 match application junos-geneve

set security policies from-zone vteps to-zone vtepc policy p1 match source-address any

set security policies from-zone vteps to-zone vtepc policy p1 match destination-address any

set security policies from-zone vteps to-zone vtepc policy p1 then permit tunnel-inspection ti-vendor
```

```

set security policies default-policy deny-all

set security policies policy-set pset1 policy pset_p1 match source-address any
set security policies policy-set pset1 policy pset_p1 match destination-address any
set security policies policy-set pset1 policy pset_p1 match application any
set security policies policy-set pset1 policy pset_p1 then permit
set interfaces ge-0/0/1 mtu 9000
set interfaces ge-0/0/1 unit 0 family inet address any

set interfaces ge-0/0/1 unit 0 family inet6 address any

```

Procedure

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode* in the *Junos OS CLI User Guide*.

To configure Geneve flow support for tunnel inspection on vSRX Virtual Firewall 3.0 (vSRX Virtual Firewall 3.0 as transit router) :

1. Define a trust and untrust zone to permit all host traffic under the **[edit security zones]** hierarchy.
2. Define the tunnel-inspection profile.

```

[edit security tunnel-inspection]
user@host# set security tunnel-inspection vni r1 vni-range 1 to 100
user@host# set security tunnel-inspection vni r1 vni-id 500
user@host# set security tunnel-inspection profile inspection-profile ti-vendor geneve geneve1
vni r1
user@host# set security tunnel-inspection profile inspection-profile ti-vendor geneve geneve1
policy-set pset1
user@host# set security tunnel-inspection vni r2 vni-range 200 to 400
user@host# set security tunnel-inspection vni r2 vni-id 500
user@host# set security tunnel-inspection profile inspection-profile ti-vendor geneve geneve2
vni r2
user@host# set security tunnel-inspection profile inspection-profile ti-vendor geneve geneve2
policy-set pset2

```

3. Define outer session policies.

NOTE: For vSRX Virtual Firewall 3.0 as transit router, you need two policies in each direction. The from-zone and to-zone are the respective zones that must be defined under the interfaces.

```
[edit security policies]
user@host# set security policies from-zone vtepc to-zone vteps policy p1 match source-address
any
user@host# set security policies from-zone vtepc to-zone vteps policy p1 match destination-
address any
user@host# set security policies from-zone vtepc to-zone vteps policy p1 match application
junos-geneve
user@host# set security policies from-zone vtepc to-zone vteps policy p1 then permit tunnel-
inspection ti-vendor
user@host# set security policies from-zone vteps to-zone vtepc policy p1 match application
junos-geneve
user@host# set security policies from-zone vteps to-zone vtepc policy p1 match source-address
any
user@host# set security policies from-zone vteps to-zone vtepc policy p1 match destination-
address any
user@host# set security policies from-zone vteps to-zone vtepc policy p1 then permit tunnel-
inspection ti-vendor
user@host# set security policies default-policy deny-all
```

4. Define an inner policy under policy-set to process the decapsulated packet.

```
[edit security policies]
user@host# set security policies policy-set pset1 policy pset_p1 match source-address any
user@host# set security policies policy-set pset1 policy pset_p1 match destination-address any
user@host# set security policies policy-set pset1 policy pset_p1 match application any
user@host# set security policies policy-set pset1 policy pset_p1 then permit
```

5. Configure the interface associated with from-zone of the virtual tunnel endpoint client (VTEPC) to receive the Geneve-encapsulated packets and the health-check packets.

NOTE: In case of transit mode, vSRX Virtual Firewall 3.0 must be configured with two L3 interfaces for ingress and egress.

```
[edit]
user@host# set interfaces ge-0/0/1 mtu 9000
user@host# set interfaces ge-0/0/1 unit 0 family inet address any
user@host# set interfaces ge-0/0/1 unit 0 family inet6 address any
```

Results

From the configuration mode, confirm your configuration by entering the `show security policies` command. If the output does not display the intended configuration, repeat the instructions in this example to correct the configuration.

```
user@host# show security policies
```

```
from-zone trust to-zone untrust {
  policy p1 {
    match {
      source-address any;
      destination-address any;
      application any;
    }
    then {
      permit {
        application-services {
          application-traffic-control {
            rule-set ftp-test1;
          }
        }
      }
    }
  }
}
from-zone vtepc to-zone vteps {
  policy p1 {
    match {
```



```

        source-address any;
        destination-address any;
        application junos-geneve;
    }
    then {
        permit {
            tunnel-inspection {
                ti-vendor;
            }
        }
    }
}
}
}
from-zone vsteps to-zone vstepc {
    policy p1 {
        match {
            source-address any;
            destination-address any;
            application junos-geneve;
        }
        then {
            permit {
                tunnel-inspection {
                    ti-vendor;
                }
            }
        }
    }
}
}
policy-set pset1 {
    policy pset_p1 {
        match {
            source-address any;
            destination-address any;
            application any;
        }
        then {
            permit;
        }
    }
}
}
default-policy {

```

```
deny-all;
}}
```

```
user@host# show security tunnel-inspection
```

```
inspection-profile ti-vendor {
  geneve g-rule {
    policy-set ps-vendor;
    vni vni-vendor;
  }
}
inspection-profile pro1;
vni r1 {
  vni-id 500;
}
vni r2 {
  vni-id 500;
}
}
```

After you complete configuring the feature on your device, enter `commit` from the configuration mode.

SEE ALSO

No Link Title
No Link Title

Change History Table

Feature support is determined by the platform and release you are using. Use [Feature Explorer](#) to determine if a feature is supported on your platform.

Release	Description
17.3R1	Starting with Junos OS Release 17.3R1, the number of security policies and the maximum number of policies per context for SRX5400, SRX5600, and SRX5800 devices increases from 80,000 to 100,000.
15.1X49-D120	Starting with Junos OS Release 15.1X49-D120, the number of address objects per policy for SRX5400, SRX5600, and SRX5800 increases from 4096 to 16,000.

12.3X48-D15	Starting with Junos OS Release 12.3X48-D15 and Junos OS Release 17.3R1, the maximum number of address objects per policy for SRX5400, SRX5600, and SRX5800 devices increases from 1024 to 4096, and the maximum number of policies per context increases from 10240 to 80,000.
10.4	Support for IPv6 addresses in active/active chassis cluster configurations (in addition to the existing support of active/passive chassis cluster configurations) is added in Junos OS Release 10.4.
10.2	Support for IPv6 addresses is added in Junos OS Release 10.2.

RELATED DOCUMENTATION

[Security Zones | 7](#)

[Global Security Policies | 198](#)

[User Role Firewall Security Policies | 210](#)

Unified Security Policies

IN THIS SECTION

- [Unified Policies Overview | 168](#)
- [Unified Policies Configuration Overview | 169](#)
- [Example: Configure a Unified Policy Using a Redirect Message Profile | 178](#)
- [Configure a URL Category with Unified Policies | 184](#)
- [Configure Applications in Unified Policies | 190](#)
- [Configure Micro-Applications in Unified Policies | 196](#)

Unified policies are the security policies that enable you to use dynamic applications as match conditions as part of the existing 5-tuple or 6-tuple (5-tuple with user firewall) match conditions to detect application changes over time.

Unified Policies Overview

IN THIS SECTION

- [Benefits](#) | 168

Starting in Junos OS Release 18.2R1, unified policies are supported on SRX Series Firewalls, allowing granular control and enforcement of dynamic Layer 7 applications within the security policy.

Unified policies are the security policies that enable you to use dynamic applications as match conditions as part of the existing 5-tuple or 6-tuple (5-tuple with user firewall) match conditions to detect application changes over time. If the traffic matches the security policy rule, one or more actions defined in the policy are applied to the traffic.

By adding dynamic applications to the match criteria, the data traffic is classified based on the Layer 7 application inspection results. AppID identifies dynamic or real-time Layer 4 through Layer 7 applications. After a particular application is identified and the matching policy is found, then the actions are applied according to the policy.

Configuring dynamic applications as match criteria in a security policy is not mandatory.

Examples of configuring dynamic applications as a match condition within a security policy are as follows:

- `set security policies from-zone z1 to-zone z2 policy p1 match dynamic-application junos:FTP`
- `set security policies from-zone z1 to-zone z2 policy p1 match dynamic-application junos:HTTP`
- `set security policies from-zone z1 to-zone z2 policy p1 match dynamic-application junos:GOOGLE`

Examples of configuring dynamic application groups as a match condition within a security policy are as follows:

- `set security policies from-zone trust to-zone untrust policy p1 match dynamic-application junos:p2p`
- `set security policies from-zone trust to-zone untrust policy p1 match dynamic-application junos:web:shopping`

Benefits

- Simplifies application-based security policy management at Layer 7.
- Enables your device to adapt to the dynamic traffic changes in the network.

- Provides greater control and extensibility to manage dynamic applications traffic than a traditional security policy.

Unified Policies Configuration Overview

IN THIS SECTION

- [Dynamic Application Configuration Options | 169](#)
- [Default Ports and Protocols as Application Matching Criteria | 171](#)
- [Pre-ID Default Policy | 171](#)
- [Default Policy Actions Prior to Dynamic Application Identification | 172](#)
- [Global Policy Utilization with Unified Policies | 173](#)
- [Unified Policy Actions | 173](#)
- [Redirect Profile for Reject Action | 173](#)
- [SSL Proxy Profile for Reject Action | 174](#)
- [Match Criteria and Rules for Unified Policies | 175](#)
- [Limitations to Configuring Unified Policies | 177](#)

The following sections provide more information on unified policies:

Dynamic Application Configuration Options

[Table 21 on page 170](#) provides options for configuring a unified policy with dynamic applications.

Table 21: Dynamic Application Configuration Options

Dynamic Application Configuration Options	Description
Dynamic Applications or Application Groups	<p>Specify dynamic applications or a dynamic application group.</p> <p>Examples are as follows:</p> <ul style="list-style-type: none"> • junos:FTP (dynamic application) • junos:web:shopping (dynamic application group)
Any	<p>Configuring the dynamic application as any installs the policy with the application as a wildcard (default). If an application cannot be specified, configure any as the default application. Data traffic that match the parameters in a unified policy matches the policy regardless of the application type.</p>
None	<p>Configuring the dynamic application as none ignores classification results from AppID and does not use the dynamic application in security policy lookups. Within the list of potential match policies, if there is any policy configured with a dynamic application as none, this policy is matched as the final policy and is terminal. If any Layer 7 services are configured in this policy, deep packet inspection for the traffic is performed.</p> <p>When upgrading the Junos OS release (where dynamic applications were not supported), all existing traditional policies are considered to be policies with the dynamic application configured as none.</p>
Dynamic Application Not Configured	<p>If a dynamic application is not configured within a security policy, the policy is considered to be a traditional security policy. This policy is similar to a policy with the dynamic application configured as none.</p>

Starting in Junos OS Releases 19.4R1 and 20.1R1, security policy does not support using following applications as dynamic-applications match criteria:

- junos:HTTPS
- junos:POP3S
- junos:IMAPS
- junos:SMTPS

Software upgrade to the Junos OS Releases 19.4R1 and 20.1R1 and later releases fails during the validation if any of the security policies are configured with `junos:HTTPS`, `junos:POP3S`, `junos:IMAPS`, `junos:SMTPS` as dynamic-applications as match criteria.

We recommend you to use `therquest system software validate package-name` option before upgrading to the above mentioned releases.

We recommend you to remove any configuration that includes the dynamic-application `junos:HTTPS`, `junos:IMAPS`, `junos:SMTPS` or `junos:POP3S` as match criteria in security policies.

Default Ports and Protocols as Application Matching Criteria

Starting in Junos OS Release 18.2R1, the `junos-defaults` option is introduced in the security policy configuration as application match criteria. The `junos-defaults` group contains preconfigured statements that include predefined values for common applications. As the default protocols and ports are inherited from `junos-defaults`, there is no requirement to explicitly configure the ports and protocols, thus simplifying the security policy configuration.

In the following example, the security policy `L7-test-policy` uses `junos:HTTP` as the dynamic application and inherits destination TCP ports: 80, 3128, 8000, and 8080 as the application match criteria.

```
set security policies from-zone trust to-zone untrust policy L7-test-policy match application junos-defaults
dynamic-application junos:HTTP
```

If the application does not have default ports and protocols, then the application uses the default ports and protocols of the dependent application. For example, `junos:FACEBOOK-CHAT` uses default protocols and ports of `HTTP2`, `HTTPS`, and `SPDY`.

The `junos-defaults` option must be configured along with a dynamic application. If you configure the `junos-defaults` option without specifying any dynamic application, then an error message displays and the configuration commit fails. Use the `show security policies detail` command to validate the `junos-defaults` option.

Pre-ID Default Policy

A unified policy leverages the information from `AppID` to match the application and take action as specified in the policy. Before identifying the final application, the policy cannot be matched precisely.

The pre-ID default policy temporarily allows the session to get created so that DPI can get the packet and perform application identification (`AppID`).

Starting in Junos OS Release 23.4R1, the pre-ID default policy ([pre-id-default-policy](#)) denies the flow before performing application identification (`AppID`) when there are no potential policies to permit the flow.

When the device receives the first packet of a traffic flow, it performs the basic 5-tuple matching and checks the defined potential policies to determine how to treat the packet. If all potential policies have the action as "deny", and the default policy action is also set to "deny", then the device denies the traffic and does not perform application identification (AppID).

If any policy has action as other than "deny", then the device performs DPI to identify the application.

The device checks for potential policies on both zone context and global context.

Default Policy Actions Prior to Dynamic Application Identification

Before an application is identified by Application Identification (AppID), the `pre-id-default-policy` options are applied to the session. The session timeout value, along with the required mode of session logging, are applied according to the `pre-id-default-policy` configuration. If there is no configuration within the `pre-id-default-policy` stanza, the default session timeout values are applied to the session and no logs are generated for the `pre-id-default-policy`.

We recommend that customers implement the `set security policies pre-id-default-policy then log session-close` configuration, as shown below, in their own environments.

```
# show security policies pre-id-default-policy
  then {
    log {
      session-close;
    }
  }
```

This configuration will ensure security logs are generated by the SRX if a flow is unable to leave the `pre-id-default-policy`. These events are generally a result of JDPI being unable to properly classify traffic, although they may also indicate potential attempts at evading the APPID engine.

In recent versions of Junos OS, the factory-default configuration of an SRX includes the `session-close` configuration.



CAUTION: Configuring session-init logging for the `pre-id-default-policy` can generate a large amount of logs. Each session that enters the SRX that initially matches the `pre-id-default-policy` will generate an event. We recommend only using this option for troubleshooting purposes.

Global Policy Utilization with Unified Policies

Zone-based security policies are prioritized over global policies when a policy lookup is implemented. Starting in Junos OS Release 18.2R1, if a unified policy is configured within the zone-based security policies, then global policy lookup is not performed. Prior to Junos OS Release 18.2R1, if no zone-based policy is matched, then a global policy lookup is performed.

Starting in Junos OS Release 20.4R1, SRX Series Firewalls support unified policies at both zone-context and global-level policies at the same time. In previous releases, unified policies supported only zone-context policies.

If the session matches any unified policy, either at a zone-level or at a global-level, then the policy is added to potential policy match list. If the session does not match a policy at zone-level then the next policy match occurs at the global-level. Global-level policies have the same match criteria as any other security policy (example: source address, destination address, application, dynamic-application and so on).

Unified Policy Actions

In a unified policy configuration, specify one of the following actions:

- Permit—Permit the traffic.
- Deny—Drop the traffic and close the session.
- Reject—Notify the client, drop the traffic, and close the session.

Redirect Profile for Reject Action

Unified policies log drop and reject actions. Unified policies do not notify connected clients for drop and reject actions. The clients are unaware that the webpage is not accessible and might continue their attempts to access it.

Starting in Junos OS Release 18.2R1, a redirect profile can be configured within a unified policy. When a policy blocks HTTP or HTTPS traffic with a deny or reject action, you can define a response in the unified policy to notify the connected clients.

To provide an explanation for the action or to redirect the client to an informative webpage, use the `redirect-message` option at the `[edit security dynamic-application profile name]` hierarchy level with the reject or deny action in a unified policy configuration to display a custom message.

When you configure the redirect option, you can specify the custom message or the URL to which the client is redirected.

Limitations to Configuring a Redirect Profile in Unified Policies

There are limitations to configuring a redirect profile in unified policies. They include:

- Support for the redirect action with block messages with a redirect URL are not available for non-HTTP or non-HTTPS applications.
- A unified policy does not check the validity and accessibility of a user-configured redirect URL.
- For clear text processing, out-of-order HTTP packets, or segmented HTTP requests, the available policy actions are reject or deny. A redirect profile is not available.
- The redirect profile can be applied in unified policies only. The reject action for traditional security policies do not support a redirect action with block message profiles or a redirect URL.

SSL Proxy Profile for Reject Action

Starting in Junos OS Release 18.2R1, you can configure a redirect profile within a unified policy. When a policy blocks HTTP or HTTPS traffic with a deny or reject action, you can apply an SSL proxy profile to the traffic. SSL proxy decrypts the traffic and application identification functionality identifies the application. Next, you can take action to redirect or drop the traffic as per the configuration.

Consider the following example:

In this example, you are rejecting some of the Facebook applications such as chat, Farmville, and so on in the policy 'policy-1'. As Facebook is an encrypted application, you need SSL proxy to decrypt the traffic first.

```
policy policy-1 {
  match {
    source-address any;
    destination-address any;
    application any;
    dynamic-application [ junos:FACEBOOK-CHAT junos:FACEBOOK-FARMVILLE junos:FACEBOOK-MOBILE-
CHAT junos:FACEBOOK-SUPERPOKE junos:FACEBOOK-WINDOWSLIVEMESSENGER junos:FACEBOOK-VIDEO ];
  }
  then {
    reject {
      ssl-proxy {
        profile-name test;
      }
    }
    log {
      session-init;
    }
  }
}
```

```

        session-close;
    }
}
}

```

In this example, the policy rejects the encrypted Facebook traffic and applies the configured SSL proxy profile. The SSL proxy decrypts the traffic, and JDPI identifies the application.

Now the policy takes following actions based on your configuration:

- Redirects the client access to other URL, and closes the original session.
- Notifies the client with pre-defined text messages, and closes the session
- Closes the session only. In the example, the policy closes the session.

Match Criteria and Rules for Unified Policies

Unified Policy Implicit and Explicit Match

Starting in Junos OS Release 18.2R1, the command `unified-policy-explicit-match` is introduced at the `[edit security policies]` hierarchy level. This command defines the explicit and implicit policy match behavior and is disabled by default.

- *Explicit match*—If a dependent application does not have any matching policy, then the traffic is dropped if explicit match is enabled. Only those security policies that are explicitly configured for the application are applied.
- *Implicit Match*—If the dependent application does not have any matching policy, then the security policy that is configured for the base application is applied.

By default, the unified policies enforce implicit rules on dependent applications.

In the example shown in [Table 22 on page 175](#), the unified policy P3 is configured for FACEBOOK-ACCESS traffic. HTTP is a dependent application of FACEBOOK-ACCESS and does not have any security policy explicitly configured for it.

Table 22: Example of an Explicit and Implicit Policy Match for a Dependent Application

Dynamic Application	Policy Configured
HTTP	None

Table 22: Example of an Explicit and Implicit Policy Match for a Dependent Application (Continued)

Dynamic Application	Policy Configured
FACEBOOK-ACCESS	P3

The results for implicit and explicit match behavior is shown in [Table 23 on page 176](#).

Table 23: Example of a Policy Match (Implicit and Explicit Match Criteria)

Application Identified	Policy Matched	Explicit or Implicit Rule Type	Result
None	P3	Implicit (Explicit is not Enabled)	The identified application is HTTP. There is no matching security policy configured for HTTP. The explicit match is not enabled (implicit match), so traffic is further processed until FACEBOOK-ACCESS is identified. The security policy that is configured for FACEBOOK-ACCESS (policy P3) is applied.
HTTP			
FACEBOOK-ACCESS			
HTTP	None	Explicit	The identified application is HTTP. There is no matching policy available for HTTP. The explicit match is enabled, so no security policy is applied in this case.

Profile Overlap for Layer 7 Services

While using unified policies, if AppID results have not yet identified the final application, a policy search might return a list of policies instead of a fixed policy. These policies are referred to as potential match policies. Before the final application is identified, a conflict might occur due to multiple policy matches.

In this case, an appropriate profile or default profile is applied for services such as AppQoS, SSL proxy, Content Security, and IDP.

Policy Rematch

When the `policy rematch` option is enabled, the unified policy allows the device to reevaluate an active session when its associated security policy is modified.

The session remains open if it continues to match the policy that allowed the session initially. The session closes if its associated policy is renamed, deactivated, or deleted. Use the `extensive` option to reevaluate an active session when its associated security policy is renamed, deactivated, or deleted.

If policy rematch is configured in a unified policy before a final match, then rematch behavior might lead to a session closure. After the final match, a policy rematch triggers another policy lookup based on the 6-tuple match criteria and the final identified application.

Configure policy-rematch and the policy-rematch `extensive` options at the [edit security policies] hierarchy level.

Limitations to Configuring Unified Policies

There are limitations to configuring unified policies. They include:

- An existing session might close in the following cases:
 - When there is a change in the final match for the policy.
 - When a new policy is inserted within the existing policies, and if this new policy is configured with new services.
 - When a final match policy enables new services after the session is created and before the final match.
- Policy-based VPN is not supported for unified policies and can be applied only to the traditional policy.
- ALG traffic processing on the Unified policies does not engage ALG functions.
- ALGs are applied when matching against traditional security policies.
 - Policies using a match condition of `dynamic-application` as `none` are treated as traditional policies .
- FTP is an exception to ALG support on Unified policies allowing FTP file scanning for Content Security Antivirus.
 - Requires use of `dynamic-application any` or `dynamic-application junos:FTP`.
 - See [Enabling FTP Antivirus Scanning \(CLI Procedure\)](#)
- A security policy that is configured with GPRS might not work if the policy is part of a potential match list.
- A group VPN and user firewall authentication can be applied to a traditional security policy.
- Final policy match information might not be available within session-init logs for policies leveraging dynamic applications.

SEE ALSO

pre-id-default-policy[Unified Policies Support for Flow](#)*profile(dynamic-application)**unified-policy-explicit-match*[Understanding Unified Policies \[Unified Threat Management \(UTM\)\]](#)[Overview of IDP Policy support for Unified Policies](#)*policy-rematch*

Example: Configure a Unified Policy Using a Redirect Message Profile

IN THIS SECTION

- [Requirements | 178](#)
- [Overview | 179](#)
- [Configuration | 179](#)
- [Verification | 182](#)

This example describes how to configure a unified policy with a redirect message profile. In this example, you configure a redirect profile with a redirect URL. You use the redirect profile as a block message in the policy for traffic in the dynamic applications GMAIL and FACEBOOK-CHAT. Simultaneously, you configure the application `junos-defaults` so that the default port and protocol from the dynamic applications are inherited as the current policy's destination port and protocol match criteria.

Requirements

This example uses the following hardware and software components:

- SRX Series Firewall running Junos OS Release 18.2R1. This configuration example is tested with Junos OS release 18.2R1.

Before you begin, configure security zones. See ["Example: Creating Security Zones" on page 9](#).

No special configuration beyond device initialization is required before configuring this feature.

Overview

In this example, you define the redirect profile as a response when a policy blocks HTTP or HTTPS traffic with a deny or reject action. Through a redirect profile, you provide an explanation for the action or you redirect the client request to an informative webpage when the reject or deny action is applied in a security policy.

To accomplish these objectives, you perform the following tasks:

- Configure the redirect profile with a redirect URL such as <http://abc.company.com/information/block-message> and use it in the policy as a block message.
- Configure the security policy match criteria source-address and destination-address with the value any.
- Configure the application with junos-defaults, so that the default port and protocol from dynamic-application is inherited as the current policy's destination port and protocol match criteria.
- Configure dynamic-application with [junos:GMAIL, junos:FACEBOOK-CHAT] so that the policy can apply the block message profile on the applications.

Configuration

IN THIS SECTION

- [CLI Quick Configuration | 179](#)
- [Procedure | 180](#)
- [Results | 181](#)

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the [edit] hierarchy level, and then enter `commit` from configuration mode.

```
set security zones security-zone trust
set security zones security-zone untrust
set security dynamic-application profile profile1 redirect-message type redirect-url content
http://abc.company.com/information/block-message
set security policies from-zone trust to-zone untrust policy p2 match source-address any
set security policies from-zone trust to-zone untrust policy p2 match destination-address any
set security policies from-zone trust to-zone untrust policy p2 match application junos-defaults
```

```
set security policies from-zone trust to-zone untrust policy p2 match dynamic-application
[junos:GMAIL, junos:FACEBOOK-CHAT]
set security policies from-zone trust to-zone untrust policy p2 then reject profile profile1
```

Procedure

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode* in the CLI User guide.

To configure a unified policy with a redirect message profile:

1. Configure security zones.

```
[edit security]
user@host# set security-zone trust
user@host# set security-zone untrust
```

2. Create a profile for the redirect message.

```
[edit security]
user@host# set dynamic-application profile profile1 redirect-message type redirect-url
content http://abc.company.com/information/block-message
```

3. Create a security policy with a dynamic application as the match criteria.

```
[edit security policies]
user@host# set from-zone trust to-zone untrust policy p2 match source-address any
user@host# set from-zone trust to-zone untrust policy p2 match destination-address any
user@host# set from-zone trust to-zone untrust policy p2 match application junos-defaults
user@host# set from-zone trust to-zone untrust policy p2 match dynamic-application junos:GMAIL
user@host# set from-zone trust to-zone untrust policy p2 match dynamic-application
junos:FACEBOOK-CHAT
```


4. Define the policy action.

```
[edit security policies]
user@host# set security policies from-zone trust to-zone untrust policy p2 then reject
profile profile1
```

Results

From configuration mode, confirm your configuration by entering the `show security policies` and `show security dynamic-application` commands. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```
[edit]
user@host# show security policies

from-zone trust to-zone untrust {
  policy p2 {
    match {
      source-address any;
      destination-address any;
      application junos-defaults;
      dynamic-application [ junos:GMAIL, junos:FACEBOOK-CHAT ];
    }
    then {
      reject {
        profile profile1;
      }
    }
  }
}
```

```
[edit]
user@host# show security dynamic-application

profile profile1 {
  redirect-message {
    type {
```

```

        redirect-url {
            content http://abc.company.com/information/block-message;
        }
    }
}

```

If you are done configuring the device, enter `commit` from configuration mode.

Verification

IN THIS SECTION

- [Verifying Unified Policy Configuration | 182](#)

Verifying Unified Policy Configuration

Purpose

Verify that the unified policy configuration is correct.

Action

From operational mode, enter the `show security policies` command to display a summary of all security policies on the device.

```
user@host> show security policies
```

```
Default policy: deny-all
```

```
Pre ID default policy: permit-all
```

```
From zone: trust, To zone: untrust
```

```
Policy: p2, State: enabled, Index: 4, Scope Policy: 0, Sequence number: 1
```

```
Source addresses: any
```

```
Destination addresses: any
```

```
Applications: junos-defaults
```

```
Dynamic Applications: junos:GMAIL, junos:FACEBOOK-CHAT
```

```
dynapp-redir-profile: profile1
```

From operational mode, enter the `show security policies detail` command to display a detailed summary of all security policies on the device.

```
user@host> show security policies detail
```

```
Default policy: deny-all
```

```
Pre ID default policy: permit-all
```

```
Policy: p2, action-type: reject, State: enabled, Index: 4, Scope Policy: 0
```

```
Policy Type: Configured
```

```
Sequence number: 1
```

```
From zone: trust, To zone: untrust
```

```
Source addresses:
```

```
any-ipv4(global): 0.0.0.0/0
```

```
any-ipv6(global): ::/0
```

```
Destination addresses:
```

```
any-ipv4(global): 0.0.0.0/0
```

```
any-ipv6(global): ::/0
```

```
Application: junos-defaults
```

```
IP protocol: 6, ALG: 0, Inactivity timeout: 1800
```

```
Source port range: [0-0]
```

```
Destination port range: [443-443]
```

```
IP protocol: 6, ALG: 0, Inactivity timeout: 1800
```

```
Source port range: [0-0]
```

```
Destination port range: [5432-5432]
```

```
IP protocol: 6, ALG: 0, Inactivity timeout: 1800
```

```
Source port range: [0-0]
```

```
Destination port range: [80-80]
```

```
IP protocol: 6, ALG: 0, Inactivity timeout: 1800
```

```
Source port range: [0-0]
```

```
Destination port range: [3128-3128]
```

```
IP protocol: 6, ALG: 0, Inactivity timeout: 1800
```

```
Source port range: [0-0]
```

```
Destination port range: [8000-8000]
```

```
IP protocol: 6, ALG: 0, Inactivity timeout: 1800
```

```
Source port range: [0-0]
```

```
Destination port range: [8080-8080]
```

```
IP protocol: 17, ALG: 0, Inactivity timeout: 60
```

```
Source port range: [0-0]
```

```

Destination port range: [1-65535]
Dynamic Application:
  junos:GMAIL: 51
  dynapp-redir-profile: profile1
Per policy TCP Options: SYN check: No, SEQ check: No, Window scale: No

```

Meaning

The output displays information about all currently active security sessions on the device. Verify the following information:

- Configured policy name
- Source and destination addresses
- Configured applications
- Configured dynamic applications
- Policy reject action

SEE ALSO

dynamic-application (Security Policies)

profile(dynamic-application)

Configure a URL Category with Unified Policies

IN THIS SECTION

- [Understanding URL Category with Unified Policies | 185](#)
- [Example: Configuring a Unified Policy Using URL Category | 185](#)

Understanding URL Category with Unified Policies

IN THIS SECTION

- [Limitations of URL Category with Unified Policies | 185](#)

Starting from Junos OS Release 18.4R1, the unified policies feature is enhanced to include URL categories as match criteria for web filtering category. URL categories can be configured to unified policies with or without dynamic-application been applied. .

When the URL category is configured as `url-category any` to a policy, the policy matches all categories of traffic configured to the unified policies.

When the URL category is configured as `url-category none` to a policy, the URL category is not used in the policy look-up. The unified policy configured with `url-category none` is considered as the highest priority to policy match for a traffic. When the URL category to a policy is not configured, or when you upgrade a device from previous release to latest release, the URL category of all the policies are considered as `url-category none`.

Limitations of URL Category with Unified Policies

Using URL categories in an unified policy has the following limitation:

- Only the ports that are generally used such as HTTP and HTTPs traffics are supported by `url-category`. Hence, the policy lookup supports HTTP and HTTPs traffics.

Example: Configuring a Unified Policy Using URL Category

IN THIS SECTION

- [Requirements | 186](#)
- [Overview | 186](#)
- [Configuration | 186](#)
- [Verification | 189](#)

This example describes how to configure a unified policy with a URL category.

Requirements

This example uses the following hardware and software components:

- SRX Series Firewall running Junos OS Release 18.4R1. This configuration example is tested with Junos OS release 18.4R1.

Before you begin, configure security zones. See ["Example: Creating Security Zones" on page 9](#).

No special configuration beyond device initialization is required before configuring this feature.

Overview

In this example, URL category is added to security policy as match criteria for web filtering category.

To accomplish these objectives, you perform the following tasks:

- Configure the security policy match criteria `source-address` and `destination-address` with the value `any`.
- Configure the application with `junos-defaults`, so that the default port and protocol from `dynamic-application` is inherited as the current policy's destination port and protocol match criteria.
- Configure `dynamic-application` with `[junos:GMAIL, junos:FACEBOOK-CHAT]` so that the policy can apply the block message profile on the applications.
- Configure `url-category` with `Enhanced_News_and_Media` as match criteria for web filtering category.

Configuration

IN THIS SECTION

- [CLI Quick Configuration | 187](#)
- [Step-by-Step Procedure | 187](#)
- [Results | 188](#)

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the `[edit]` hierarchy level, and then enter `commit` from configuration mode.

CLI Quick Configuration

```
set security zones security-zone trust
set security zones security-zone untrust
set security policies from-zone trust to-zone untrust policy p2 match source-address any
set security policies from-zone trust to-zone untrust policy p2 match destination-address any
set security policies from-zone trust to-zone untrust policy p2 match application junos-defaults
set security policies from-zone trust to-zone untrust policy p2 match dynamic-application
[junos:GMAIL, junos:FACEBOOK-CHAT]
set security policies from-zone trust to-zone untrust policy p2 match url-category
Enhanced_News_and_Media
set security policies from-zone trust to-zone untrust policy p2 then reject profile profile1
```

Step-by-Step Procedure

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode* in the CLI User guide.

To configure a unified policy with a redirect message profile:

1. Configure security zones.

```
[edit security]
user@host# set security-zone trust
user@host# set security-zone untrust
```

2. Create a security policy with a URL category as the match criteria.

```
[edit security policies]
user@host# set from-zone trust to-zone untrust policy p2 match source-address any
user@host# set from-zone trust to-zone untrust policy p2 match destination-address any
user@host# set from-zone trust to-zone untrust policy p2 match application junos-defaults
user@host# set from-zone trust to-zone untrust policy p2 match dynamic-application junos:GMAIL
user@host# set security policies from-zone trust to-zone untrust policy p2 match url-category
Enhanced_News_and_Media
user@host# set from-zone trust to-zone untrust policy p2 match dynamic-application
junos:FACEBOOK-CHAT
```

3. Define the policy action.

```
[edit security policies]
user@host# set security policies from-zone trust to-zone untrust policy p2 then reject
profile profile1
```

Results

From configuration mode, confirm your configuration by entering the `show security policies` and `show security dynamic-application` commands. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```
[edit]
user@host# show security policies

from-zone trust to-zone untrust {
  policy p2 {
    match {
      source-address any;
      destination-address any;
      application junos-defaults;
      dynamic-application [ junos:GMAIL, junos:FACEBOOK-CHAT ];
      url-category Enhanced_News_and_Media;
    }
    then {
      reject {
        profile profile1;
      }
    }
  }
}
```

If you are done configuring the device, enter `commit` from configuration mode.

Verification

IN THIS SECTION

- [Verifying Unified Policy Configuration | 189](#)

Verifying Unified Policy Configuration

Purpose

Verify that the unified policy configuration is correct.

Action

From operational mode, enter the `show security policies` command to display a summary of all security policies on the device.

```
user@host> show security policies
```

```
Default policy: permit-all
```

```
Pre ID default policy: permit-all
```

```
From zone: untrust, To zone: internet
```

```
Policy: ip1, State: enabled, Index: 6, Scope Policy: 0, Sequence number: 1
```

```
Source addresses: any
```

```
Destination addresses: any
```

```
Applications: junos-ping, junos-pingv6, junos-dns-udp, junos-dns-tcp
```

```
Action: permit, log
```

```
Policy: ip2, State: enabled, Index: 7, Scope Policy: 0, Sequence number: 2
```

```
Source addresses: any
```

```
Destination addresses: any
```

```
Applications: junos-ping, junos-pingv6, junos-telnet, junos-dns-udp, junos-dns-tcp, junos-ftp, junos-http, junos-https
```

```
Action: permit, log
```

```
From zone: untrust, To zone: trust
```

```
Policy: up3, State: enabled, Index: 5, Scope Policy: 0, Sequence number: 1
```

```
Source addresses: H1, H1_v6
```

```
Destination addresses: H0, H0_v6
```

```

Applications: junos-ping, junos-telnet, junos-ftp, junos-http, junos-https, my_app_udp,
my_app_tcp
Dynamic Applications: junos:HTTP, junos:GOOGLE-GEN, junos:YAHOO, junos:SSL
Url-category: Enhanced_Search_Engines_and_Portals, cust_white
Action: permit, log
Policy: up4, State: enabled, Index: 9, Scope Policy: 0, Sequence number: 2
Source addresses: as1
Destination addresses: as0
Applications: junos-ping, junos-telnet, junos-ftp, junos-http, junos-https, my_app_udp,
my_app_tcp
Dynamic Applications: junos:web, junos:FTP
Url-category: Enhanced_Private_IP_Addresses, cust_white
Action: permit, log

```

Meaning

The output displays information about all currently active security sessions on the device. Verify the following information:

- Configured policy name
- Source and destination addresses
- Configured applications
- Configured dynamic applications
- Configured URL Category
- Policy reject action

Configure Applications in Unified Policies

IN THIS SECTION

- [Applications in Unified Policies | 191](#)
- [Example: Configure a Unified Policy Using Dynamic Applications | 191](#)

Applications in Unified Policies

Starting in Junos OS Release 19.1R1, configuring the application statement at the [edit security policies from-zone *zone-name* to-zone *zone-name* policy *policy-name* match] hierarchy level is optional if the dynamic-application statement is configured at the same hierarchy level.

In releases before Junos OS Release 19.1R1, it is mandatory to configure the application statement even if the dynamic-application statement is configured.

- When the application option is defined then the defined application is used.
- When the application option is not defined and the dynamic-application option is defined as any, then the application any is implicitly added.
- When the application option is not defined and the dynamic-application option is defined (and is not configured as any), then the application junos-defaults is implicitly added.

Example: Configure a Unified Policy Using Dynamic Applications

IN THIS SECTION

- [Requirements | 191](#)
- [Overview | 191](#)
- [Configuration | 192](#)
- [Verification | 194](#)

This example describes how to configure a unified policy using dynamic applications.

Requirements

This example uses the following hardware and software components:

- SRX Series Firewall running Junos OS Release 19.1R1. This configuration example is tested with Junos OS release 19.1R1.

Before you begin, configure security zones. See ["Example: Creating Security Zones" on page 9](#).

No special configuration beyond device initialization is required before configuring this feature.

Overview

In this example, dynamic applications are added to the security policy as match criteria.

To accomplish these objectives, perform the following tasks:

- Configure the security policy match criteria `source-address` and `destination-address` with the value `any`.
- Configure `dynamic-application` with `[junos:CNN, junos:BBC]` so that the policy can permit the applications `junos:CNN` and `junos:BBC`.

Configuration

IN THIS SECTION

- [CLI Quick Configuration | 192](#)
- [Step-by-Step Procedure | 192](#)
- [Results | 193](#)

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the `[edit]` hierarchy level, and then enter `commit` from configuration mode.

CLI Quick Configuration

```
set security zones security-zone trust
set security zones security-zone untrust
set security policies from-zone trust to-zone untrust policy p3 match source-address any
set security policies from-zone trust to-zone untrust policy p3 match destination-address any
set security policies from-zone trust to-zone untrust policy p3 match dynamic-application
junos:CNN
set security policies from-zone trust to-zone untrust policy p3 match dynamic-application
junos:BBC
set security policies from-zone trust to-zone untrust policy p3 then permit
```

Step-by-Step Procedure

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode* in the CLI User guide.

To configure a unified policy using dynamic applications:

1. Configure security zones.

```
[edit security]
user@host# set security-zone trust
user@host# set security-zone untrust
```

2. Create a security policy with a dynamic application as the match criteria.

```
[edit security policies]
user@host# set from-zone trust to-zone untrust policy p3 match source-address any
user@host# set from-zone trust to-zone untrust policy p3 match destination-address any
user@host# set from-zone trust to-zone untrust policy p3 match dynamic-application junos:CNN
user@host# set from-zone trust to-zone untrust policy p3 match dynamic-application junos:BBC
```

3. Define the policy action.

```
[edit security policies]
user@host# set from-zone trust to-zone untrust policy p3 then permit
```

Results

From configuration mode, confirm your configuration by entering the `show security policies` command. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```
[edit]
user@host# show security policies

from-zone trust to-zone untrust {
  policy p3 {
    match {
      source-address any;
      destination-address any;
      dynamic-application [ junos:CNN junos:BBC ];
    }
    then {
      permit;
    }
  }
}
```

```

    }
  }
}

```

If you are done configuring the device, enter `commit` from configuration mode.

Verification

IN THIS SECTION

- [Verifying Unified Policy Configuration | 194](#)

Verifying Unified Policy Configuration

Purpose

Verify that the unified policy configuration is correct.

Action

From operational mode, enter the `show security policies` command to display a summary of all security policies on the device.

```
user@host> show security policies
```

```

Policy: p3, State: enabled, Index: 4, Scope Policy: 0, Sequence number: 1
Source addresses: any
Destination addresses: any
Applications: junos-defaults
Dynamic Applications: junos:CNN, junos:BBC
Action: permit

```

From operational mode, enter the `show security policies detail` command to display a detailed summary of all security policies on the device.

```
user@host> show security policies detail

Default policy: permit-all
Pre ID default policy: permit-all
Policy: p3, action-type: permit, State: enabled, Index: 4, Scope Policy: 0
  Policy Type: Configured
  Sequence number: 1
  From zone: trust, To zone: untrust
  Source addresses:
    any-ipv4(global): 0.0.0.0/0
    any-ipv6(global): ::/0
  Destination addresses:
    any-ipv4(global): 0.0.0.0/0
    any-ipv6(global): ::/0
  Application: junos-defaults
    IP protocol: TCP, ALG: 0, Inactivity timeout: 1800
    Destination ports: 80, 443, 3128, 8000, 8080
  Dynamic Application:
    junos:BBC: 1754
    junos:CNN: 988
  Per policy TCP Options: SYN check: No, SEQ check: No, Window scale: No
```

Meaning

The output displays information about all currently active security sessions on the device. Verify the following information:

- Configured policy name
- Source and destination addresses
- Configured applications

NOTE: The Applications field is autopopulated and its value `junos-defaults` is added implicitly.

- Configured dynamic applications
- Policy action

SEE ALSO

dynamic-application (Security Policies)

Configure Micro-Applications in Unified Policies

IN THIS SECTION

- [Limit the Number of Policy Lookups | 196](#)
- [Configure Micro-Applications | 196](#)

Starting in Junos OS Release 19.2R1, you can configure micro-applications in a unified policy. Micro-applications are sub-functions of an application. Micro-applications enable granular control of an application at a sub-function level instead of blocking or allowing the entire application. By default, detection of micro-applications is disabled.

The application identification (AppID) module detects an application at a sub-function level on your network. Security policies leverage the application identity information determined by the AppID module. After a specific application is identified, an action such as permit, deny, reject, or redirect is applied to the traffic according to the policy configured on the device. You must enable detection of micro-applications to use them in a security policy. See *Enabling and Disabling Micro-Applications Detection*.

Limit the Number of Policy Lookups

To process a policy, the policy lookup must return the *final match* state for the application. When using a micro-application, application classification does not reach the *final match* state because the micro-application constantly changes for the session. Because the micro-application changes from one transaction to another, an unlimited number of policy lookups is attempted.

Use the unified-policy max-lookups statement at the [edit security policies] hierarchy level to limit the number of policy lookups.

Configure Micro-Applications

To permit a base-level application and all its dependent micro-applications, you can configure a unified policy by specifying the base-level application as a matching criterion. You do not have to explicitly specify each dependent application as matching criteria for the policy. For example, if you specify the

base-level application **junos-MODBUS** as a matching criterion in a unified policy, then you don't have to configure the micro-applications of the **junos-MODBUS** application (**junos:MODBUS-READ-COILS** and **junos:MODBUS-WRITE-SINGLE-COIL**) as matching criteria for the policy.

If you want to define a unified policy for granular-level control, then you must specify the micro-applications of the base-level application as matching criteria for the policy. You must not define the base-level application as match criteria in the policy. For more granular-level policy configuration, specify **junos:MODBUS-READ-COILS** as matching criteria in a unified policy. Ensure that the base-level application **junos:MODBUS** is not defined as a matching criterion in the same unified policy.

Policy Lookup with Micro-Applications

Detection of micro-applications is disabled by default. To use micro-applications as matching criteria for policy lookup, you must enable detection of micro-applications and then specify them as matching criteria for the unified policy. If you have not enabled detection of micro-applications, the application identification (AppID) module does not detect any micro-application and considers the base-level application as the final matching criterion. For example, consider the base-level application **junos:MODBUS** that has two micro-applications **junos:MODBUS-READ-COILS** and **junos:MODBUS-WRITE-SINGLE-COIL**:

- If you have not enabled detection of micro-applications, **junos:MODBUS** is considered as the *final match* state for the AppID classification. If you enable micro-applications, then you can configure them in a unified policy as any other pre-defined dynamic application. This micro-application is used for policy lookup.
- If you have enabled detection of micro-applications, the AppID module considers **junos:MODBUS** as the *pre-match* state. When the AppID module detects either **junos:MODBUS-READ-COILS** or **junos:MODBUS-WRITE-SINGLE-COIL**, AppID considers this result as the *final match* state and proceeds with policy lookup using this matching criterion.

SEE ALSO

Application Identification Support for Micro-Applications

max-lookups

Dynamic Application Classification States

RELATED DOCUMENTATION

[Unified Policies Support for Flow](#)

[Understanding Unified Policies \[Unified Threat Management \(UTM\)\]](#)

[Overview of IDP Policy support for Unified Policies](#)

Global Security Policies

IN THIS SECTION

- [Global Policy Overview | 198](#)
- [Example: Configuring a Global Policy with No Zone Restrictions | 201](#)
- [Example: Configuring a Global Policy with Multiple Zones | 207](#)

A security policy is a stateful firewall policy and controls the traffic flow from one zone to another zone by defining the kind(s) of traffic permitted from specific IP sources to specific IP destinations at scheduled times. To avoid creating multiple policies across every possible context, you can create a global policy that encompasses all zones, or a multizone policy that encompasses several zones. Using a global policy, you can regulate traffic with addresses and applications, regardless of their security zones, by referencing user-defined addresses or the predefined address and also provides access to multiple source zones and multiple destination zones in one policy.

Global Policy Overview

In a Junos OS stateful firewall, security policies enforce rules for transit traffic, in terms of what traffic can pass through the firewall, and the actions that need to take place on traffic as it passes through the firewall. Security policies require traffic to enter one security zone and exit another security zone. This combination of a from-zone and to-zone is called a *context*. Each context contains an ordered list of policies. Each policy is processed in the order that it is defined within a context. Traffic is classified by matching the policy's from-zone, to-zone, source address, destination address, and the application that the traffic carries in its protocol header. Each global policy, as with any other security policy, has the following actions: permit, deny, reject, log, count.

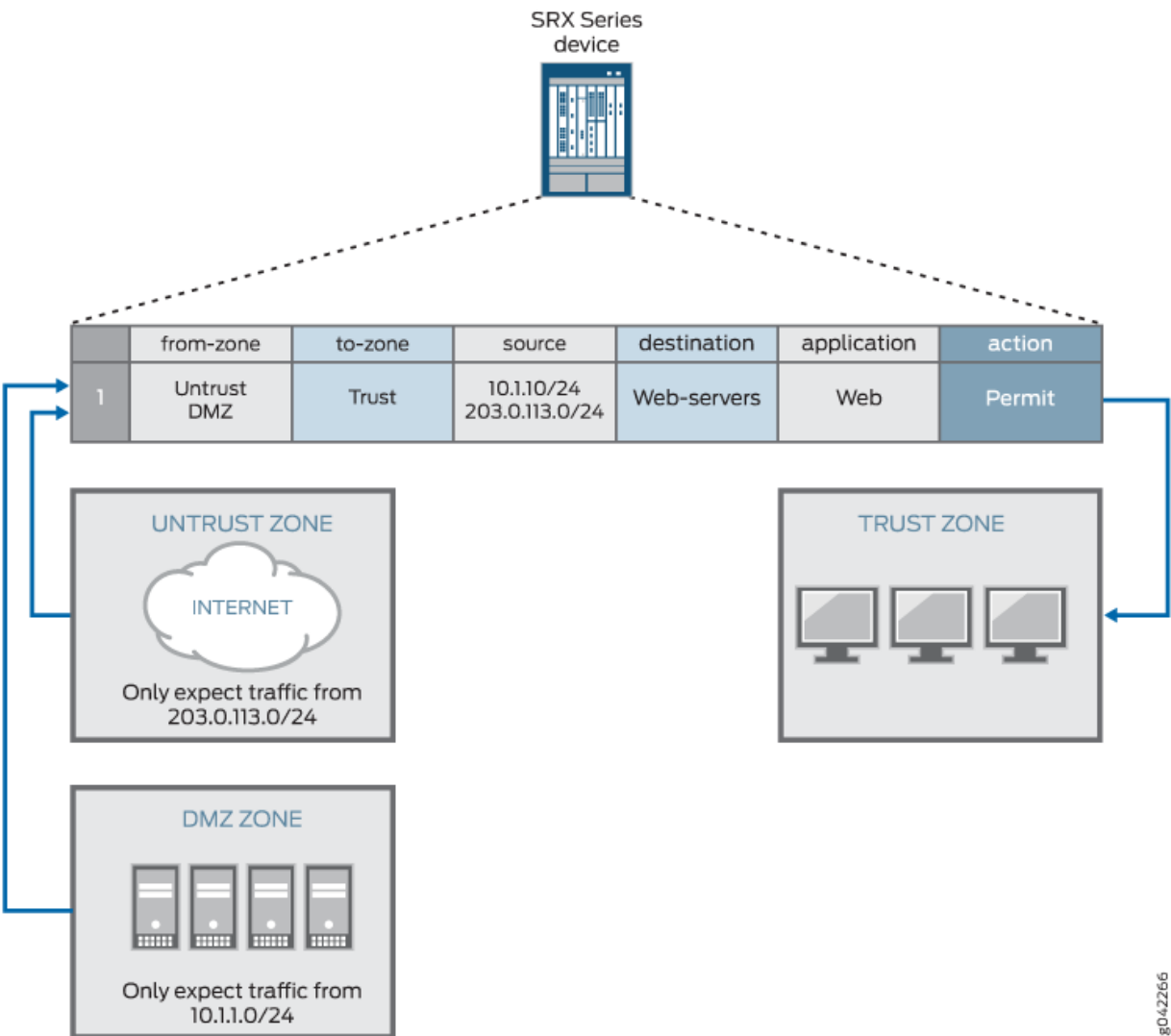
You can configure a security policy from the user interface. Security policies control traffic flow from one zone to another zone by defining the kind(s) of traffic permitted from specific IP sources to specific IP destinations at scheduled times. This works well in most cases, but it is not flexible enough. For example, if you want to perform actions on traffic you have to configure policies for each possible context. To avoid creating multiple policies across every possible context, you can create a global policy that encompasses all zones, or a multizone policy that encompasses several zones.

Using a global policy, you can regulate traffic with addresses and applications, regardless of their security zones, by referencing user-defined addresses or the predefined address "any." These addresses can span

multiple security zones. For example, if you want to provide access to or from multiple zones, you can create a global policy with the address “any,” which encompasses all addresses in all zones. Selecting the “any” address matches any IP address, and when “any” is used as a source/destination address in any global policy configuration, it matches the source/destination address of any packet.

Using a global policy you can also provide access to multiple source zones and multiple destination zones in one policy. However, we recommend that, for security reasons and to avoid spoofing traffic, when you create a multizone policy you use identical matching criteria (source address, destination address, application) and an identical action. In [Figure 11 on page 200](#), for example, if you create a multizone policy that includes DMZ and Untrust from-zones, spoofing traffic from 203.0.113.0/24 from the DMZ zone could match the policy successfully and reach the protected host in the Trust to-zone.

Figure 11: Multizone Global Policy Security Consideration



NOTE: Global policies without from-zone and to-zone information do not support VPN tunnels because VPN tunnels require specific zone information.

When policy lookup is performed, policies are checked in the following order: intra-zone (trust-to-trust), inter-zone (trust-to-untrust), then global. Similar to regular policies, global policies in a context are ordered, such that the first matched policy is applied to the traffic.

NOTE: If you have a global policy, make sure you have not defined a “catch-all” rule such as, match source any, match destination any, or match application any in the intra-zone or inter-zone policies because the global policies will not be checked. If you do not have a global policy, then it is recommended that you include a “deny all” action in your intra-zone or inter-zone policies. If you do have a global policy, then you should include a “deny all” action in the global policy.

In logical systems, you can define global policies for each logical system. Global policies in one logical system are in a separate context than other security policies, and have a lower priority than regular security policies in a policy lookup. For example, if a policy lookup is performed, regular security policies have priority over global policies. Therefore, in a policy lookup, regular security policies are searched first and if there is no match, global policy lookup is performed.

SEE ALSO

[Security Policies Overview | 2](#)

[Understanding Security Policy Rules | 96](#)

[Understanding Security Policy Elements | 95](#)

Example: Configuring a Global Policy with No Zone Restrictions

IN THIS SECTION

- [Requirements | 202](#)
- [Overview | 202](#)
- [Configuration | 202](#)
- [Verification | 205](#)

Unlike other security policies in Junos OS, global policies do not reference specific source and destination zones. Global policies reference the predefined address “any” or user-defined addresses that can span multiple security zones. Global policies give you the flexibility of performing actions on traffic without any zone restrictions. For example, you can create a global policy so that every host in every zone can access the company website, for example, www.example.com. Using a global policy is a

convenient shortcut when there are many security zones. Traffic is classified by matching its source address, destination address, and the application that the traffic carries in its protocol header.

This example shows how to configure a global policy to deny or permit traffic.

Requirements

Before you begin:

- Review the firewall security policies.

See ["Security Policies Overview" on page 2](#), ["Global Policy Overview" on page 198](#), ["Understanding Security Policy Rules" on page 96](#), and ["Understanding Security Policy Elements" on page 95](#).

- Configure an address book and create addresses for use in the policy.

See ["Example: Configuring Address Books and Address Sets" on page 37](#).

- Create an application (or application set) that indicates that the policy applies to traffic of that type.

See ["Example: Configuring Security Policy Applications and Application Sets" on page 55](#).

Overview

IN THIS SECTION

- [Topology | 202](#)

This configuration example shows how to configure a global policy that accomplishes what multiple security policies (using zones) would have accomplished. Global policy gp1 permits all traffic while policy gp2 denies all traffic.

Topology

Configuration

IN THIS SECTION

- [CLI Quick Configuration | 203](#)

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the [edit] hierarchy level, and then enter `commit` from configuration mode.

```
set security address-book global address server1 dns-name www.example.com
set security address-book global address server2 dns-name www.mail.example.com
set security policies global policy gp1 match source-address server1
set security policies global policy gp1 match destination-address server2
set security policies global policy gp1 match application any
set security policies global policy gp1 then permit
set security policies global policy gp2 match source-address server2
set security policies global policy gp2 match destination-address server1
set security policies global policy gp2 match application junos-ftp
set security policies global policy gp2 then deny
```

Procedure

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode* in the CLI User guide.

To configure a global policy to permit or deny all traffic:

1. Create addresses.

```
[edit security]
user@host# set security address-book global address server1 dns-name www.example.com
user@host# set security address-book global address server2 dns-name www.mail.example.com
```

2. Create the global policy to permit all traffic.

```
[edit security]
user@host# set policy global policy gp1 match source-address server1
user@host# set policy global policy gp1 match destination-address server2
user@host# set policy global policy gp1 match application any
user@host# set policy global policy gp1 then permit
```

3. Create the global policy to deny all traffic.

```
[edit security]
user@host# set policy global policy gp2 match source-address server2
user@host# set policy global policy gp2 match destination-address server1
user@host# set policy global policy gp2 match application junos-ftp
user@host# set policy global policy gp2 then deny
```

Results

From configuration mode, confirm your configuration by entering the `show security policies` and `show security policies global` commands. If the output does not display the intended configuration, repeat the instructions in this example to correct the configuration.

```
user@host# show security policies
global {
  policy gp1 {
    match {
      source-address server1;
      destination-address server2;
      application any;
    }
    then {
      permit;
    }
  }
  policy gp2 {
    match {
      source-address server2;
      destination-address server1;
      application junos-ftp;
    }
  }
}
```



```

    }
    then {
        deny;
    }
}
}

```

```

user@host# show security policies global
policy gp1 {
    match {
        source-address server1;
        destination-address server2;
        application any;
    }
    then {
        permit;
    }
}
policy gp2 {
    match {
        source-address server2;
        destination-address server1;
        application junos-ftp;
    }
    then {
        deny;
    }
}

```

If you are done configuring the device, enter `commit` from configuration mode.

Verification

IN THIS SECTION

- [Verifying Global Policy Configuration | 206](#)

Verifying Global Policy Configuration

Purpose

Verify that global policies gp1 and gp2 are configured as required.

Action

From operational mode, enter the `show security policies global` command.

```
user@host> show security policies global
```

Global policies:

Policy: gp1, State: enabled, Index: 6, Scope Policy: 0, Sequence number: 1

From zones: any

To zones: any

Source addresses: server1

Destination addresses: server2

Applications: any

Action: permit

Policy: gp2, State: enabled, Index: 7, Scope Policy: 0, Sequence number: 2

From zones: any

To zones: any

Source addresses: server2

Destination addresses: server1

Applications: junos-ftp

Action: deny

Meaning

The output displays information about all the global policies configured on the device.

Example: Configuring a Global Policy with Multiple Zones

IN THIS SECTION

- [Requirements | 207](#)
- [Overview | 207](#)
- [Configuration | 208](#)
- [Verification | 210](#)

Unlike other security policies in Junos OS, global policies allow you to create multizone policies. A global policy is a convenient shortcut when there are many security zones, because it enables you to configure multiple source zones and multiple destination zones in one global policy instead of having to create a separate policy for each from-zone/to-zone pair, even when other attributes, such as source-address or destination-address, are identical.

Requirements

Before you begin:

- Review the firewall security policies.

See ["Security Policies Overview" on page 2](#), ["Global Policy Overview" on page 198](#), ["Understanding Security Policy Rules" on page 96](#), and ["Understanding Security Policy Elements" on page 95](#).

- Create security zones.

See ["Example: Creating Security Zones" on page 9](#)

Overview

IN THIS SECTION

- [Topology | 208](#)

This configuration example shows how to configure a global policy that accomplishes what multiple security policies would have accomplished. Global policy Pa permits all traffic from zones 1 and 2 to zones 3 and 4.

Topology

Configuration

IN THIS SECTION

- [CLI Quick Configuration | 208](#)
- [Procedure | 208](#)

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the [edit] hierarchy level, and then enter `commit` from configuration mode.

```
set security policies global policy Pa match source-address any
set security policies global policy Pa match destination-address any
set security policies global policy Pa match application any
set security policies global policy Pa match from-zone zone1
set security policies global policy Pa match from-zone zone2
set security policies global policy Pa match to-zone zone3
set security policies global policy Pa match to-zone zone4
set security policies global policy Pa then permit
```

Procedure

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode*.

To configure a global policy with multiple zones:

1. Create a global policy to allow any traffic from zones 1 and 2 to zones 3 and 4.

```
[edit security]
set security policies global policy Pa match source-address any
set security policies global policy Pa match destination-address any
set security policies global policy Pa match application any
set security policies global policy Pa match from-zone zone1
set security policies global policy Pa match from-zone zone2
set security policies global policy Pa match to-zone zone3
set security policies global policy Pa match to-zone zone4
set security policies global policy Pa then permit
```

Results

From configuration mode, confirm your configuration by entering the `show security policies global` command. If the output does not display the intended configuration, repeat the instructions in this example to correct the configuration.

```
[edit]
user@host# show security policies global
policy Pa {
  match {
    source-address any;
    destination-address any;
    application any;
    from-zone [ zone1 zone2 ];
    to-zone [ zone3 zone4 ];
  }
  then {
    permit;
  }
}
```

If you are done configuring the device, enter `commit` from configuration mode.

Verification

IN THIS SECTION

- [Verifying Global Policy Configuration | 210](#)

Verifying Global Policy Configuration

Purpose

Verify that the global policy is configured as required.

Action

From operational mode, enter the `show security policies global` command.

RELATED DOCUMENTATION

[Security Policies Overview | 2](#)

[Configuring Security Policies | 95](#)

User Role Firewall Security Policies

IN THIS SECTION

- [Understanding User Role Firewalls | 211](#)
- [User Role Retrieval and the Policy Lookup Process | 212](#)
- [Understanding the User Identification Table | 214](#)
- [Obtaining Username and Role Information Through Firewall Authentication | 221](#)
- [Configuring a User Role Firewall For Captive Portal Redirection | 223](#)
- [Example: Configuring a User Role Firewall on an SRX Series Device | 224](#)

User role firewall policies allows the administrators to permit or restrict network access for users based on the roles they are assigned. User role firewalls enable greater threat mitigation, provide more informative forensic resources, improve record archiving for regulatory compliance, and enhance routine access provisioning.

Understanding User Role Firewalls

Network security enforcement, monitoring, and reporting based solely on IP information soon will not be sufficient for today's dynamic and mobile workforce. By integrating user firewall policies, administrators can permit or restrict network access of employees, contractors, partners, and other users based on the roles they are assigned. User role firewalls enable greater threat mitigation, provide more informative forensic resources, improve record archiving for regulatory compliance, and enhance routine access provisioning.

User role firewalls trigger two actions:

- Retrieve user and role information associated with the traffic
- Determine the action to take based on six match criteria within the context of the zone pair

The source-identity field distinguishes a user role firewall from other types of firewalls. If the source identity is specified in any policy for a particular zone pair, it is a user role firewall. The user and role information must be retrieved before policy lookup occurs. If the source identity is not specified in any policy, user and role lookup is not required.

To retrieve user and role information, authentication tables are searched for an entry with an IP address corresponding to the traffic. If an entry is found, the user is classified as an authenticated user. If not found, the user is classified as an unauthenticated user.

The username and roles associated with an authenticated user are retrieved for policy matching. Both the authentication classification and the retrieved user and role information are used to match the source-identity field.

Characteristics of the traffic are matched to the policy specifications. Within the zone context, the first policy that matches the user or role and the five standard match criteria determines the action to be applied to the traffic.

The following sections describe the interaction of user and role retrieval and the policy lookup process, methods for acquiring user and role assignments, techniques for configuring user role firewall policies, and an example of configuring user role firewall policies.

User Role Retrieval and the Policy Lookup Process

For policy lookup, firewall policies are grouped by zone pair (the from zone and to zone). Within the context of the zone pair, IP-based firewall policies are matched to traffic based on five criteria—source IP, source port, destination IP, destination port, and protocol.

User role firewall policies include a sixth match criteria—source identity. The source-identity field specifies the users and roles to which the policy applies. When the source-identity field is specified in any policy within the zone pair, user and role information must be retrieved before policy lookup can proceed. (If all policies in the zone pair are set to any or have no entry in the source-identity field, user and role information is not required and the five standard match criteria are used for policy lookup.)

The user identification table (UIT) provides user and role information for an active user who has already been authenticated. Each entry in the table maps an IP address to an authenticated user and any roles associated with that user.

When traffic requires user and role data, each registered UIT is searched for an entry with the same IP address. If a user has not been authenticated, there is no entry for that IP address in the table. If no UIT entry exists, the user is considered an unauthenticated user.

Policy lookup resumes after the user and role information has been retrieved. The characteristics of the traffic are matched against the match criteria in the policies. The source-identity field of a policy can specify one or more users or roles, and the following keywords:

authenticated-user	Users that have been authenticated.
unauthenticated-user	Users that have not been authenticated.
any	All users regardless of authentication. If the source-identity field is not configured or is set to any in all of the policies for the zone pair, only five criteria are matched.
unknown-user	Users unable to be authenticated due to an authentication server disconnection, such as a power outage.

For example, consider user-c who is assigned to the mgmt role. When traffic from the trust zone to the untrust zone is received from user-c at IP address 198.51.100.3, policy lookup is initiated. [Table 24 on page 213](#) represents three policies in a user role firewall for the trust to untrust zone pair.

Table 24: Trust Zone to Untrust Zone Policy Sequence

src-zone	src-zone	dest-zone	src-IP	dest-IP	source-identity	Application	Action	Services
P1	trust	untrust	192.0.2.0	203.0.113.0	any	http	deny	-
P2	trust	untrust	any	any	mgmt	any	permit	-
P3	trust	untrust	198.51.100.3	any	employee	http	deny	-

All policies for the zone pair are checked first for a source-identity option. If any of the policies specifies a user, a role, or a keyword, user and role retrieval must occur before policy lookup continues. [Table 24 on page 213](#) shows that policy P2 specifies mgmt as the source identity, making this a user role firewall. User and roles must be retrieved before policy lookup can continue.

NOTE: User and role retrieval would not be performed if the keyword any or if no source identity was specified in all of the policies in the zone context. In such cases, only the five remaining values are matched to the policy criteria.

The UIT represented in [Table 25 on page 213](#) is checked for the IP address. Because the address is found, the username user-c, all roles listed for user-c (in this case, mgmt and employee), and the keyword authenticated-user become data used to match the traffic to the source-identity field of a policy.

Table 25: UIT Authentication Details

Source IP Address	Username	Roles
192.0.2.4	user-a	employee
198.51.100.3	user-c	mgmt, employee
203.0.113.2	user-s	contractor

Policy lookup resumes and compares the match criteria in each policy in [Table 24 on page 213](#) to the incoming traffic. Assuming all other criteria match, the first policy that specifies user-c, mgmt, employee, authenticated-user, or any in the source-identity field could be a match for this traffic. Policy P1 matches one of the retrieved roles for user-c, but the source IP address does not match; therefore policy

lookup continues. For policy P2, all criteria match the traffic; therefore the policy action is followed and the traffic is permitted. Note that the traffic also matches policy P3, but user firewall policies are terminal—policy lookup ends when the first policy match is found. Because policy P2 matches all criteria, policy lookup ends and policy P3 is not checked.

Policies can also be based on the classification assigned to a user from the user and role retrieval results. Consider a different set of policies for the same zone pair represented by [Table 26 on page 214](#). If traffic is received from user-q at IP 198.51.100.5, user and role retrieval is required because the source-identity field is specified in at least one of the policies.

Table 26: Trust Zone to Untrust Zone Policy Sequence

policy-name	src-zone	dest-zone	src-IP	dest-IP	source-identity	application	action	Services
P1	trust	untrust	any	any	un-authenticated-user	http	deny	–
P2	trust	untrust	any	any	mgmt	any	permit	–
P3	trust	untrust	198.51.100.3	any	employee	http	deny	–

When the UIT entries in [Table 25 on page 213](#) are checked, no entry is found for IP address 198.51.100.5. Therefore, the user is considered an unauthenticated user. When policy lookup resumes, the traffic matches policy P1 and the traffic is denied.

Understanding the User Identification Table

IN THIS SECTION

- [Local Authentication Table | 216](#)
- [UAC Authentication Table | 218](#)
- [Firewall Authentication Table | 219](#)
- [Policy Provisioning With Users and Roles | 220](#)

On the SRX Series Firewall, the user identification table (UIT) contains the IP address, username, and role information for each authenticated user. Entries are ordered by IP address. When username and role information is required by a security policy, all UITs are checked. Finding the IP address in an entry in one of the UITs means that the user at that address has already been successfully authenticated.

Each authentication source maintains its own UIT independently and provides query functions for accessing data. Three types of UITs are supported—the local authentication table, the Unified Access Control (UAC) authentication table, and the firewall authentication table.

Local authentication table

A static UIT created on the SRX Series Firewall either manually or programmatically using CLI commands. All users included in the local authentication table are considered authenticated users. When a matching IP address is found, user and role information is retrieved from the table entry and associated with the traffic. User and role information can be created on the device manually or ported from a third-party authentication server, but the data in the local authentication table is not updated in real time.

UAC authentication table

A dynamic UIT pushed from the Junos Pulse Access Control Service to the SRX Series Firewall. The UAC authentication table of a Junos Pulse Access Control Service contains an entry for each authenticated user. The data in this table is updated and pushed to the SRX Series Firewall whenever its authentication table is updated. Depending on the device configuration, authentication could occur on the Junos Pulse Access Control Service itself or on a third-party authentication server. If the Access Control Service is relaying data from a third-party server, the data is restructured by the Access Control Service to match the file format of its authentication table and pushed to the SRX Series Firewall.

Firewall authentication table

A dynamic UIT created on the SRX when `user-firewall` is specified as the firewall authentication type in a security policy. This UIT provides an alternative user role source to UAC when firewall authentication is already in use on your SRX Series Firewall. In this way, users defined for pass-through authentication can also be used as a source for usernames and roles when the `user-firewall` option is specified as the firewall authentication type in a policy.

The `user-firewall` authentication type initiates firewall authentication to verify the user by using either local authentication information or external authentication servers supporting RADIUS, LDAP, or SecureID authentication methods. When this type is specified for firewall authentication, the username and associated groups (roles) from the authentication source are mapped to the IP address and added to the firewall authentication UIT.

Local Authentication Table

The local authentication table is managed with CLI commands that insert or delete entries. A local authentication table can be used as a backup solution when a dynamic UIT is not available, or to assign user and role information to devices that cannot authenticate to the network, such as printers or file servers. The local authentication table can be used for testing or to demonstrate how a user role firewall works without firewall authentication or the Access Control Service configured.

The IP addresses, user names, and roles from a third-party authentication source can be downloaded and added to the local authentication table programmatically using CLI commands. If an authentication source defines users and groups, the groups can be configured as roles and associated with the user as usual.

To be compliant with the UAC authentication table, user names are limited to 65 characters and role names are limited to 64 characters. The local authentication table has a maximum of 10,240 authentication entries on SRX1500 devices and above, 5120 authentication entries on SRX650 devices and below, depending on the Junos OS release in your installation. The local authentication table has 5120 authentication entries on the vSRX Virtual Firewall. Each authentication entry can be associated with up to 200 roles. The maximum capacity is based on an average of 10 roles assigned to each user. This is the same capacity specified for a UAC authentication table.

Use the following command to add an entry to a local authentication table. Note that each entry is keyed by IP address.

```
user@host> request security user-identification local-authentication-table add user user-name ip-  
address ip-address role [role-name role-name ]
```

The role option in a single CLI command accepts up to 40 roles. To associate more than 40 roles with a single user, you need to enter multiple commands. Keep the following characteristics in mind when adding or modifying authentication user and role entries.

- Role names cannot be the same as usernames.
- Using the add option with an existing IP address and username aggregates the role entries. The table can support up to 200 roles per user.
- Using the add option with an existing IP address and a new username overwrites the existing username for that IP address.
- Role aggregation does not affect existing sessions.
- To change the role list of an existing entry, you need to delete the existing entry and add an entry with the new role list.

- To change the IP address of an existing entry, you need to delete the existing entry and add an entry with the new IP address.

An entry can be deleted by IP address or by username.

```
user@host> request security user-identification local-authentication-table delete (ip-address | user-name)
```

The local authentication table can be cleared with the following command:

```
user@host> clear security user-identification local-authentication-table
```

To display the content of the local authentication table, use the following `show...` command:

```
user@host> show security user-identification local-authentication-table all (brief | extensive)
```

The brief option (the default) displays information in a tabular format sequenced by IP address. User names and role lists are truncated to fit the format.

```
user@host> show security user-identification local-authentication-table all
```

```
Total entries: 2
Source IP      Username      Roles
198.51.100.1   user1         role1
203.0.113.2    user2         role2, role3
```

The extensive option displays the full content for each field. Other options limit the display to a single username, IP address, or role.

```
user@host> show security user-identification local-authentication-table all extensive
```

```
Total entries: 3
Ip-address: 198.51.100.2
Username: user1
Roles: role1

Ip-address: 203.0.113.2
```

```

Username: user1
Roles: role2

Ip-address: 192.0.2.3
Username: user3
Roles: role1, role2

```

UAC Authentication Table

An SRX Series Firewall can act as an enforcer for a Junos Pulse Access Control Service. In this implementation, the SRX Series Firewall acts as a Layer 3 enforcement point and controls access to resources with IP-based resource policies that have been pushed down from the Access Control Service.

When implemented as a user role firewall, the SRX Series Firewall can access the UAC network in a similar way for user role retrieval. In this instance, user and role information for all authenticated users is pushed from the Access Control Service.

The SRX Series Firewall configuration is similar to that of an enforcer. To establish communication, both devices require configuration and password settings to recognize the other. From the SRX Series Firewall, connect the Access Control Service as an infranet controller.

```

[edit]
user@host# set services unified-access-control infranet-controller ic-name address ip-address
user@host# set services unified-access-control infranet-controller ic-name interface interface-
name
user@host# set services unified-access-control infranet-controller ic-name password password

```

From the Access Control Service, define the SRX Series Firewall as a New Enforcer. Use the same password specified on the SRX Series Firewall.

Users and passwords are defined on the Access Control Service as in a standard authentication configuration. One or more roles can also be associated with users. When a user is authenticated, an entry containing the IP address, username, and associated roles is added to the UAC authentication table on the Access Control Service.

The UAC authentication table is pushed from the Access Control Service to the SRX Series Firewall when the connection between the two devices is initialized. Whenever an entry is added, removed, or updated on the Access Control Service, the updated UAC authentication table is pushed to the SRX Series Firewall.

Resource access policies are not necessary on the Access Control Service for a user role firewall implementation. The access behavior is provided in the policy configurations on the SRX Series Firewall. If resource access policies are defined on the Access Control Service, they are pushed to the SRX Series

Firewall, but they are not used unless a specific firewall policy implements UAC policies in the policy's action field.

The following `show services` command displays the content of the UAC authentication table on the SRX Series Firewall, confirming that the table has been pushed from the Access Control Service successfully:

```
user@host> show services unified-access-control authentication-table extended
```

Id	Source IP	Username	Age	Role name
3	192.0.2.1	april	60	Users
6	192.0.2.2	june	60	Employees
Total: 2				

The SRX Series Firewall monitors connections and detects if communication to the Access Control Service has been lost. Based on the UAC configuration, the SRX Series Firewall waits for a response for a configured interval before issuing another request. If a response is received, the Access Control Service is considered functional. If no response is received after a specified timeout period, communication is considered lost and the timeout action is applied. The following UAC command syntax configures the interval, timeout, and timeout action:

```
user@host# set services unified-access-control interval seconds
user@host# set services unified-access-control timeout seconds
user@host# set services unified-access-control timeout-action (close | no-change | open)
```

During a disconnection, if user and role lookup is attempted for the disconnected device, it returns a failure code regardless of the timeout action. If access to all authentication sources is lost, the keyword `unknown-user` is associated with the IP address. When policy lookup resumes, a policy with `unknown-user` as the source identity would match the traffic. By implementing a specific policy for `unknown-user`, you can create a method for handling the loss of authentication sources.

Firewall Authentication Table

Firewall authentication requires users to authenticate to the SRX firewall before permitting access between zones and devices. When traffic is received, the user is prompted for a username and password, and verified against a specified profile of valid users. Depending on the device configuration, firewall authentication verifies that telnet, HTTP, HTTPS (for SRX5800, SRX5600, and SRX5400 devices), and FTP traffic has been authenticated locally or by a RADIUS, LDAP, or SecureID authentication server.

If firewall authentication is in use on a device, the authentication process can also provide the username and role information needed for user role firewall match criteria. In this case, the information is collected and maintained in a UIT called the firewall authentication table. One or more access policies in the edit access hierarchy define authentication methods to be used for firewall authentication.

The firewall authentication table must be enabled as the authentication source for user role information retrieval. The priority option specifies the sequence in which all UITs will be checked.

```
user@host# set security user-identification authentication-source firewall-authentication
priority priority
```

In a firewall policy for a given zone pair, the firewall-authentication service specified for the permit action initiates authentication of matching traffic. The user-firewall authentication type generates the UIT entry for the authenticated user. The name specified in the access-profile option identifies the profile to be used to authenticate valid users.

```
[edit security policies from-zone zone to-zone zone policy policy-name]
user@host# set match source-identity unauthenticated-user
user@host# set then permit firewall-authentication user-firewall access-profile profile-name
```

The UIT table entry contains the IP address of the traffic mapped to the authenticated user and the user's associated groups. When the user is no longer active, the entry is removed from the table. Because entries are continuously added and removed as the traffic and authenticated users change, the firewall authentication table is considered dynamic.

When policies within the same zone pair specify the source-identity field as part of its match criteria, all enabled UITs are searched for an entry corresponding to the IP address of the traffic. If found, the associated username and groups are retrieved for source-identity matching. (User authentication group names are considered role names for source-identity matching.)

Policy Provisioning With Users and Roles

All users and roles, whether defined on the SRX Series Firewall or on the Access Control Service, are maintained in a user role file on the SRX Series Firewall. To display all users and roles available for provisioning, use the following show security... commands.

NOTE: Usernames and roles in the firewall authentication table are not included in the following displays.

- To display all of the roles that are available for provisioning, use the `show security user-identification role-provision all` command. Note that the roles from all UITs are listed together.
- To display all of the users that are available for provisioning, use the `show security user-identification user-provision all` command.
- To display all of the users and roles that are available for provisioning, use the `show security user-identification source-identity-provision all` command.

When a policy configuration is committed, the user role file is checked to determine if all users and roles specified in the policy are available for provisioning. If a user or role is not found, a warning identifies the missing user or role so that you can define it later.

NOTE: The policy is committed even if a user or role is not yet defined.

SEE ALSO

[Acquiring User Role Information from an Active Directory Authentication Server](#)

Obtaining Username and Role Information Through Firewall Authentication

User role firewall policies can be integrated with firewall authentication both to authenticate users and to retrieve username and role information. The information is mapped to the IP address of the traffic, stored in the firewall authentication table, and used for user role firewall policy enforcement.

The following CLI statements configure firewall authentication for user role firewall enforcement.

1. If not already established, define the access profile to be used for firewall authentication. You can skip this step if an existing access profile provides the client data needed for your implementation. The access profile is configured in the `[edit access profile]` hierarchy as with other firewall authentication types. It defines clients as firewall users and the passwords that provide them access. Use the following command to define a profile and add client names and passwords for firewall authentication.

```
set access profile profile-name client client-name firewall-user password pwd
```

2. If HTTPS traffic is expected, define the access profile to be used for SSL termination services. You can skip this step if an existing SSL termination profile provides the services needed for your implementation.

The SSL termination profile is configured in the [edit services ssl] hierarchy.

```
set services ssl termination profile ssl-profile-name server-certificate certificate-type
```

3. Enable the firewall authentication table as an authentication source.

```
set security user-identification authentication-source firewall-authentication priority priority
```

The priority value determines the sequence in which authentication sources are checked. The default value is 150 for the firewall authentication table. (It is 100 for the local authentication table and 200 for the Unified Access Control (UAC) authentication table.) By default, the local authentication table is checked first, the firewall authentication table is next, and the UAC authentication table is third if it is enabled. You can change this sequence by changing the priority value of one or more of the tables.

4. Configure policies that permit traffic for user firewall authentication.

```
edit security policies from-zone zone to-zone zone policy policy-name
set match source-identity unauthenticated-user
set then permit firewall-authentication user-firewall access-profile profile-name ssl-
termination-profile profile-name
```

When unauthenticated traffic is permitted for firewall authentication, the user is authenticated based on the access profile configured in this statement. The `ssl-termination-profile` option is needed only for HTTPS traffic.

By specifying the authentication type `user-firewall`, the firewall authentication table is propagated with the IP address, the username, and any group names associated with the authenticated user. (Group names from firewall authentication are interpreted as roles by the user role `firewall`.) Any further traffic from this IP address will match the IP address in the firewall authentication table, and not require authentication. The associated username and roles are retrieved from the table for use as potential match criteria in subsequent security policies.

Configuring a User Role Firewall For Captive Portal Redirection

To automatically redirect unauthenticated users to the Access Control Service, use the UAC captive portal feature. The following syntax defines the profile for the captive portal:

```
set services unified-access-control captive-portal profile-name redirect-traffic
[unauthenticated | all]
set services unified-access-control captive-portal profile-name redirect-url host-url
```

The Kerberos protocol, used for authentication encryption, identifies the Access Control Service only by its service principal name (SPN). The protocol does not accept an IP address. Therefore, the format for the redirect URL must be

```
service://hostname/options
```

In this implementation, the service is HTTP and the hostname is the FQDN of the Access Control Service. Options specified after the hostname pass additional information to the Access Control Service directing the user back to the original destination, to the SRX Series Firewall, or to the policy that originated the redirection. You can configure the options using the following keyword and variable pairs:

- | | |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| ?target=%dest-url% | Specifies the protected resource which the user is trying to access. |
| &enforcer=%enforcer-id% | Specifies the ID assigned to the SRX Series Firewall when it is configured as an enforcer by the Access Control Service. |
| &policy=%policy-id% | Specifies the encrypted policy ID for the security policy that redirected the traffic. |

The following statements define the profile of the captive portal named auth-redirect. The captive-portal redirects unauthenticated users to the URL of the Access Control Service for authentication. After successful authentication, the traffic will be directed back to the SRX Series Firewall.

```
[edit]
user@host# set services unified-access-control captive-portal auth-redirect redirect-traffic
unauthenticated
user@host# set services unified-access-control captive-portal auth-redirect redirect-url "http://
ic6000.example.com/?target=%dest-url%&enforcer=%enforcer-id%&policy=%policy-id%"
```

A defined captive-portal profile is displayed as part of the UAC configuration.

```
[edit]
user@host#show services
```

```
unified-access-control {
  captive-portal auth-redirect {
    redirect-traffic unauthenticated;
    redirect-url "http://ic6000.example.com/?target=%dest-url%&enforcer=%enforcer-id%&policy=
%policy-id%";
  }
}
```

After the profile is defined, a policy can apply the captive portal as an application service when certain criteria is matched. Whenever a user role is unauthenticated, auth-redirect captive portal diverts the traffic from trust zone to untrust zone. The following example defines policy P1 to apply the auth-redirect captive portal profile to any HTTP traffic from the trust to untrust:

```
[edit]
user@host# set security policies from-zone trust to-zone untrust policy P1 match application http
user@host# set security policies from-zone trust to-zone untrust policy P1 match source-identity
unauthenticated-user
user@host# set security policies from-zone trust to-zone untrust policy P1 then permit
application-services uac-policy captive-portal auth-redirect
```

Example: Configuring a User Role Firewall on an SRX Series Device

IN THIS SECTION

- [Requirements | 225](#)
- [Overview | 225](#)
- [Configuration | 227](#)

The following example configures a user role firewall on an SRX Series Firewall. The firewall controls access from the trust zone to the untrust zone based on active, authenticated users or their associated roles. User role firewall policies establish the following restrictions:

- Only authenticated users are permitted from the trust zone to the untrust zone.
- Unauthenticated users are redirected to an Access Control Service for authentication.
- Traffic from IP 192.0.2.0 to IP 203.0.113.0 within the zone context is restricted. Only the traffic from users with the dev-abc, http-juniper-accessible, or ftp-accessible role is permitted. Permitted traffic is further evaluated by AppFW rules.
 - Permitted traffic identified as junos:FACEBOOK-ACCESS, junos:GOOGLE-TALK, or junos:MEEBO application traffic is denied.
 - Permitted traffic for any other application is permitted.
 - All other traffic from the trust zone to the untrust zone is permitted.

Requirements

Before you begin, ensure that the SRX Series Firewall with Junos OS Release 12.1 or later is configured and initialized.

In this example, user and role information associated with the IP address of the traffic is provided by an Access Control Service. For instructions on configuring the Access Control Server, see [Acquiring User Role Information from an Active Directory Authentication Server](#).

Overview

[Table 27 on page 225](#) outlines a firewall that meets the requirements for this example. The user role firewall consists of four policies.

Table 27: User Role Firewall Policies

policy-name	src-zone	dest-zone	src-IP	dest-IP	source-identity	application	action	Services
user-role-fw1	trust	untrust	any	any	un-authenticated-user	http	permit	UAC captive portal

Table 27: User Role Firewall Policies (Continued)

policy-name	src-zone	dest-zone	src-IP	dest-IP	source-identity	application	action	Services
user-role-fw2	trust	untrust	192.0.2.0	203.0.113.0	dev-abc http-juniper-accessible ftp-accessible	http	permit	AppFW ruleset RS1
user-role-fw3	trust	untrust	192.0.2.0	203.0.113.0	any	http	deny	
user-role-fw4	trust	untrust	any	any	any	http	permit	

Because the source-identity field is specified for at least one of the policies in this firewall, user and role information must be retrieved before policy lookup is conducted. The source IP of the traffic is compared to the items in the UIT. If the source IP address is found, the keyword `authenticated`, the username, and any roles associated with this user are stored for later use in policy lookup. If a matching entry for the IP address is not found in the UIT, the keyword `unauthenticated-user` is stored for policy lookup.

After retrieving the username, roles, and keywords, policy lookup begins. Characteristics of the incoming traffic are compared to each policy's match criteria. If a match is found, the action specified in that policy is taken.

A policy match is a terminal event, and no policies after the match are checked. Policy sequence influences the action to be taken for matching traffic. In this example, policies are applied in the following sequence:

user-role-fw1 Applies the UAC captive portal service to matching HTTP traffic with the `unauthenticated-user` keyword, and redirects it to the Access Control Service for authentication. A UAC profile must also be configured to identify the captive portal specifications.

user-role-fw2 Applies an AppFW rule set to any HTTP traffic from address 192.0.2.0 to address 203.0.113.0 that has a matching username or role. An application firewall must also be configured to define the rule set.

user-role-fw3	Denies all remaining HTTP traffic from address 192.0.2.0 to address 203.0.113.0 for this zone pair.
user-role-fw4	Permits all remaining HTTP traffic for this zone pair.

Configuration

IN THIS SECTION

- [Configuring Redirection For Unauthenticated Users | 227](#)
- [Creating a User Role Policy With an Application Firewall | 229](#)
- [Creating Remaining Security Policies Based on User and Role | 231](#)

The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode* in the CLI User guide.

Configuring Redirection For Unauthenticated Users

Step-by-Step Procedure

When an IP address is not listed in the UIT, the unauthenticated-user keyword is used in policy lookup. Instead of denying access to this traffic, a policy can redirect the traffic to a UAC captive portal for authentication.

NOTE: It is important to position a redirection policy for unauthenticated-user before a policy for “any” user so that UAC authentication is not shadowed by a policy intended for authenticated users.

To configure redirection from the SRX Series Firewall to the Access Control Service:

1. From configuration mode, configure the UAC profile for the captive portal acs-device.

```
[edit]
user@host# set services unified-access-control captive-portal acs-device redirect-traffic
unauthenticated-user
```

2. Configure the redirection URL for the Access Control Service or a default URL for the captive portal.

```
[edit]
user@host# set services unified-access-control captive-portal acs-device redirect-url
"https://%ic-url%/?target=%dest-url%&enforcer=%enforcer-id%"
```

This policy specifies the default target and enforcer variables to be used by the Access Control Service to direct the user back after authentication. This ensures that changes to system specifications will not affect configuration results.

NOTE: When variables, such as `?target=`, are included in the command line, you must enclose the URL and variables in quotation marks.

3. Configure a user role firewall policy that redirects HTTP traffic from zone trust to zone untrust if the source-identity is unauthenticated-user. The captive portal profile name is specified as the action to be taken for traffic matching this policy.

```
[edit]
user@host# set security policies from-zone trust to-zone untrust policy user-role-fw1 match
source-address any
user@host# set security policies from-zone trust to-zone untrust policy user-role-fw1 match
destination-address any
user@host# set security policies from-zone trust to-zone untrust policy user-role-fw1 match
application http
user@host# set security policies from-zone trust to-zone untrust policy user-role-fw1 match
source-identity unauthenticated-user
user@host# set security policies from-zone trust to-zone untrust policy user-role-fw1 then
permit application-services uac-policy captive-portal acs-device
```

4. If you are done configuring the policies, commit the changes.

```
[edit]
user@host# commit
```


Results

From configuration mode, confirm your configuration by entering the `show services` and `show security policies` commands. If the output does not display the intended configuration, repeat the instructions in this example to correct the configuration.

```
[edit]
user@host# show services
unified-access-control {
    captive-portal acs-device {
        redirect-traffic unauthenticated;
        redirect-url "https://%ic-ip%/?target=%dest-url%&enforcer=%enforcer-id%"
```

```
user@host# show security policies
from-zone trust to-zone untrust {
    policy user-role-fw1 {
        match {
            source-address any;
            destination-address any;
            application http;
            source-identity unauthenticated-user
        }
        then {
            permit {
                application-services {
                    uac-policy {
                        captive-portal acs-device;
                    }
                }
            }
        }
    }
}
```

Creating a User Role Policy With an Application Firewall

Step-by-Step Procedure

This policy restricts traffic from IP 192.0.2.0 to IP 203.0.113.0 based on its user and roles, and also its application. The configuration defines an application rule set and applies it to matching user role traffic.

1. Configure the AppFW rule set rs1. The following rule set denies junos:FACEBOOK-ACCESS, junos:GOOGLE-TALK, or junos:MEEBO application traffic. It applies the default setting, permit, to the remaining traffic.

```
[edit security application-firewall rule-sets rs1]
user@host# set rule r1 match dynamic-application [junos:FACEBOOK-ACCESS junos:GOOGLE-TALK
junos:MEEBO]
user@host# set rule r1 then deny
user@host# set default-rule permit
```

2. Configure a policy to apply the rs1 application firewall rule set to traffic from IP 192.0.2.0 to IP 203.0.113.0 with the dev-abc, http-mgmt-accessible, or ftp-accessible user role.

```
[edit]
user@host# set security policies from-zone trust to-zone untrust policy user-role-fw2 match
source-address 192.0.2.0
user@host# set security policies from-zone trust to-zone untrust policy user-role-fw2 match
destination-address 203.0.113.0
user@host# set security policies from-zone trust to-zone untrust policy user-role-fw2 match
application http
user@host# set security policies from-zone trust to-zone untrust policy user-role-fw2 match
source-identity [dev-abc http-mgmt-accessible ftp-accessible]
user@host# set security policies from-zone trust to-zone untrust policy user-role-fw2 then
permit application-services application-firewall rule-set rs1
```

3. If you are done configuring the policy, commit the changes.

```
[edit]
user@host# commit
```

Results

Verify that the AppFW rule set is configured properly. If the output does not display the intended configuration, repeat the instructions in this example to correct the configuration.

```
[edit]
user@host# show security application-firewall
rule-sets rs1 {
    rule r1 {
```

```

        match {
            dynamic-application [junos:FACEBOOK-ACCESS junos:GOOGLE-TALK junos:MEEBO]
        }
        then {
            deny;
        }
    }
    default-rule {
        permit;
    }
}

```

Creating Remaining Security Policies Based on User and Role

Step-by-Step Procedure

The following procedure configures policies for the remaining traffic.

1. Configure a policy to deny traffic with the same source and destination address but with different user and role criteria than specified in the user-role-fw2 policy.

```

[edit]
user@host# set security policies from-zone trust to-zone untrust policy user-role-fw3 match
source-address 192.0.2.0
user@host# set security policies from-zone trust to-zone untrust policy user-role-fw3 match
destination-address 203.0.113.0
user@host# set security policies from-zone trust to-zone untrust policy user-role-fw3 match
application http
user@host# set security policies from-zone trust to-zone untrust policy user-role-fw3 match
source-identity any
user@host# set security policies from-zone trust to-zone untrust policy user-role-fw3 then
deny

```

2. Configure a security policy to permit all other HTTP traffic from zone trust to zone untrust.

```

[edit]
user@host# set security policies from-zone trust to-zone untrust policy user-role-fw4 match
source-address any
user@host# set security policies from-zone trust to-zone untrust policy user-role-fw4 match
destination-address any

```

```

user@host# set security policies from-zone trust to-zone untrust policy user-role-fw4 match
application http
user@host# set security policies from-zone trust to-zone untrust policy user-role-fw4 match
source-identity any
user@host# set security policies from-zone trust to-zone untrust policy user-role-fw4 then
permit

```

Results

Verify the content and sequence of the user role firewall policies. If the output does not display the intended configuration, repeat the instructions in this example to correct the configuration.

```

[edit]
user@host# show security policies
...
from-zone trust to-zone untrust {
  policy user-role-fw1 {
    match {
      source-address any;
      destination-address any;
      application http;
      source-identity unauthenticated-user
    }
    then {
      permit {
        application-services {
          uac-policy {
            captive-portal acs-device;
          }
        }
      }
    }
  }
}
}
}
}
from-zone trust to-zone untrust {
  policy user-role-fw2 {
    match {
      source-address 192.0.2.0;
      destination-address 203.0.113.0;
      application http;
      source-identity [dev-abc http-juniper-accessible ftp-accessible]
    }
  }
}
}

```

```

    }
    then {
        permit {
            application-services {
                application-firewall {
                    rule-set rs1
                }
            }
        }
    }
}

from-zone trust to-zone untrust {
    policy user-role-fw3 {
        match {
            source-address 192.0.2.0;
            destination-address 203.0.113.0;
            application http;
            source-identity any
        }
        then {
            deny
        }
    }
}

from-zone trust to-zone untrust {
    policy user-role-fw4 {
        match {
            source-address any;
            destination-address any;
            application http;
            source-identity any
        }
        then {
            permit
        }
    }
}

```

Configuring Resource Policies Using UAC

When using the user role firewall feature, resource policies are not necessary on the Access Control Service. If, however, resource policies exist, they are pushed to the SRX Series Firewall at connection. You can create policies that use these resource policies by applying the UAC application service in the policy configuration. [Table 28 on page 234](#) shows three firewall policies that use the UAC resource policies exclusively:

Table 28: User Role Firewall Usage

policy-name	src-zone	dest-zone	src-IP	dest-IP	source-identity	application	action	Services
P1	zone1	zone2	any	192.0.2.1	any	http	permit	Content Security
P2	zone1	zone2	any	net2	any	http	permit	IDP
P3	zone1	zone2	any	any	any	any	permit	UAC

The policies for traffic from zone1 to zone2 do not initiate user and role retrieval because any is specified in the source-identity field of every policy. In this example, traffic to the IP address 192.0.2.1 is permitted, but must meet processing requirements for the specified application service, in this case, Content Security. Traffic to net2 is permitted and processed by the IDP processing requirements. Any remaining traffic is permitted and processed by the UAC processing requirements.

The configuration for this firewall policy would be as follows:

```
[edit]
user@host# show security policies
from-zone zone1 to-zone zone2 {
  policy P1 {
    match {
      source-address any;
      destination-address 192.0.2.1;
      source-identity any;
      application http;
    }
    then {
      permit {
```


In this sample configuration, the action fields in P1 and P2 apply any requirements that have been configured for IDP and Content Security respectively. By specifying the uac-policy option, the resource policies pushed to the SRX Series Firewall determine whether the destination is accessible.

A user role firewall can implement both user role policies and the resource policies pushed from the Access Control Service. [Table 29 on page 236](#) shows the policies for three zone pairs.

Table 29: User Role Firewall Usage

policy-name	src-zone	dest-zone	src-IP	dest-IP	source-identity	application	action	Services
P1	zone1	zone2	any	any	unauthenticated-user	any	permit	UAC captive portal
P2	zone1	zone2	any	192.0.2.1	role2	http	permit	IDP
P3	zone1	zone2	any	net2	authenticated-user	http	permit	Content Security
P4	zone1	zone2	any	any	any	any	permit	
P5	zone1	zone3	any	any	any	any	permit	UAC
P6	zone2	zone3	any	any	any	any	permit	UAC

Traffic from zone1 to zone2 is subject to one of four user role policies. The first of these policies uses the UAC captive portal to redirect unauthenticated users to the Access Control Service for authentication.

The access of traffic from zone1 to zone3 and from zone2 to zone3 is controlled by the resource policies pushed from the Access Control Service.

RELATED DOCUMENTATION

[Configuring Security Policies | 95](#)

[Monitoring and Troubleshooting Security Policies | 317](#)

Reordering Security Policies

IN THIS SECTION

- [Understanding Security Policy Ordering | 237](#)
- [Example: Reordering Security Policies | 239](#)

Reordering security policy allows to move the policies around after they have been created. Junos OS offers a tool for verifying that the order of policies in the policy list is valid.

Understanding Security Policy Ordering

Junos OS offers a tool for verifying that the order of policies in the policy list is valid.

It is possible for one policy to eclipse, or *shadow*, another policy. Consider the following examples:

Example 1

```
[edit]
user@host# set security zones security-zone trust interfaces ge-0/0/2 host-inbound-traffic
system-services all
user@host# set security zones security-zone untrust interfaces ge-0/0/1 host-inbound-traffic
system-services all
user@host# set security policies from-zone trust to-zone untrust policy permit-all match source-
address any
user@host# set security policies from-zone trust to-zone untrust match destination-address any
user@host# set security policies from-zone trust to-zone untrust match application any
user@host# set security policies from-zone trust to-zone untrust set then permit
user@host# set security policies from-zone untrust to-zone trust policy deny-all match source-
address any
user@host# set security policies from-zone untrust to-zone trust policy deny-all match
destination-address any
user@host# set security policies from-zone untrust to-zone trust policy deny-all match
application any
user@host# set security policies from-zone untrust to-zone trust policy deny-all then deny
```

Example 2

```
[edit]
user@host# set security zones security-zone trust interfaces ge-0/0/2.0 host-inbound-traffic
system-services all
user@host# set security zones security-zone untrust interfaces ge-0/0/1.0 host-inbound-traffic
system-services all
user@host# set security address-book book1 address mail-untrust 192.0.2.1/24
user@host# set security address-book book1 attach zone untrust
user@host# set security address-book book2 address mail-trust 192.168.1.1/24
user@host# set security address-book book2 attach zone trust
user@host# set security policies from-zone trust to-zone untrust policy permit-mail match source-
address mail-trust
user@host# set security policies from-zone trust to-zone untrust policy permit-mail match
destination-address mail-untrust
user@host# set security policies from-zone trust to-zone untrust policy permit-mail match
application junos-mail
user@host# set security policies from-zone trust to-zone untrust policy permit-mail then permit
```

In examples 1 and 2, where policy permit-mail is configured after policy permit-all from zone trust to zone untrust. All traffic coming from zone untrust matches the first policy permit-all and is allowed by default. No traffic matches policy permit-mail.

Because Junos OS performs a policy lookup starting from the top of the list, when it finds a match for traffic received, it does not look any lower in the policy list. To correct the previous example, you can simply reverse the order of the policies, putting the more specific one first:

```
[edit]
user@host# insert security policies from-zone trust to-zone untrust policy permit-mail before policy permit-
all
```

In cases where there are dozens or hundreds of policies, the eclipsing of one policy by another might not be so easy to detect. To check if policies are being shadowed, enter any of the following commands:

```
[edit]
user@host# run show security shadow-policies logical-system lsys-name from-zone from-zone-name to-zone to-zone-name
```

```
[edit]
user@host# run show security shadow-policies logical-system lsys-name global
```

This command reports the shadowing and shadowed policies. It is then the administrator's responsibility to correct the situation.

NOTE: The concept of policy *shadowing* refers to the situation where a policy higher in the policy list always takes effect before a subsequent policy. Because the policy lookup always uses the first policy it finds that matches the five-part tuple of the source and destination zone, source and destination address, and application type, if another policy applies to the same tuple (or a subset of the tuple), the policy lookup uses the first policy in the list and never reaches the second one.

SEE ALSO

[Security Policies Configuration Overview | 101](#)

[Example: Configuring a Security Policy to Permit or Deny All Traffic | 106](#)

[Example: Configuring a Security Policy to Permit or Deny Selected Traffic | 111](#)

Example: Reordering Security Policies

IN THIS SECTION

● [Requirements | 240](#)

● [Overview | 240](#)

●	Configuration 240
●	Verification 241

This example shows how to move policies around after they have been created.

Requirements

Before you begin:

- Create zones. See ["Example: Creating Security Zones" on page 9](#).
- Configure the address book and create addresses for use in the policy. See ["Example: Configuring Address Books and Address Sets" on page 37](#).

Overview

To reorder policies to correct shadowing, you can simply reverse the order of the policies, putting the more specific one first.

Configuration

IN THIS SECTION

●	Procedure 240
---	-----------------

Procedure

Step-by-Step Procedure

To reorder existing policies:

1. Reorder two existing policies by entering the following command:

```
[edit]
user@host# insert security policies from-zone trust to-zone untrust policy permit-mail before
policy permit-all
```

2. If you are done configuring the device, commit the configuration.

```
[edit]  
user@host# commit
```

Verification

To verify the configuration is working properly, enter the `show security policies` command.

RELATED DOCUMENTATION

| [Security Policies Overview](#) | 2

Scheduling Security Policies

IN THIS SECTION

- [Security Policy Schedulers Overview](#) | 241
- [Example: Configuring Schedulers for a Daily Schedule Excluding One Day](#) | 242
- [Verifying Scheduled Policies](#) | 247

Scheduler is a security feature that allows a policy to be activated for a specified duration. You can define schedulers for a single (nonrecurrent) or recurrent time slot within which a policy is active. You can create schedulers irrespective of a policy, meaning that a scheduler cannot be used by any policies.

Security Policy Schedulers Overview

Schedulers are powerful features that allow a policy to be activated for a specified duration. You can define schedulers for a single (nonrecurrent) or recurrent time slot within which a policy is active. You can create schedulers irrespective of a policy, meaning that a scheduler cannot be used by any policies. However, if you want a policy to be active within a scheduled time, then you must first create a scheduler.

When a scheduler times out, the associated policy is deactivated. All sessions associated with the policy are subsequently timed out only if policy-rematch is used

If a policy contains a reference to a scheduler, the schedule determines when the policy is active, that is, when it can be used as a possible match for traffic. Schedulers allow you to restrict access to a resource for a period of time or remove a restriction.

The following guidelines apply to schedulers:

- A scheduler can have multiple policies associated with it; however, a policy cannot be associated with multiple schedulers.
- A policy is active during the time when the scheduler it refers to is also active.
- When a scheduler is off, the policy is unavailable for policy lookup.
- A scheduler can be configured as one of the following:
 - Scheduler can be active for a single time slot, as specified by a start date and time and a stop date and time.
 - Scheduler can be active forever (recurrent), but as specified by the daily schedule. The schedule on a specific day (time slot) takes priority over the daily schedule.
 - Scheduler can be active within a time slot as specified by the weekday schedule.
 - Scheduler can have a combination of two time slots (daily and timeslot).

Example: Configuring Schedulers for a Daily Schedule Excluding One Day

IN THIS SECTION

- [Requirements | 243](#)
- [Overview | 243](#)
- [Configuration | 243](#)
- [Verification | 246](#)

This example shows how to configure schedulers for packet match checks every day, from 8:00 AM to 5:00 PM, except Sunday.

Requirements

Before you begin:

- Understand security policies schedulers. See ["Security Policies Overview" on page 2](#).
- Configure security zones before applying this configuration.

Overview

Schedulers are powerful features that allow a policy to be activated for a specified duration. You can define schedulers for a single (nonrecurrent) or recurrent time slot within which a policy is active. If you want a policy to be active within a scheduled time, then you must first create a scheduler.

To configure a scheduler, you enter a meaningful name and a start and stop time for the scheduler. You can also attach comments.

In this example, you:

- Specify the scheduler, sch1, that allows a policy, which refers to it, to be used for packet match checks every day, from 8:00 AM to 5:00 PM, except Sunday.

NOTE: Use the 24-hour format (hh:mm) to specify the hours and minutes for the daily time.

- Create a policy, abc, and specify the match conditions and action to be taken on traffic that matches the specified conditions. and bind the schedulers to the policy to allow access during the specified days.

Configuration

IN THIS SECTION

- [Procedure | 244](#)

Procedure

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, and then copy and paste the commands into the CLI at the [edit] hierarchy level.

```
set schedulers scheduler sch1 daily start-time 08:00 stop-time 17:00
set schedulers scheduler sch1 sunday exclude
set security policies from-zone green to-zone red policy abc match source-address any
set security policies from-zone green to-zone red policy abc match destination-address any
set security policies from-zone green to-zone red policy abc match application any
set security policies from-zone green to-zone red policy abc then permit
set security policies from-zone green to-zone red policy abc scheduler-name sch1
set security policies default-policy permit-all
```

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode* in the CLI User Guide.

To configure a scheduler:

1. Set a scheduler.

```
[edit schedulers ]
user@host# set scheduler sch1 daily start-time 08:00 stop-time 17:00
user@host# set scheduler sch1 sunday exclude
```

2. Specify the match conditions for the policy.

```
[edit security policies from-zone green to-zone red policy abc]
user@host# set match source-address any destination-address any application any
```


3. Specify the action.

```
[edit security policies from-zone green to-zone red policy abc]
user@host# set then permit
```

4. Associate the scheduler to the policy.

```
[edit security policies from-zone green to-zone red policy abc ]
user@host# set scheduler-name sch1
```

Results

From configuration mode, confirm your configuration by entering the `show schedulers` command. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```
[edit]
[user@host]show schedulers
    scheduler sch1 {
        daily {
            start-time 08:00 stop-time 17:00;
            sunday exclude;
        }
    }
[edit]
[user@host]show security policies
from-zone green to-zone red {
    policy abc {
        match {
            source-address any;
            destination-address any;
            application any;
        }
        then {
            permit;
        }
        scheduler-name sch1;
    }
}
default-policy {
```

```
    permit-all;  
}
```

If you are done configuring the device, enter `commit` from configuration mode.

Verification

IN THIS SECTION

- [Verifying Schedulers are Active | 246](#)
- [Verifying Policies | 246](#)

To confirm that the configuration is working properly, perform these tasks:

Verifying Schedulers are Active

Purpose

Verify if schedulers are enabled or not.

Action

From operational mode, enter the `show schedulers` command.

Verifying Policies

Purpose

Verify if the policies are working.

Action

From operational mode, enter the `show security policies` command.

Verifying Scheduled Policies

IN THIS SECTION

- Purpose | 247
- Action | 247
- Meaning | 248

Purpose

Display information about scheduled security policies.

Action

Use the `show schedulers` CLI command to display information about schedulers configured on the system. If a specific scheduler is identified, detailed information is displayed for that scheduler only.

```
user@host# show schedulers
scheduler sche1 {
    /* This is sched1 */
    start-date 2006-11-02.12:12 stop-date 2007-11-02.12:11;
}
scheduler sche2 {
    daily {
        all-day;
    }
    sunday {
        start-time 16:00 stop-time 17:00;
    }
    friday {
        exclude;
    }
}
scheduler sche3 {
    start-date 2006-11-02.12:12 stop-date 2007-11-02.12:11;
    daily {
        start-time 10:00 stop-time 17:00
```

```

    }
    sunday {
        start-time 12:00 stop-time 14:00;
        start-time 16:00 stop-time 17:00;
    }
    monday {
        all-day;
    }
    friday {
        exclude;
    }
}

```

Meaning

The output displays information about schedulers configured on the system. Verify the following information:

- Daily (recurrent) and one-time only (nonrecurrent) schedulers are configured correctly.
- Schedulers are active if policies are associated.

RELATED DOCUMENTATION

[Configuring Security Policies](#) | 95

Threat Profiling Support in Security Policy

SUMMARY

Read this topic to understand SRX Series Firewall support for threat feeds in the security policies.

IN THIS SECTION

- [Support for Threat Feeds in Security Policies](#) | 249

Support for Threat Feeds in Security Policies

SRX Series Firewalls can generate, propagate, and consume threat feeds based on their own advanced detection and policy-match events.

Juniper ATP Cloud service consolidates the generated feeds from SRX Series Firewall and shares the duplicated results back to the security device. The security device then uses the feeds to perform actions against the designated traffic. You can enable the security device to use the feeds by configuring security policies with the feeds as a matching criteria. When traffic matches policy conditions, the device applies policy actions.

SRX Series Firewalls support following types of threat feeds in the security policies:

- source and destination addresses
- user source identity (user name)

Workflow in using the threat feeds in security policies:

1. In a security policy, you can add the source address/destination address,/source identity (user name) as a feed for the policy action (deny, reject, and permit rules).
2. Policy module adds the username to the traffic's IP address into the feed.
3. Once the feed is created, Juniper ATP cloud consolidates feeds from all SRX Series Firewalls in your enterprise and sends result to SRX Series Firewall.
4. When you create another security policy, you can add the feed as match criteria.

See [Adaptive Threat Profiling Overview](#) for more information on configuring and deploying security policies with feeds.

Configuring Security Policies for a VRF Routing Instance

IN THIS SECTION

- [Overview | 250](#)
- [Understanding Security Policy Rules | 252](#)

- [Example: Configuring a Security Policy to Permit or Deny VRF-Based Traffic from MPLS Network to an IP Network | 253](#)
- [Example: Configuring a Security Policy to Permit VRF-Based Traffic from an IP Network to an MPLS Network | 259](#)
- [Example: Configuring a Security Policy to Permit VRF-Based Traffic from an MPLS Network to an MPLS Network over GRE without NAT | 265](#)
- [Example: Configuring Security Policies Using VRF Routing Instances in an MPLS Network | 271](#)

Overview

IN THIS SECTION

- [Controlling Traffic in SD-WAN Architecture | 250](#)

A security policy is a set of statements that controls traffic from a specified source to a specified destination using a specified service. A policy permits, denies, or tunnels specified types of traffic unidirectionally between two points. Security policies enforce a set of rules for transit traffic, identifying which traffic can pass through the firewall and the actions taken on the traffic as it passes through the firewall. Actions for traffic matching the specified criteria include permit and deny.

When an SRX Series Firewall receives a packet that matches the specifications, it performs the action specified in the policy.

Controlling Traffic in SD-WAN Architecture

In an SD-WAN, the SRX Series Firewall can be configured in a hub and spoke location. You can permit or deny virtual routing and forwarding (VRF) based traffic that enters the device from overlay tunnels by applying firewall policies. You can configure the SRX Series Firewall to permit or deny traffic that is sent to a VRF instance. Configuring the device at the hub location enables you to control all traffic at one location, and provide access to specific network services by applying firewall policies.

Junos OS Release 19.1R1 supports MPLS-based SDWAN deployment on SRX1500, SRX4100, SRX4200, SRX4600 devices.

Starting in Junos OS Release 22.2R1, we support MPLS-based SDWAN deployment for SRX5400, SRX5600, and SRX5800 devices.

Each security policy consists of:

- A unique name for the policy.
- A from-zone and a to-zone, for example: `user@host# set security policies from-zone GRE_Zone-GE_Zone to-zone GRE_Zone.`
- A set of match criteria defining the conditions that must be satisfied to apply the policy rule. The match criteria are based on a source IP address, destination IP address, and applications. The user identity firewall provides greater granularity by including an additional tuple, such as source-identity, as part of the policy statement.
- A set of actions to be performed in case of a match—permit or deny.
- A set of source VRF group.
- A set of destination VRF group.

NOTE: The configuration options for the source and destination VRF instances are optional. You can configure either the source VRF or a destination VRF, but we recommend that you do not configure both source VRF and destination VRF. The main reason for configuring the source VRF or destination VRF is to differentiate different MPLS labels going through a shared physical network interface.

Table 30 on page 251 lists when to configure the source VRF and destination VRF.

Table 30: Recommendations for Configuring VRF Options

Network Type from Source to Destination	Recommended to Configure Source VRF	Recommended to Configure Destination VRF	VRF Policy Differentiated By
IP network to IP network	No	No	Zones
IP network to MPLS network	No	Yes	Destination VRF
MPLS network to IP network	Yes	No	Source VRF
MPLS network to MPLS network without destination NAT	Yes	No	Source VRF

Table 30: Recommendations for Configuring VRF Options *(Continued)*

Network Type from Source to Destination	Recommended to Configure Source VRF	Recommended to Configure Destination VRF	VRF Policy Differentiated By
MPLS network to MPLS network with destination NAT	Yes	Yes	Source VRF and Destination VRF

Understanding Security Policy Rules

IN THIS SECTION

- | [252](#)

A security policy applies security rules to the transit traffic within a context (from-zone to to-zone). Each policy is uniquely identified by its name. The traffic is classified by matching its source and destination zones, the source and destination addresses, the application, the source VRF, and the destination VRF that the traffic carries in its protocol headers with the policy database in the data plane.

Each policy is associated with the following characteristics:

- A source zone
- A destination zone
- One or many source address names or address set names
- One or many destination address names or address set names
- One or many application names or application set names
- One or many source VRF instances, for example, the VRF routing instance associated with an incoming packet
- One or many destination VRF instances in which the MPLS next hop or destination address route is located

These characteristics are called the match criteria. Each policy also has actions associated with it: permit, deny, and reject. You have to specify the match condition arguments when you configure a policy, source address, destination address, application name, source VRF, and destination VRF.

You can configure either source VRF or destination VRF, but not recommended to configure both source VRF and destination VRF. The main reason for configuring source VRF and destination VR is to differentiate different MPLS labels going through a shared physical network interface. If the source VRF and destination VRF are not configured, then the device determines the source and destination VRF as any.

Example: Configuring a Security Policy to Permit or Deny VRF-Based Traffic from MPLS Network to an IP Network

IN THIS SECTION

- [Requirements | 253](#)
- [Overview | 253](#)
- [Configuration | 254](#)

This example shows how to configure a security policy to permit traffic and deny traffic using the source VRF.

Requirements

- Understand how to create a security zone. See ["Example: Creating Security Zones" on page 9](#).
- Supported SRX Series Firewall with Junos OS Release 15.1X49-D160 or later. This configuration example is tested for Junos OS Release 15.1X49-D160.
- Configure network interfaces on the device. See [Interfaces User Guide for Security Devices](#).

Overview

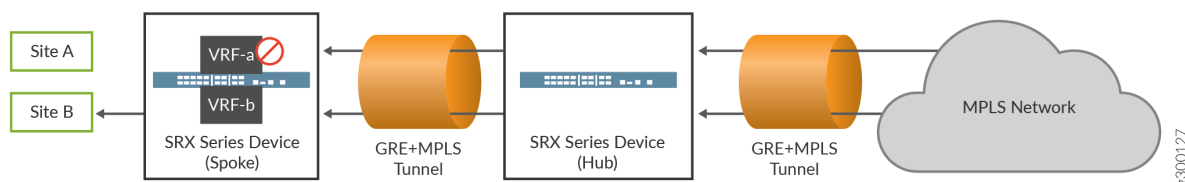
In Junos OS, security policies enforce rules for transit traffic, in terms of what traffic can pass through the device and the actions that need to take place on the traffic as it passes through the device. In [Figure 12 on page 254](#), an SRX Series Firewall is deployed in an SD-WAN to control traffic using the source VRF. Traffic from the MPLS network is sent to site A and site B of the IP network. As per the network requirement, site A traffic should be denied, and only site B traffic should be permitted.

This configuration example shows how to:

- Deny traffic to VRF-a (from GRE_Zone-GE_Zone to GRE_Zone)
- Permit traffic to VRF-b (from GRE_Zone-GE_Zone to GRE_Zone)

In this example, the source VRF is configured. We recommend that you configure the source VRF when the destination network points to the MPLS network.

Figure 12: Permitting or Denying VRF-Based Traffic from MPLS Network to an IP Network



Configuration

IN THIS SECTION

- [Verification](#) | 258

Procedure

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the [edit] hierarchy level, and then enter `commit` from configuration mode.

```
set routing-instances VRF-a instance-type vrf
set routing-instances VRF-a route-distinguisher 10:200
set routing-instances VRF-a vrf-target target:100:100
set routing-instances VRF-a vrf-table-label
set routing-instances VRF-b instance-type vrf
set routing-instances VRF-b route-distinguisher 20:200
set routing-instances VRF-b vrf-target target:200:100
```

```

set routing-instances VRF-b vrf-table-label
set security policies from-zone GRE_Zone-GE_Zone to-zone GRE_Zone policy vrf-a_policy match
source-address any
set security policies from-zone GRE_Zone-GE_Zone to-zone GRE_Zone policy vrf-a_policy match
destination-address any
set security policies from-zone GRE_Zone-GE_Zone to-zone GRE_Zone policy vrf-a_policy match
application any
set security policies from-zone GRE_Zone-GE_Zone to-zone GRE_Zone policy vrf-a_policy match
source-l3vpn-vrf-group VRF-a
set security policies from-zone GRE_Zone-GE_Zone to-zone GRE_Zone policy vrf-a_policy then deny
set security policies from-zone GRE_Zone-GE_Zone to-zone GRE_Zone policy vrf-b_policy match
source-address any
set security policies from-zone GRE_Zone-GE_Zone to-zone GRE_Zone policy vrf-b_policy match
destination-address any
set security policies from-zone GRE_Zone-GE_Zone to-zone GRE_Zone policy vrf-b_policy match
application any
set security policies from-zone GRE_Zone-GE_Zone to-zone GRE_Zone policy vrf-b_policy match
source-l3vpn-vrf-group VRF-b
set security policies from-zone GRE_Zone-GE_Zone to-zone GRE_Zone policy vrf-b_policy then permit

```

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For information about navigating the CLI, see *Using the CLI Editor in Configuration Mode* in the [Junos OS CLI User Guide](#).

1. Layer 3 VPNs require a VRF table for distributing routes within the networks. Create a VRF instance and specify the value **vrf**.

```

[edit routing-instances]
user@host# set VRF-a instance-type vrf
user@host# set VRF-b instance-type vrf

```

2. Assign a route distinguisher to the routing instance.

```

[edit routing-instances]
user@host# set VRF-a route-distinguisher 10:200
user@host# set VRF-b route-distinguisher 20:200

```

3. Create a community policy to import or export all routes.

```
[edit routing-instances]
user@host# set VRF-a vrf-target target:100:100
user@host# set VRF-b vrf-target target:200:100
```

4. Assign a single VPN label for all the routes in the VRF.

```
[edit routing-instances]
user@host# set VRF-a vrf-table-label
user@host# set VRF-b vrf-table-label
```

5. Create a security policy to deny VRF-a traffic.

```
[edit security policies from-zone GRE_Zone-GE_Zone to-zone GRE_Zone]
user@host# set policy vrf-a_policy match source-address any
user@host# set policy vrf-a_policy match destination-address any
user@host# set policy vrf-a_policy match application any
user@host# set policy vrf-a_policy match source-l3vpn-vrf-group VRF-a
user@host# set policy vrf-a_policy then deny
```

6. Create a security policy to permit VRF-b traffic.

```
[edit security policies from-zone GRE_Zone-GE_Zone to-zone GRE_Zone]
user@host# set policy vrf-b_policy match source-address any
user@host# set policy vrf-b_policy match destination-address any
user@host# set policy vrf-b_policy match application any
user@host# set policy vrf-b_policy match source-l3vpn-vrf-group VRF-b
user@host# set policy vrf-b_policy then permit
```

NOTE: If no destination VRF group is configured then the device considers the traffic passes from VRF-a to any-vrf.

Results

From configuration mode, confirm your configuration by entering the `show security policies` and `show routing-instances` commands. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```
[edit]
user@host# show security policies
from-zone GRE_Zone-GE_Zone to-zone GRE_Zone {
  policy vrf-a_policy {
    match {
      source-address any;
      destination-address any;
      application any;
      source-l3vpn-vrf-group VRF-a;
    }
    then {
      deny;
    }
  }
  policy vrf-b_policy {
    match {
      source-address any;
      destination-address any;
      application any;
      source-l3vpn-vrf-group VRF-b;
    }
    then {
      permit;
    }
  }
}
```

```
[edit]
user@host# show routing-instances
VRF-a {
  instance-type vrf;
  route-distinguisher 10:200;
  vrf-target target:100:100;
  vrf-table-label;
}
VRF-b {
```

```

        instance-type vrf;
        route-distinguisher 20:200;
        vrf-target target:200:100;
        vrf-table-label;
    }
}

```

If you are done configuring the device, enter `commit` from configuration mode.

Verification

IN THIS SECTION

- [Verifying Policy Configuration | 258](#)

Verifying Policy Configuration

Purpose

Verify information about security policies.

Action

From operational mode, enter the `show security policies` command to display a summary of all the security policies configured on the device.

```

user@root> show security policies
Default policy: permit-all
From zone: GRE_Zone-GE_Zone, To zone: GRE_Zone
Policy: vrf-a_policy, State: enabled, Index: 4, Scope Policy: 0, Sequence number: 1
  Source vrf: VRF-a
  destination vrf: any
  Source addresses: any
  Destination addresses: any
  Applications: any
  Action: deny
Policy: vrf-b_policy, State: enabled, Index: 5, Scope Policy: 0, Sequence number: 2
  Source vrf: VRF-b

```

```

destination vrf: any
Source addresses: any
Destination addresses: any
Applications: any
Action: permit

```

Example: Configuring a Security Policy to Permit VRF-Based Traffic from an IP Network to an MPLS Network

IN THIS SECTION

- [Requirements | 259](#)
- [Overview | 259](#)
- [Configuration | 260](#)

This example shows how to configure a security policy to permit traffic using the destination VRF.

Requirements

- Understand how to create a security zone. See ["Example: Creating Security Zones" on page 9](#).
- Supported SRX Series Firewall with Junos OS Release 15.1X49-D160 or later. This configuration example is tested for Junos OS Release 15.1X49-D160.
- Configure network interfaces on the device. See the [Interfaces User Guide for Security Devices](#).

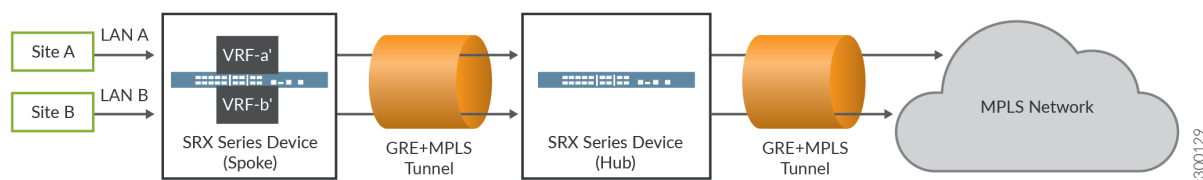
Overview

In Junos OS, security policies enforce rules for transit traffic, in terms of what traffic can pass through the device and the actions that need to take place on the traffic as it passes through the device.

In this example, an SRX Series Firewall is deployed in an SD-WAN architecture to control traffic using the destination VRF. You need to configure policies to control the traffic. The default policy does not support VRF options. Traffic from the IP network, that is site A and site B, is sent to the MPLS network. By configuring the policies, you can permit both the traffic from site A and site B to the MPLS network.

In [Figure 13 on page 260](#), the source VRF is not configured as the LAN interface does not belong to an MPLS network. We recommend that you configure the destination VRF when the destination network points to the MPLS network.

Figure 13: Permitting VRF-Based Traffic from an IP Network to an MPLS Network



Configuration

IN THIS SECTION

- [Verification | 264](#)

Procedure

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the [edit] hierarchy level, and then enter `commit` from configuration mode.

```
set routing-instances VRF-a' instance-type vrf
set routing-instances VRF-a' route-distinguisher 10:200
set routing-instances VRF-a' vrf-target target:100:100
set routing-instances VRF-a' vrf-table-label
set routing-instances VRF-b' instance-type vrf
set routing-instances VRF-b' route-distinguisher 20:200
set routing-instances VRF-b' vrf-target target:200:100
set routing-instances VRF-b' vrf-table-label
set security policies from-zone LAN-a_Zone to-zone GRE_Zone policy vrf-a_policy match source-address any
set security policies from-zone LAN-a_Zone to-zone GRE_Zone policy vrf-a_policy match
```



```

destination-address any
set security policies from-zone LAN-a_Zone to-zone GRE_Zone policy vrf-a_policy match
application any
set security policies from-zone LAN-a_Zone to-zone GRE_Zone policy vrf-a_policy match
destination-l3vpn-vrf-group VRF-a'
set security policies from-zone LAN-a_Zone to-zone GRE_Zone policy vrf-a_policy then permit
set security policies from-zone LAN-b_Zone to-zone GRE_Zone policy vrf-b_policy match source-
address any
set security policies from-zone LAN-b_Zone to-zone GRE_Zone policy vrf-b_policy match
destination-address any
set security policies from-zone LAN-b_Zone to-zone GRE_Zone policy vrf-b_policy match
application any
set security policies from-zone LAN-b_Zone to-zone GRE_Zone policy vrf-b_policy match
destination-l3vpn-vrf-group VRF-b'
set security policies from-zone LAN-b_Zone to-zone GRE_Zone policy vrf-b_policy then permit

```

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For information about navigating the CLI, see *Using the CLI Editor in Configuration Mode* in the [Junos OS CLI User Guide](#).

To configure a policy to permit traffic from the IP network to the MPLS network using the destination VRF:

1. Layer 3 VPNs require a VRF table for distributing routes within the networks. Create a VRF instance and specify the value **vrf**.

```

[edit routing-instances]
user@host# set VRF-a' instance-type vrf
user@host# set VRF-b' instance-type vrf

```

2. Assign a route distinguisher to the routing instance.

```

[edit routing-instances]
user@host# set VRF-a' route-distinguisher 10:200
user@host# set VRF-b' route-distinguisher 20:200

```

3. Create a community policy to import or export all routes.

```
[edit routing-instances]
user@host# set VRF-a' vrf-target target:100:100
user@host# set VRF-b' vrf-target target:200:100
```

4. Assign a single VPN label for all the routes in the VRF.

```
[edit routing-instances]
user@host# set VRF-a' vrf-table-label
user@host# set VRF-b' vrf-table-label
```

5. Create a security policy to permit VRF-a' traffic from the IP network.

```
[edit security policies from-zone LAN-a_Zone to-zone GRE_Zone]
user@host# set policy vrf-a_policy match source-address any
user@host# set policy vrf-a_policy match destination-address any
user@host# set policy vrf-a_policy match application any
user@host# set policy vrf-a_policy match destination-l3vpn-vrf-group VRF-a'
user@host# set policy vrf-a_policy then permit
```

6. Create a security policy to permit VRF-b' traffic from the IP network.

```
[edit security policies from-zone LAN-b_Zone to-zone GRE_Zone]
user@host# set policy vrf-b_policy match source-address any
user@host# set policy vrf-b_policy match destination-address any
user@host# set policy vrf-b_policy match application any
user@host# set policy vrf-b_policy match destination-l3vpn-vrf-group VRF-b'
user@host# set policy vrf-b_policy then permit
```

Results

From configuration mode, confirm your configuration by entering the `show security policies` and `show routing-instances` commands. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```
[edit]
user@host# show security policies
  from-zone LAN-a_Zone to-zone GRE_Zone {
    policy vrf-a_policy {
      match {
        source-address any;
        destination-address any;
        application any;
        destination-l3vpn-vrf-group "VRF-a";
      }
      then {
        permit;
      }
    }
  }
  from-zone LAN-b_Zone to-zone GRE_Zone {
    policy vrf-b_policy {
      match {
        source-address any;
        destination-address any;
        application any;
        destination-l3vpn-vrf-group "VRF-b";
      }
      then {
        permit;
      }
    }
  }
}
```

```
[edit]
user@host# show routing-instances
  VRF-a' {
    instance-type vrf;
    route-distinguisher 10:200;
    vrf-target target:100:100;
```

```

        vrf-table-label;
    }
    VRF-b' {
        instance-type vrf;
        route-distinguisher 20:200;
        vrf-target target:200:100;
        vrf-table-label;
    }

```

If you are done configuring the device, enter `commit` from configuration mode.

Verification

IN THIS SECTION

- [Verifying Policy Configuration | 264](#)

Verifying Policy Configuration

Purpose

Verify that the security policy permits VRF-based traffic from the IP network to the MPLS network.

Action

From operational mode, enter the `show security policies` command to display a summary of all the security policies configured on the device.

```

user@host> show security policies
From zone: LAN-a_Zone, To zone: GRE_Zone
Policy: vrf-a_policy, State: enabled, Index: 4, Scope Policy: 0, Sequence number: 1
  Source vrf: any
  destination vrf: VRF-a'
  Source addresses: any
  Destination addresses: any
  Applications: any
  Action: permit
From zone: LAN-b_Zone, To zone: GRE_Zone

```

```

Policy: vrf-b_policy, State: enabled, Index: 5, Scope Policy: 0, Sequence number: 1
  Source vrf: any
  destination vrf: VRF-b'
  Source addresses: any
  Destination addresses: any
  Applications: any
  Action: permit

```

Example: Configuring a Security Policy to Permit VRF-Based Traffic from an MPLS Network to an MPLS Network over GRE without NAT

IN THIS SECTION

- [Requirements | 265](#)
- [Overview | 265](#)
- [Configuration | 266](#)

This example shows how to configure a security policy to permit traffic using the source VRF.

Requirements

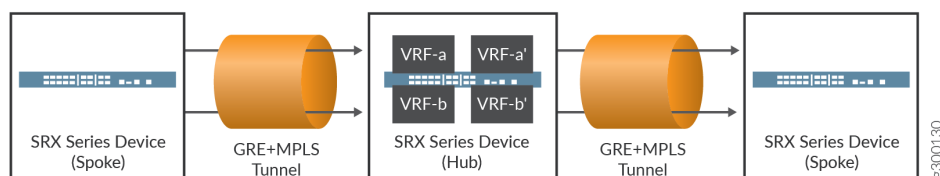
- Understand how to create a security zone. See ["Example: Creating Security Zones" on page 9](#).
- Supported SRX Series Firewall with Junos OS Release 15.1X49-D160 or later. This configuration example is tested for Junos OS Release 15.1X49-D160.
- Configure network interfaces on the device. See the [Interfaces User Guide for Security Devices](#).

Overview

In Junos OS, security policies enforce rules for transit traffic, in terms of what traffic can pass through the device and the actions that need to take place on the traffic as it passes through the device. In [Figure 14 on page 266](#), an SRX Series Firewall is deployed in an SD-WAN architecture to control traffic using the source VRF. You need to configure policies to control the traffic. You can permit traffic from an MPLS network to another MPLS network by configuring policies.

We recommend that you configure both the source VRF and the destination VRF when the source and destination are from the MPLS network.

Figure 14: Permitting VRF-Based Traffic from an MPLS Network to an MPLS Network over GRE without NAT



Configuration

IN THIS SECTION

- [Verification | 270](#)

Procedure

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the [edit] hierarchy level, and then enter `commit` from configuration mode.

```
set routing-instances VRF-a instance-type vrf
set routing-instances VRF-a route-distinguisher 10:200
set routing-instances VRF-a vrf-target target:100:100
set routing-instances VRF-a vrf-table-label
set routing-instances VRF-b instance-type vrf
set routing-instances VRF-b route-distinguisher 20:200
set routing-instances VRF-b vrf-target target:200:100
set routing-instances VRF-b vrf-table-label
set routing-instances VRF-a' instance-type vrf
set routing-instances VRF-a' route-distinguisher 30:200
set routing-instances VRF-a' vrf-target target:300:100
set routing-instances VRF-a' vrf-table-label
set routing-instances VRF-b' instance-type vrf
set routing-instances VRF-b' route-distinguisher 40:200
set routing-instances VRF-b' vrf-target target:400:100
```

```

set routing-instances VRF-b' vrf-table-label
set security policies from-zone GRE-1_Zone to-zone GRE-2_Zone policy vrf-a_policy match source-
address any
set security policies from-zone GRE-1_Zone to-zone GRE-2_Zone policy vrf-a_policy match
destination-address any
set security policies from-zone GRE-1_Zone to-zone GRE-2_Zone policy vrf-a_policy match
application any
set security policies from-zone GRE-1_Zone to-zone GRE-2_Zone policy vrf-a_policy match source-
l3vpn-vrf-group VRF-a
set security policies from-zone GRE-1_Zone to-zone GRE-2_Zone policy vrf-a_policy match
destination-l3vpn-vrf-group VRF-a'
set security policies from-zone GRE-1_Zone to-zone GRE-2_Zone policy vrf-a_policy then permit
set security policies from-zone GRE-1_Zone to-zone GRE-2_Zone policy vrf-b_policy match source-
address any
set security policies from-zone GRE-1_Zone to-zone GRE-2_Zone policy vrf-b_policy match
destination-address any
set security policies from-zone GRE-1_Zone to-zone GRE-2_Zone policy vrf-b_policy match
application any
set security policies from-zone GRE-1_Zone to-zone GRE-2_Zone policy vrf-b_policy match source-
l3vpn-vrf-group VRF-b
set security policies from-zone GRE-1_Zone to-zone GRE-2_Zone policy vrf-b_policy match
destination-l3vpn-vrf-group VRF-b'
set security policies from-zone GRE-1_Zone to-zone GRE-2_Zone policy vrf-b_policy then permit

```

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For information about navigating the CLI, see *Using the CLI Editor in Configuration Mode* in the [Junos OS CLI User Guide](#).

To configure a policy to permit traffic from an MPLS network to an MPLS network using source VRF:

1. Layer 3 VPNs require a VRF table for distributing routes within the networks. Create a VRF instance and specify the value **vrf**.

```

[edit routing-instances]
user@host# set VRF-a instance-type vrf
user@host# set VRF-b instance-type vrf
user@host# set VRF-a' instance-type vrf
user@host# set VRF-b' instance-type vrf

```

2. Assign a route distinguisher to the routing instance.

```
[edit routing-instances]
user@host# set VRF-a route-distinguisher 10:200
user@host# set VRF-b route-distinguisher 20:200
user@host# set VRF-a' route-distinguisher 30:200
user@host# set VRF-b' route-distinguisher 40:200
```

3. Create a community policy to import or export all routes.

```
[edit routing-instances]
user@host# set VRF-a vrf-target target:100:100
user@host# set VRF-b vrf-target target:200:100
user@host# set VRF-a' vrf-target target:300:100
user@host# set VRF-b' vrf-target target:400:100
```

4. Assign a single VPN label for all the routes in the VRF.

```
[edit routing-instances]
user@host# set VRF-a vrf-table-label
user@host# set VRF-a' vrf-table-label
user@host# set VRF-b vrf-table-label
user@host# set VRF-b' vrf-table-label
```

5. Create a security policy to permit VRF-a traffic from the MPLS network.

```
[edit security policies from-zone GRE-1_Zone to-zone GRE-2_Zone]
user@host# set policy vrf-a_policy match source-address any
user@host# set policy vrf-a_policy match destination-address any
user@host# set policy vrf-a_policy match application any
user@host# set policy vrf-a_policy match source-l3vpn-vrf-group VRF-a
user@host# set policy vrf-a_policy match destination-l3vpn-vrf-group VRF-a'
user@host# set policy vrf-a_policy then permit
```

6. Create a security policy to permit VRF-b traffic from the MPLS network.

```
[edit security policies from-zone GRE-1_Zone to-zone GRE-2_Zone]
user@host# set policy vrf-b_policy match source-address any
```



```

user@host# set policy vrf-b_policy match destination-address any
user@host# set policy vrf-b_policy match application any
user@host# set policy vrf-b_policy match source-l3vpn-vrf-group VRF-b
user@host# set policy vrf-b_policy match destination-l3vpn-vrf-group VRF-b'
user@host# set policy vrf-b_policy then permit

```

Results

From configuration mode, confirm your configuration by entering the `show security policies` and `show routing-instances` commands. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```

[edit]
user@host# show security policies
  from-zone GRE-1_Zone to-zone GRE-2_Zone {
    policy vrf-a_policy {
      match {
        source-address any;
        destination-address any;
        application any;
        source-l3vpn-vrf-group VRF-a;
        destination-l3vpn-vrf-group "VRF-a'";
      }
      then {
        permit;
      }
    }
    policy vrf-b_policy {
      match {
        source-address any;
        destination-address any;
        application any;
        source-l3vpn-vrf-grou VRF-b;
        destination-l3vpn-vrf-group "VRF-b'";
      }
      then {
        permit;
      }
    }
  }

```

```
    }
}
```

```
[edit]
user@host# show routing-instances
  VRF-a {
    instance-type vrf;
    route-distinguisher 10:200;
    vrf-target target:100:100;
    vrf-table-label;
  }
  VRF-b {
    instance-type vrf;
    route-distinguisher 20:200;
    vrf-target target:200:100;
    vrf-table-label;
  }
  VRF-a' {
    instance-type vrf;
    route-distinguisher 30:200;
    vrf-target target:300:100;
    vrf-table-label;
  }
  VRF-b' {
    instance-type vrf;
    route-distinguisher 40:200;
    vrf-target target:400:100;
    vrf-table-label;
  }
}
```

If you are done configuring the device, enter `commit` from configuration mode.

Verification

IN THIS SECTION

- [Verifying Policy Configuration | 271](#)

Verifying Policy Configuration

Purpose

Verify that the security policy permits VRF based traffic from the IP network to the MPLS network.

Action

From operational mode, enter the `show security policies` command to display a summary of all the security policies configured on the device.

```
user@host> show security policies
From zone: GRE-1_Zone, To zone: GRE-2_Zone
Policy: vrf-a_policy, State: enabled, Index: 7, Scope Policy: 0, Sequence number: 1
  Source vrf: VRF-a
  destination vrf: VRF-a'
  Source addresses: any
  Destination addresses: any
  Applications: any
  Action: permit
Policy: vrf-b_policy, State: enabled, Index: 8, Scope Policy: 0, Sequence number: 2
  Source vrf: VRF-b
  destination vrf: VRF-b'
  Source addresses: any
  Destination addresses: any
  Applications: any
  Action: permit
```

Example: Configuring Security Policies Using VRF Routing Instances in an MPLS Network

IN THIS SECTION

- [Requirements | 272](#)
- [Overview | 272](#)
- [MPLS Network to Private IP Network | 272](#)

- [Global IP Network to an MPLS Network | 275](#)

This example shows how to configure security policies using VRF routing instances.

Requirements

- Supported SRX Series Firewall with Junos OS Release 15.1X49-D160 or later. This configuration example is tested for Junos OS Release 15.1X49-D160.
- Configure network interfaces on the device. See [Interfaces User Guide for Security Devices](#).
- Understand how to create a security zone. See ["Example: Creating Security Zones" on page 9](#).

Overview

In this example, you create security policies using virtual routing and forwarding (VRF) instances to isolate traffic traversing in the following networks:

- An MPLS to a private IP network
- A Global IP to an MPLS network

MPLS Network to Private IP Network

IN THIS SECTION

- [Procedure | 273](#)

Procedure

Step-by-Step Procedure

1. Layer 3 VPNs require a VRF table for distributing routes within the networks. Create a VRF instance and specify the value **vrf**.

```
[edit routing-instances]
user@host#set VRF-a instance-type vrf
user@host#set VRF-b instance-type vrf
```

2. Assign a route distinguisher to the routing instance.

```
[edit routing-instances]
user@host# set VRF-a route-distinguisher 10:200
user@host# set VRF-b route-distinguisher 20:200
```

3. Create a community policy to import or export all routes.

```
[edit routing-instances]
user@host# set VRF-a vrf-target target:100:100
user@host# set VRF-b vrf-target target:200:100
```

4. Assign a single VPN label for all the routes in the VRF.

```
[edit routing-instances]
user@host# set VRF-a vrf-table-label
user@host# set VRF-b vrf-table-label
```

5. Create a security policy to permit traffic from VRF-a destined for LAN A.

```
[edit security policies from-zone GRE_Zone to-zone LAN-a_Zone]
set policy vrf-a_policy match source-address any
set policy vrf-a_policy match destination-address any
set policy vrf-a_policy match application any
set policy vrf-a_policy match source-l3vpn-vrf-group VRF-a
set policy vrf-a_policy then permit
```

6. Create a security policy to permit traffic from VRF-b destined for LAN B.

```
[edit security policies from-zone GRE_Zone to-zone LAN-b_Zone]
set policy vrf-b_policy match source-address any
set policy vrf-b_policy match destination-address any
set policy vrf-b_policy match application any
set policy vrf-b_policy match source-l3vpn-vrf-group VRF-b
set policy vrf-b_policy then permit
```

Results

From configuration mode, confirm your configuration by entering the `show security policies` and `show routing-instances` commands. If the output does not display the intended configuration, repeat the instructions in this example to correct the configuration.

```
user@host# show security policies
from-zone GRE_Zone to-zone LAN-a_Zone {
  policy vrf-a_policy {
    match {
      source-address any;
      destination-address any;
      application any;
    }
    then {
      permit;
    }
  }
}
from-zone GRE_Zone to-zone LAN-b_Zone {

  policy vrf-b_policy {
    match {
      source-address any;
      destination-address any;
      application any;

      source-l3vpn-vrf-group VRF-b;
    }
    then {
      permit;
    }
  }
}
```

```

    }
  }
}

```

```

[edit]
user@host# show routing-instances
  VRF-a {
    instance-type vrf;
    route-distinguisher 10:200;
    vrf-target target:100:100;
    vrf-table-label;
  }
  VRF-b {
    instance-type vrf;
    route-distinguisher 20:200;
    vrf-target target:200:100;
    vrf-table-label;
  }

```

If you are done configuring the device, enter `commit` from configuration mode.

Global IP Network to an MPLS Network

IN THIS SECTION

● [Verification | 280](#)

Procedure

Step-by-Step Procedure

1. Layer 3 VPNs require a VRF table for distributing routes within the networks. Create a VRF instance and specify the value **vrf**.

```

[edit routing-instances]
user@host# set VRF-a instance-type vrf
user@host# set VRF-b instance-type vrf

```

```

user@host# set VRF-a' instance-type vrf
user@host# set VRF-b' instance-type vrf

```

2. Assign a route distinguisher to the routing instance.

```

[edit routing-instances]
user@host# set VRF-a route-distinguisher 10:200
user@host# set VRF-b route-distinguisher 20:200
user@host# set VRF-a' route-distinguisher 30:200
user@host# set VRF-b' route-distinguisher 40:200

```

3. Create a community policy to import or export all routes.

```

[edit routing-instances]
user@host# set VRF-a vrf-target target:100:100
user@host# set VRF-b vrf-target target:200:100
user@host# set VRF-a' vrf-target target:300:100
user@host# set VRF-b' vrf-target target:400:100

```

4. Assign a single VPN label for all the routes in the VRF.

```

[edit routing-instances]
user@host# set VRF-a vrf-table-label
user@host# set VRF-a' vrf-table-label
user@host# set VRF-b vrf-table-label
user@host# set VRF-b' vrf-table-label

```

5. Create the destination NAT pool.

```

[edit security nat destination]
user@host# set pool vrf-a_p routing-instance VRF-a
user@host# set pool vrf-a_p address 20.0.0.4/24
user@host# set pool vrf-b_p routing-instance VRF-b
user@host# set pool vrf-b_p address 30.0.0.4/24

```


6. Create a destination NAT rule set.

```
[edit security nat destination]
user@host# set rule-set rs from interface ge-0/0/0.0
user@host# set rule-set rs rule vrf-a_r match destination-address 40.0.0.4/24
user@host# set rule-set rs rule vrf-a_r then destination-nat pool vrf-a_p
```

7. Configure a rule that matches packets and translates the destination address to the address in the pool.

```
[edit security nat destination]
user@host# set rule-set rs from interface ge-0/0/1.0
user@host# set rule-set rs rule vrf-b_r match destination-address 50.0.0.4/24
user@host# set rule-set rs rule vrf-b_r then destination-nat pool vrf-b_p
```

8. Configure a security policy that allows traffic from the untrust zone to the server in the trust zone.

```
[edit security policies from-zone internet to-zone trust]
user@host# set policy vrf-a_policy match source-address any
user@host# set policy vrf-a_policy match destination-address any
user@host# set policy vrf-a_policy_policy match application any
user@host# set policy vrf-a_policy match destination-l3vpn-vrf-group VRF-a'
user@host# set policy vrf-a_policy then permit
user@host# set policy vrf-b_policy match source-address any
user@host# set policy vrf-b_policy match destination-address any
user@host# set policy vrf-b_policy match application any
user@host# set policy vrf-b_policy match destination-l3vpn-vrf-group VRF-b'
user@host# set policy vrf-b_policy then permit
```

Results

From configuration mode, confirm your configuration by entering the `show security policies`, `show routing-instances`, and the `show security nat` commands. If the output does not display the intended configuration, repeat the instructions in this example to correct the configuration.

```
user@host# show security policies
from-zone internet to-zone trust {
  policy vrf-a_policy {
```

```

        match {
            source-address any;
            destination-address any;
            application any;
            destination-l3vpn-vrf-group VRF-a;

        }
        then {
            permit;
        }
    }

    policy vrf-b_policy {
        match {
            source-address any;
            destination-address any;
            application any;
            destination-l3vpn-vrf-group VRF-b;
        }
        then {
            permit;
        }
    }
}

```

```

[edit]
user@host# show routing-instances
    VRF-a {
        instance-type vrf;
        route-distinguisher 10:200;
        vrf-target target:100:100;
        vrf-table-label;
    }
    VRF-b {
        instance-type vrf;
        route-distinguisher 20:200;
        vrf-target target:200:100;
        vrf-table-label;
    }
    VRF-a' {
        instance-type vrf;

```

```

        route-distinguisher 30:200;
        vrf-target target:300:100;
        vrf-table-label;
    }
    VRF-b' {
        instance-type vrf;
        route-distinguisher 40:200;
        vrf-target target:400:100;
        vrf-table-label;
    }

```

```

user@host# show security nat destination
pool vrf-a_p {
    routing-instance {
        VRF-a';
    }
    address 20.0.0.4/24;
}
pool vrf-b_p {
    routing-instance {
        VRF-b';
    }
    address 30.0.0.4/24;
}
rule-set rs {
    from interface [ ge-0/0/0.0 ge-0/0/1.0 ];
    rule vrf-a_r {
        match {
            destination-address 40.0.0.4/24;
        }
        then {
            destination-nat {
                pool {
                    vrf-a_p;
                }
            }
        }
    }
    rule vrf-b_r {
        match {
            destination-address 50.0.0.4/24;

```

```

    }
    then {
        destination-nat {
            pool {
                vrf-b_p;
            }
        }
    }
}
}
}

```

If you are done configuring the device, enter `commit` from configuration mode.

Verification

IN THIS SECTION

- [Verifying the Destination NAT Rule | 280](#)
- [Verifying Flow Session | 281](#)

Verifying the Destination NAT Rule

Purpose

Display information about all the destination NAT rules.

Action

From operational mode, enter the `show security nat destination rule all` command.

```

user@host> show security nat destination rule all
Total destination-nat rules: 1
Total referenced IPv4/IPv6 ip-prefixes: 6/0
Destination NAT rule: rule1          Rule-set: vrf-b_r
Rule-Id                          : 2
Rule position                     : 2
From routing instance             : vrf-b_r
Destination addresses              : 50.0.0.4      - 50.0.0.4

```

```

Action          : vrf-b_p
Translation hits : 0
  Successful sessions : 0
  Failed sessions   : 0
Number of sessions : 0

```

[...Output truncated...]

Meaning

The command displays the destination NAT rule. View the Translation hits field to check for traffic that matches the destination rule.

Verifying Flow Session

Purpose

Display information about all the currently active security sessions on the device.

Action

From operational mode, enter the show security flow session command.

```

user@host>show security flow session
Flow Sessions on FPC0 PIC1:
Session ID: 10115977, Policy name: SG/4, State: Active, Timeout: 62, Valid
In: 203.0.113.11/1000 203.0.113.1/2000;udp, Conn Tag: 0x0, If: reth1.1, VRF: VRF-a, Pkts: 1,
Bytes: 86, CP Session ID: 10320276
Out: 203.0.113.1/2000 203.0.113.11/1000;udp, Conn Tag: 0x0, If: reth0.0, VRF: VRF-b, Pkts: 0,
Bytes: 0, CP Session ID: 10320276

```

Meaning

The command displays details about all the active sessions. View the VRF field to check the VRF routing instance details in the flow.

RELATED DOCUMENTATION

[Flow Management in SRX Series Devices Using VRF Routing Instance](#)

[Understanding ALG Support for VRF Routing Instance](#)

[NAT for VRF Routing Instance](#)

Configuring Security Policies Using VRF Group

IN THIS SECTION

- [Overview | 282](#)
- [Example: Configuring a Security Policy to Permit or Deny VRF-Based Traffic from MPLS Network to an IP Network using Source VRF Group | 284](#)
- [Example: Configuring a Security Policy to Permit or Deny VRF-Based Traffic from an IP Network to MPLS Network using Destination VRF Group | 289](#)
- [Managing Overlapping VPN using VRF group | 295](#)

Overview

In SD-WAN network, when different VRF based traffic enter the device from same tunnel such as GRE or GE, the device applies policy based on the given VRF instance. The device either permit or deny traffic destined to a particular VRF instance to control the VRF based traffic.

Currently, there are 5 matching conditions for each policy:

- From zone
- To zone
- Source address
- Destination address
- Applications

[Figure 15 on page 283](#) shows the match conditions in a policy.

Figure 15: Match Conditions

	Match Conditions					Action
	From-Zone	To-Zone	SRC-Add	DST-Add	App	
P1	Z1	Z2	any	any	https	permit/UTM

8300280

With the current policy matching conditions, you cannot permit VRF-B1 or VRF-B2 and deny VRF-A1 or VRF-A2. To support this, additional matching conditions are added to the policy in the SD-WAN network using VRF group.

When the flow receives the information of source and destination VRF groups, it forwards the information to policy search API along with the policy key tuple information to meet the match conditions.

Figure 16 on page 283 shows the VRF groups added as match condition in a policy.

Figure 16: Match Conditions with VRF group

	Match Conditions							Action
	From-Zone	To-Zone	SRC-Add	DST-Add	App	source- l3vpn-vrf- group	Destination- l3vpn-vrf- group	
vpn-a_policy	GRE_Zone	GRE_Zone/GE_Zone	any	any	any	VRF-GRP_A	VRF-GRP_A'	deny
vpn-b_policy	GRE_Zone	GRE_Zone/GE_Zone	any	any	any	VRF-GRP_B	VRF-GRP_B'	permit

8300279

NOTE: If the source and destination VRF group information is not specified in a policy, then these groups matches any VRF group.

Example: Configuring a Security Policy to Permit or Deny VRF-Based Traffic from MPLS Network to an IP Network using Source VRF Group

IN THIS SECTION

- [Requirements | 284](#)
- [Overview | 284](#)
- [Configuration | 285](#)

This example shows how to configure a security policy to permit traffic and deny traffic using the source VRF group.

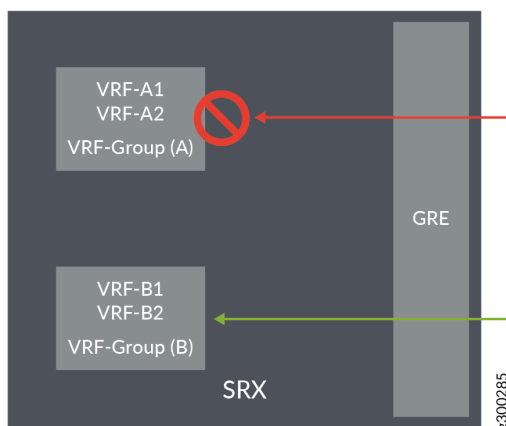
Requirements

- Understand how to create a security zone. See ["Example: Creating Security Zones" on page 9](#).
- Supported SRX Series Firewall with Junos OS Release 15.1X49-D170 or later. This configuration example is tested for Junos OS Release 15.1X49-D170.
- Configure network interfaces on the device. See [Interfaces User Guide for Security Devices](#).

Overview

In Junos OS, security policies enforce rules for transit traffic, in terms of what traffic can pass through the device and the actions that need to take place on the traffic as it passes through the device. In [Figure 17 on page 285](#), an SRX Series Firewall is deployed in an SD-WAN to control traffic using the source VRF group. Traffic from the GRE MPLS network is sent to site A and site B of the IP network. As per the network requirement, site A traffic should be denied, and only site B traffic should be permitted.

Figure 17: Policy Control from MPLS network



This configuration example shows how to:

- Deny traffic from vpn-A (from GRE MPLS)
- Permit traffic from vpn-B (from GRE MPLS)

Configuration

IN THIS SECTION

- [Verification](#) | 288

Procedure

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the [edit] hierarchy level, and then enter `commit` from configuration mode.

```
set security l3vpn vrf-group vpn-A vrf VRF-A1
set security l3vpn vrf-group vpn-A vrf VRF-A2
set security l3vpn vrf-group vpn-B vrf VRF-B1
```

```

set security l3vpn vrf-group vpn-B vrf VRF-B2
set security policies from-zone GRE_Zone to-zone GE_Zone policy vrf-a_policy match source-
address any
set security policies from-zone GRE_Zone to-zone GE_Zone policy vrf-a_policy match destination-
address any
set security policies from-zone GRE_Zone to-zone GE_Zone policy vrf-a_policy match application
any
set security policies from-zone GRE_Zone to-zone GE_Zone policy vrf-a_policy match source-l3vpn-
vrf-group vpn-A
set security policies from-zone GRE_Zone to-zone GE_Zone policy vrf-a_policy then deny
set security policies from-zone GRE_Zone to-zone GE_Zone policy vrf-b_policy match source-
address any
set security policies from-zone GRE_Zone to-zone GE_Zone policy vrf-b_policy match destination-
address any
set security policies from-zone GRE_Zone to-zone GE_Zone policy vrf-b_policy match application
any
set security policies from-zone GRE_Zone to-zone GE_Zone policy vrf-b_policy match source-l3vpn-
vrf-group vpn-B
set security policies from-zone GRE_Zone to-zone GE_Zone policy vrf-b_policy then permit

```

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For information about navigating the CLI, see *Using the CLI Editor in Configuration Mode* in the [Junos OS CLI User Guide](#).

1. Create VRF group vpn-A with VRF instances A1 and A2

```

[edit security]
user@host# set l3vpn vrf-group vpn-A vrf VRF-A1
user@host# set l3vpn vrf-group vpn-A vrf VRF-A2

```

2. Create VRF group vpn-B with VRF instances B1 and B2

```

[edit security]
user@host# set l3vpn vrf-group vpn-B vrf VRF-B1
user@host# set l3vpn vrf-group vpn-B vrf VRF-B2

```

3. Create a security policy to deny vpn-A traffic.

```
[edit security policies from-zone GRE_Zone to-zone GE_Zone]
user@host# set policy vrf-a_policy match source-address any
user@host# set policy vrf-a_policy match destination-address any
user@host# set policy vrf-a_policy match application any
user@host# set policy vrf-a_policy match source-l3vpn-vrf-group vpn-A
user@host# set policy vrf-a_policy then deny
```

4. Create a security policy to permit vpn-B traffic.

```
[edit security policies from-zone GRE_Zone to-zone GE_Zone]
user@host# set policy vrf-b_policy match source-address any
user@host# set policy vrf-b_policy match destination-address any
user@host# set policy vrf-b_policy match application any
user@host# set policy vrf-b_policy match source-l3vpn-vrf-group vpn-B
user@host# set policy vrf-b_policy then permit
```

Results

From configuration mode, confirm your configuration by entering the `show security policies` and `show routing-instances` commands. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```
[edit]
user@host# show security policies
from-zone GRE_Zone to-zone GE_Zone {
  policy vrf-a_policy {
    match {
      source-address any;
      destination-address any;
      application any;
      source-l3vpn-vrf-group vpn-A;
    }
    then {
      deny;
    }
  }
  policy vrf-b_policy {
```

```

match {
    source-address any;
    destination-address any;
    application any;
    source-l3vpn-vrf-group vpn-B;
}
then {
    permit;
}
}

```

If you are done configuring the device, enter `commit` from configuration mode.

Verification

IN THIS SECTION

- [Verifying Policy Configuration | 288](#)

Verifying Policy Configuration

Purpose

Verify information about security policies.

Action

From operational mode, enter the `show security policies` command to display a summary of all the security policies configured on the device.

```

user@root> show security policies
Default policy: permit-all
From zone: GRE_Zone, To zone: GE_Zone
Policy: vrf-a_policy, State: enabled, Index: 4, Scope Policy: 0, Sequence number: 1
Source L3VPN VRF Group: vpn-A
destination L3VPN vrf-group: any
Source addresses: any
Destination addresses: any

```

```

Applications: any
Action: deny
Policy: vrf-b_policy, State: enabled, Index: 5, Scope Policy: 0, Sequence number: 2
Source L3VPN VRF Group: vpn-B
destination L3VPN vrf-group: any
Source addresses: any
Destination addresses: any
Applications: any
Action: permit

```

Example: Configuring a Security Policy to Permit or Deny VRF-Based Traffic from an IP Network to MPLS Network using Destination VRF Group

IN THIS SECTION

- [Requirements | 289](#)
- [Overview | 289](#)
- [Configuration | 290](#)

This example shows how to configure a security policy to permit traffic and deny traffic using the source VRF group.

Requirements

- Understand how to create a security zone. See ["Example: Creating Security Zones" on page 9](#).
- Supported SRX Series Firewall with Junos OS Release 15.1X49-D170 or later. This configuration example is tested for Junos OS Release 15.1X49-D170.
- Configure network interfaces on the device. See [Interfaces User Guide for Security Devices](#).

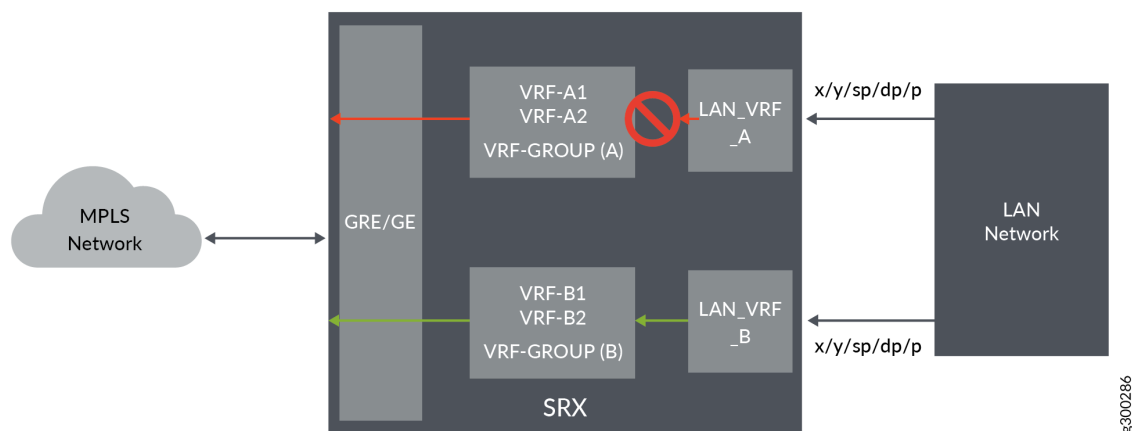
Overview

In Junos OS, security policies enforce rules for transit traffic, in terms of what traffic can pass through the device and the actions that need to take place on the traffic as it passes through the device. In [Figure 18 on page 290](#), an SRX Series Firewall is deployed in an SD-WAN to control traffic using the

destination VRF group. Traffic from IP network is sent to site A and site B of the GRE MPLS network. As per the network requirement, site A traffic should be denied, and only site B traffic should be permitted.

This configuration example shows how to:

Figure 18: Policy control to MPLS network



- Deny traffic to vpn-A (to GRE MPLS)
- Permit traffic to vpn-B (to GRE MPLS)

Configuration

IN THIS SECTION

- [Verification | 294](#)

Procedure

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the [edit] hierarchy level, and then enter `commit` from configuration mode.

```
set security l3vpn vrf-group vpn-A vrf VRF-A1
set security l3vpn vrf-group vpn-A vrf VRF-A2
set security l3vpn vrf-group vpn-B vrf VRF-B1
set security l3vpn vrf-group vpn-B vrf VRF-B2
set security policies from-zone LAN-a_Zone to-zone GRE_Zone policy vrf-a_policy match source-
address any
set security policies from-zone LAN-a_Zone to-zone GRE_Zone policy vrf-a_policy match
destination-address any
set security policies from-zone LAN-a_Zone to-zone GRE_Zone policy vrf-a_policy match
application any
set security policies from-zone LAN-a_Zone to-zone GRE_Zone policy vrf-a_policy match
destination-l3vpn-vrf-group vpn-A
set security policies from-zone LAN-a_Zone to-zone GRE_Zone policy vrf-a_policy then deny
set security policies from-zone LAN-b_Zone to-zone GRE_Zone policy vrf-b_policy match source-
address any
set security policies from-zone LAN-b_Zone to-zone GRE_Zone policy vrf-b_policy match
destination-address any
set security policies from-zone LAN-b_Zone to-zone GRE_Zone policy vrf-b_policy match
application any
set security policies from-zone LAN-b_Zone to-zone GRE_Zone policy vrf-b_policy match
destination-l3vpn-vrf-group vpn-B
set security policies from-zone LAN-b_Zone to-zone GRE_Zone policy vrf-b_policy then permit
```

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For information about navigating the CLI, see *Using the CLI Editor in Configuration Mode* in the [Junos OS CLI User Guide](#).

1. Create VRF group vpn-A with VRF instances A1 and A2

```
[edit security]
user@host# set l3vpn vrf-group vpn-A vrf VRF-A1
user@host# set l3vpn vrf-group vpn-A vrf VRF-A2
```

2. Create VRF group vpn-B with VRF instances B1 and B2

```
[edit security]
user@host# set l3vpn vrf-group vpn-B vrf VRF-B1
user@host# set l3vpn vrf-group vpn-B vrf VRF-B2
```

3. Create a security policy to deny vpn-A traffic.

```
[edit security policies from-zone LAN-a_Zone to-zone GRE_Zone]
user@host# set policy vrf-a_policy match source-address any
user@host# set policy vrf-a_policy match destination-address any
user@host# set policy vrf-a_policy match application any
user@host# set policy vrf-a_policy match destination-l3vpn-vrf-group vpn-A
user@host# set policy vrf-a_policy then deny
```

4. Create a security policy to permit vpn-B traffic.

```
[edit security policies from-zone LAN-b_Zone to-zone GRE_Zone]
user@host# set policy vrf-b_policy match source-address any
user@host# set policy vrf-b_policy match destination-address any
user@host# set policy vrf-b_policy match application any
user@host# set policy vrf-b_policy match destination-l3vpn-vrf-group vpn-B
user@host# set policy vrf-b_policy then permit
```


Results

From configuration mode, confirm your configuration by entering the `show security policies` and `show routing-instances` commands. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```
[edit]
user@host# show security policies
from-zone LAN-a_Zone to-zone GRE_Zone {
  policy vrf-a_policy {
    match {
      source-address any;
      destination-address any;
      application any;
      destination-l3vpn-vrf-group vpn-A;
    }
    then {
      deny;
    }
  }
}

from-zone LAN-b_Zone to-zone GRE_Zone {
  policy vrf-b_policy {
    match {
      source-address any;
      destination-address any;
      application any;
      destination-l3vpn-vrf-group vpn-B;
    }
    then {
      permit;
    }
  }
}
```

If you are done configuring the device, enter `commit` from configuration mode.

Verification

IN THIS SECTION

- [Verifying Policy Configuration | 294](#)

Verifying Policy Configuration

Purpose

Verify information about security policies.

Action

From operational mode, enter the `show security policies` command to display a summary of all the security policies configured on the device.

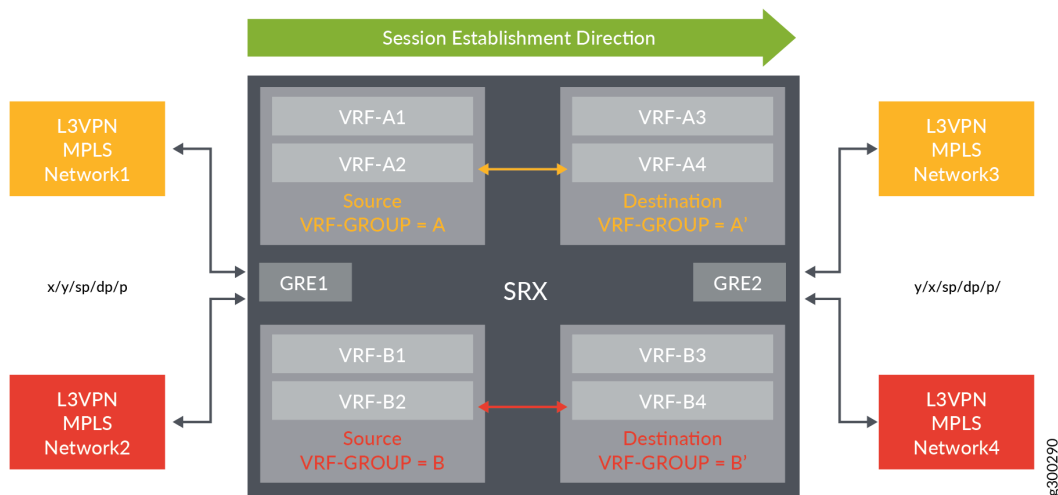
```
user@root> show security policies
Default policy: permit-all
From zone: LAN-a_Zone, To zone: GRE_Zone
  Policy: vrf-a_policy, State: enabled, Index: 4, Scope Policy: 0, Sequence number: 1
    Source L3VPN VRF Group: any
    destination L3VPN vrf-group: vpn-A
    Source addresses: any
    Destination addresses: any
    Applications: any
    Action: deny
From zone: LAN-b_Zone, To zone: GRE_Zone
  Policy: vrf-b_policy, State: enabled, Index: 5, Scope Policy: 0, Sequence number: 2
    Source L3VPN VRF Group: any
    destination L3VPN vrf-group: vpn-B
    Source addresses: any
    Destination addresses: any
    Applications: any
    Action: permit
```

Managing Overlapping VPN using VRF group

When there are two sessions in a L3VPN network, to avoid any conflicts between the two sessions VRF group-ID is added to session key as an additional key to differentiate the sessions.

In [Figure 19 on page 295](#) network1 and network3 are grouped together to VRF group-A in L3VPN network, and network2 and network4 are grouped together to VRF group-B. The sessions use VRF group-A and VRF group-B as differentiators.

Figure 19: Overlapping VPN using VRF groups



[Table 31 on page 295](#)

Table 31: L3VPN Session Information

L3VPN Network 1 and 3 session		L3VPN Network 2 and 4 session	
(Forward)	(Reverse)	(Forward)	(Reverse)
5-tuple: x/y/sp/dp/p	5-tuple: y/x/dp/sp/p	5-tuple: x/y/sp/dp/p	5-tuple: y/x/dp/sp/p
Token: GRE1(zone_id +VR_id) + VRF group-ID (A)	Token: GRE1(zone_id +VR_id) + VRF group-ID (B)	Token: GRE1(zone_id +VR_id) + VRF group-ID (A')	Token: GRE1(zone_id +VR_id) + VRF group-ID (B')

RELATED DOCUMENTATION

| [Flow Processing using Virtual Routing and Forwarding Group](#)

Explicit Web Proxy

IN THIS SECTION

- [Explicit Web Proxy | 296](#)
- [Example: Configure Explicit Web Proxy | 301](#)

Explicit Web Proxy

IN THIS SECTION

- [How Explicit Proxy Works? | 297](#)
- [Benefits | 298](#)
- [Steps to Configure Explicit Proxy on SRX Series Firewall | 298](#)
- [Security Policy Support for Explicit Web Proxy | 299](#)
- [Configuring Explicit Proxy Profile Policy | 299](#)

Explicit Proxy provides a method for steering traffic from any client device to the SRX Series. The SRX Series firewall accepts connections from clients, resolves DNS, forwards connections to the specified destination servers, and then gets the response from the server on behalf of the client. In such configuration, the firewall acts an intermediary between clients and servers. Here, all communication between client and server goes through the firewall that is configured as proxy server.

You can configure your SRX Series Firewall interface as explicit web proxy for applying proxy for IPv4 and IPv6 HTTP and HTTPS traffic.

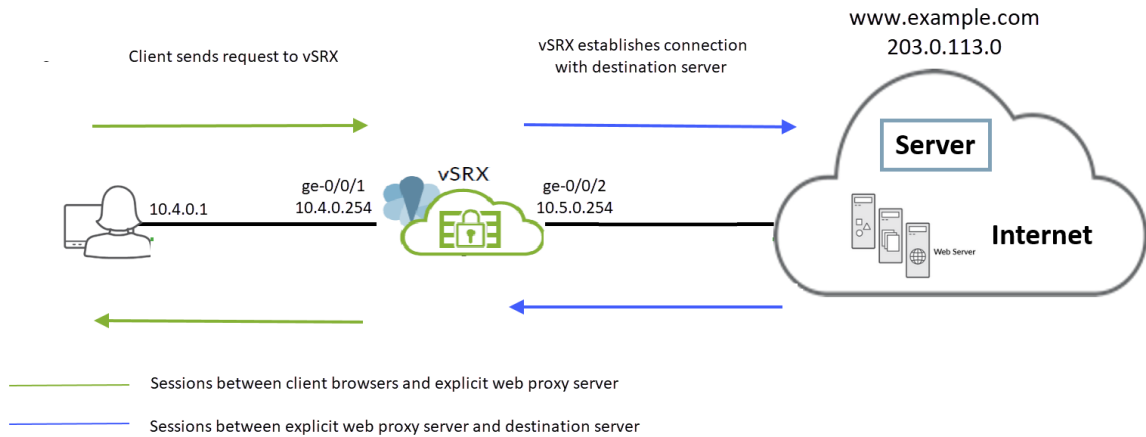
To deploy explicit proxy, manually configure the browser's settings on client device to send requests to SRX firewall. In most standard browsers, you can specify the proxy address and port.

SRX Series Firewalls support explicit proxy for on-premises infrastructure method where the active directory, identity-management server, LDAP server, physical SRX Series Firewalls, and users are available on-site.

How Explicit Proxy Works?

Lets consider an example. In [Figure 20 on page 297](#), a client initiates HTTP connection to reach [www.example.com](#). Client device first connects with SRX Series acting as explicit proxy on (10.4.0.254 and port 8080).

Figure 20: Explicit Web Proxy



The client network connects to the SRX Series Firewall on ge-0/0/1 interface with IP address 10.4.0.254. SRX Series connects to Internet using the interface ge-0/0/2 with IP address 10.5.0.254.

For each session initiated by the client browser, the SRX Series creates two sessions:

S1: Session originating from client browser to explicit web proxy

S2: Session originating from explicit web proxy to actual destination server.

[Table 32 on page 298](#) provides details on the explicit web proxy sessions.

Table 32: Explicit Proxy Session Details

Session Type	Source IP/Port	Destination IP/Port	Policy	Comments
Client to SRX Series (S1)	Client IP / dynamic port range	SRX Series interface IP (10.4.0.254) / fixed port (8080)	Security policy/ unified policy (explicitly configured on SRX Series)	Client traffic directly comes to the SRX Series interface where explicit proxy profile is configured.
SRX Series to actual destination server (S2)	SRX Series egress interface IP (10.5.0.254)/ dynamic port range	End server as resolved by DNS (203.0.113.0) or in explicit proxy request	Implicitly inherited from S1	SRX Series establishes the connection with actual server (www.example.com) .

Benefits

- Explicit web proxy secures network by controlling and filtering the inbound and outbound traffic.
- Explicit web proxy performs DNS resolution on client's behalf.

Steps to Configure Explicit Proxy on SRX Series Firewall

To manage explicit proxy for connections to your network, you must:

1. Enable web-management services and configure web-authentication feature on an interface
2. Enforce users to authenticate before they can connect to your network. When you enforce authentication in the explicit proxy, unauthenticated connections are redirected to the Firewall authentication page.
3. Configure the explicit proxy profile.
4. Configure explicit proxy on an interface. This interface must be connected to client network. The client browsers use this IP address to forward requests to the SRX Series device. You can configure and attach multiple explicit proxy profiles to a particular IP address in the interface. However, you must ensure that there must not be overlapping ports between the explicit proxy profiles.
5. Use security policies to control the explicit web proxy traffic.
6. Attach SSL proxy service to the explicit proxy policy.
7. Configure default-policy for the explicit proxy.

Security Policy Support for Explicit Web Proxy

You must configure and enforce security policies to manage the traffic for the explicit proxy. Explicit proxy profile needs a set of unique security policies or unified policies. The firewall determines which profile to leverage for a policy lookup based on the ingress interface and port combination. Once the firewall identifies the explicit proxy profile for a flow, it performs a policy lookup.

SRX Series Firewall uses the following sequence for the policy lookup:

- Source IP address, source-port, protocol, and source identity
- DNS-based destination IP resolution
- URL category detection
- Dynamic Layer 7 application match
- DNS-based destination resolved IP reputation
- Hardcoded destination IP address or reputation of hardcoded destination IP address

Configuring Explicit Proxy Profile Policy

You can configure the explicit proxy profile rule-base using the following statement:

```
[edit]
user@host# set security policies explicit-proxy profile <profile-name> policy
```

You can notice that this policy, similar to the global policies, does not need security zones.

To attach a security policy with explicit proxy profile, the profile name mentioned in policy configuration must match with the name of the explicit proxy profile configured under web-proxy services (set services web-proxy explicit-proxy profile <profile-name>).

Example:

Create a policy for the explicit proxy profile named "profile-site-A".

```
[edit]
user@host# set services web-proxy explicit-proxy profile profile-site-A
```

Ensure that the explicit profile policy also uses the same name:

```
[edit]
user@host# set security policies explicit-proxy profile profile-site-A policy
```

Limitations

For explicit proxy profile policies, the match condition does not support:

- Source or destination zone
- Source and destination Layer 3 VPN VRF group

Post-match application services do not support:

- Secure web proxy
- GPRS Tunneling protocol
- GPRS stream control transport protocol (SCTP)
- Unified Access control enforcement of policy (UAC)
- WAN acceleration (Legacy WX)
- Legacy Intrusion detection and prevention.
- APBR

Default Policy for Explicit Proxy

In case the traffic matches to any of the explicit proxy profiles but does not match any of the policies under the explicit proxy profile, the firewall applies the default policy action. You can configure the default policy in the explicit proxy profile.

In case no matching explicit proxy profile found for a given traffic, the firewall performs the policy lookup based on configured zonal and global policies.

You can configure only one default policy per explicit proxy profile.

SEE ALSO

[Configuring Security Policies | 95](#)

[Example: Configure Explicit Web Proxy | 301](#)

Example: Configure Explicit Web Proxy

SUMMARY

Use this example to configure the explicit web proxy feature and to verify the configuration on your device.

IN THIS SECTION

- [Example Prerequisites | 301](#)
- [Before You Begin | 302](#)
- [Functional Overview | 302](#)
- [Topology Overview | 303](#)
- [Topology Illustration | 305](#)
- [Configure Explicit Proxy on the SRX Series Firewall | 306](#)
- [Verification | 308](#)
- [Appendix 1: set Commands on SRX Series Firewall | 312](#)
- [Appendix 2: show Configuration Output on SRX Series Firewall | 313](#)

TIP:

Table 33: Readability Score and Time Estimates

Readability score	Flesch-Kincaid reading grade level: 11.3
Reading time	30 minutes
Configuration time	1 hour

Example Prerequisites

Hardware requirements	Juniper Networks® SRX Series Firewall or vSRX Virtual Firewall
-----------------------	----------------------------------------------------------------

Software requirements	Junos OS Release 23.4R1 or later
-----------------------	----------------------------------

Before You Begin

Benefits	<ul style="list-style-type: none"> • Secures network: Explicit web proxy configured on an SRX Series Firewall interface controls and filters the inbound and outbound traffic between the client and the destination webserver. The client-webserver traffic comprises HTTP and HTTPS traffic for IPv4 and IPv6 packets. • Acts as an intermediary between client and destination webserver: Explicit web proxy performs Domain Name System (DNS) resolution for the client. It establishes two sessions—one between the client and the SRX Series Firewall and the other between the firewall and the actual destination server. This way it steers traffic to the specified destination servers and then gets the response back from the server on behalf of the client.
Know more	Explicit Web Proxy , Pass-Through Authentication , and User Firewall
Hands-on experience	vLab Sandbox: Zones / Policies
Learn more	Juniper Identity Management Service

Functional Overview

Table 34: Explicit Web Proxy Functional Overview

Technologies used	SSL proxy The SSL proxy profile pr1 supports server authentication by enabling a Web browser to validate the identity of a webserver.
	User identification The SRX Series Firewall searches for the user source identity in the user identification table (UIT) and retrieves user and role information, if available. The device creates an authentication entry with the IP address and the username of the user in the UIT.

	<p>Security policies</p> <p>Two security policies, expp1 and expp2, enforce user-based and role-based security policies to restrict or permit users individually or in groups. The policies use different methods to authenticate users.</p>
	<p>Access profile</p> <p>Configure the Lightweight Directory Access Protocol (LDAP) profile ldap_profile for external authentication.</p>
	<p>Explicit web proxy profile</p> <p>Configure the explicit web proxy profile exp1 with dynamic application and external proxy server details. Attach this profile to the security policies expp1 and expp2 and then apply the profile on the permitted traffic.</p>
Primary verification tasks	<ul style="list-style-type: none"> • Verify the JIMS connection status. • Verify that user entries are available after firewall authentication.

Topology Overview

We've developed this example using user authentication. We configure users through firewall authentication using the [edit access profile] hierarchy. An external LDAP server maintains the user information.

In this example, a client initiates a user authentication request to a webserver through the SRX Series Firewall. When the SRX Series Firewall (henceforth also referred to as the *firewall*) receives the request, it checks whether it has the authentication entry for the given IP address. If the firewall doesn't have the entry, then it sends an IP-based query to the Juniper Identity Management Service (JIMS) identity manager to obtain the user's identity information.

For the firewall to query JIMS, you must establish an HTTPS connection between the firewall and JIMS. JIMS uses the populated identity management authentication table to authenticate a user that is requesting access to a protected resource. If the user entry is available in that table, JIMS responds to the firewall's query with the IP address of the user's device. If the user information is not available, JIMS responds with an appropriate error message.

In the deployments where JIMS (through Active Directory/Domain Controller) is unable to provide user authentication information, the firewall sends the user authentication event to JIMS using the push-to-identity-management statement. With this statement, the firewall pushes the authentication entries to the JIMS server for those users that have no entries in JIMS but have successfully authenticated to the firewall.

Table 35: Topology Components

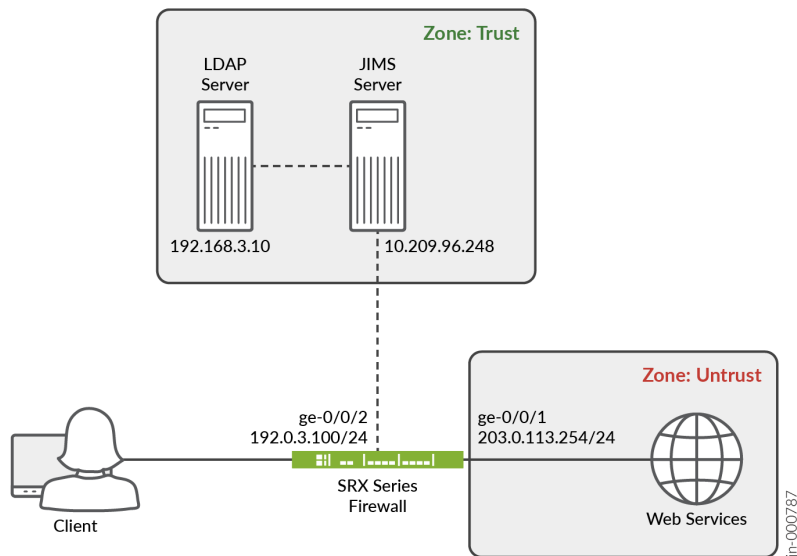
Component	Role	Function
Client	Requests Web service	Initiates an HTTPS session with the webserver through the SRX Series Firewall.
SRX Series Firewall	Juniper Networks' firewall	<p>Works as the HTTPS client and sends HTTPS requests to JIMS on port 443.</p> <p>The advanced query feature queries JIMS for user identification information that the firewall stores in its authentication table and uses to authenticate users.</p> <p>The SRX Series Firewall initiates an HTTPS session with the LDAP server to authenticate the entries. If the LDAP server doesn't have the authentication entry, the LDAP server sends an IP-based authentication query to the JIMS server.</p>
LDAP server	External server to manage a number of firewall users.	LDAP is the Active Directory server.

Table 35: Topology Components (Continued)

Component	Role	Function
JIMS	A standalone Windows service application that collects and maintains a large database of user, device, and group information from Active Directory domains.	JIMS obtains users' account attributes and login sessions from an Active Directory and provides the information to the firewall. JIMS collects user identity information from different authentication sources for SRX Series Firewalls.
Webserver	Web service provider	The webserver responds to the client's request.

Topology Illustration

Figure 21: Explicit Web Proxy



Configure Explicit Proxy on the SRX Series Firewall

NOTE: For complete sample configurations on the SRX Series Firewall, see:

- ["Appendix 1: set Commands on SRX Series Firewall" on page 312](#)
- ["Appendix 2: show Configuration Output on SRX Series Firewall" on page 313](#)

1. Activate the HTTP process (daemon) on the firewall.

```
[edit system services]
user@host# set web-management http port 80
user@host# set web-management http interface ge-0/0/2
user@host# set web-management https pki-local-certificate server_nodomain
```

2. Configure a Secure Socket Layer (SSL) support service proxy profile, pr1, to allow browser traffic and to ignore server authentication.

If you configure the firewall to ignore authentication, then the firewall ignores any errors it encounters during server verification at the time of the SSL handshake.

```
[edit services ssl proxy]
user@host# set profile pr1 root-ca MYCERT
user@host# set profile pr1 actions ignore-server-auth-failure
```

3. Configure explicit web proxy. Apply the SSL proxy profile, pr1, to the explicit web proxy profile, exp1, to permit the traffic. The firewall decrypts and then reencrypts all SSL proxy traffic.

```
[edit services web-proxy explicit-proxy]
user@host# set profile exp1 listening-port 9443
user@host# set profile exp1 ssl-proxy profile-name pr1
```

4. Configure JIMS as the authentication source for advanced query requests. Use the invalid-authentication-entry-timeout setting to protect invalid user authentication entries in an authentication table from expiring before the user can be validated.

```
[edit services user-identification identity-management]
user@host# set authentication-entry-timeout 25
user@host# set invalid-authentication-entry-timeout 20
user@host# set connection connect-method https
```

```

user@host# set connection port 443
user@host# set connection primary address 10.209.96.248
user@host# set connection primary client-id test
user@host# set connection primary client-secret "$9$F3KG3A0Ehvv87yl"

```

5. Configure the delay time (in seconds) before the firewall sends the individual user query.

```

[edit services user-identification identity-management]
user@host# set batch-query items-per-batch 100
user@host# set batch-query query-interval 60

```

6. Specify the LDAP server for external authentication, and configure ldap-options within the profile.

```

[edit access profile ldap_profile]
user@host# set authentication-order ldap
user@host# set ldap-options base-distinguished-name dc=juniper,dc=com
user@host# set ldap-options search search-filter CN=
user@host# set ldap-options search admin-search distinguished-name
CN=Administrator,CN=Users,DC=juniper,DC=com
user@host# set ldap-options search admin-search password "$9$Bmf1hreK8x7Vr124ZGiHkqmPQ36/
t00R"
user@host# set ldap-server 192.168.3.10

```

7. Configure the type of firewall and the default profile name where the authentication settings are defined.

```

[edit access]
user@host# set firewall-authentication web-authentication default-profile ldap_profile

```

8. Define a security policy, exp1, to control the explicit web proxy traffic and to add user information to JIMS.

```

[edit security policies explicit-proxy profile exp1]
user@host# set policy exp1 match source-address any
user@host# set policy exp1 match destination-address any
user@host# set policy exp1 match application any
user@host# set policy exp1 match source-identity unauthenticated-user
user@host# set policy exp1 match dynamic-application any
user@host# set policy exp1 then permit firewall-authentication user-firewall access-
profile ldap_profile
user@host# set policy exp1 then permit firewall-authentication user-firewall web-redirect

```

```

user@host# set policy exp1 then permit firewall-authentication user-firewall web-redirect-
to-https
user@host# set policy exp1 then permit firewall-authentication push-to-identity-management

```

9. Configure a security policy, exp2, and apply it to permit the traffic from any dynamic application.

```

[edit security policies explicit-proxy profile exp1]
user@host# set policy exp2 match source-address any
user@host# set policy exp2 match destination-address any
user@host# set policy exp2 match application any
user@host# set policy exp2 match source-identity any
user@host# set policy exp2 match dynamic-application any
user@host# set policy exp2 then permit

```

10. Configure interfaces to apply explicit web proxy and Web authentication. Enable Web authentication and explicit web proxy at the ge-0/0/2 interface.

```

[edit interfaces]
user@host# set ge-0/0/1 unit 0 family inet address 203.0.113.254/24
user@host# set ge-0/0/2 unit 0 family inet address 192.0.3.100/24 web-authentication http
user@host# set ge-0/0/2 unit 0 family inet address 192.0.3.100/24 web-authentication https
user@host# set ge-0/0/2 unit 0 explicit-proxy profile exp1

```

SEE ALSO

| [External Authentication Servers](#)

Verification

IN THIS SECTION

- [Explicit Web Proxy Verification | 309](#)
- [Identity Management Verification | 310](#)

List of show commands used to verify the feature in this example.

Command	Verification Task
<code>show services user-identification authentication-table</code>	Display the user identity information authentication table entries for the specified authentication source.
<code>show services web-proxy</code>	Display information about the secure Web proxy session.
<code>show services ssl proxy profile</code>	Display information about the SSL proxy profile details.

Explicit Web Proxy Verification

Purpose

Verify information about the secure explicit web proxy session.

Action

From operational mode, enter **show security policies explicit-proxy explicit-proxy-profile exp1** to view the explicit web proxy details.

```
user@host> show security policies explicit-proxy explicit-proxy-profile exp1
```

```
Explicit Proxy Profile: exp1
```

```
Pre ID default policy: permit-all
```

```
Default policy: deny-all
```

```
Policy: exp1, State: enabled, Index: 7, Scope Policy: 0, Sequence number: 1, Log Profile ID: 0
```

```
Source vrf group: any
```

```
Destination vrf group: any
```

```
Source addresses: any
```

```
Destination addresses: any
```

```
Applications: any
```

```
Dynamic Applications: any
```

```
Source identities: unauthenticated-user
```

```
Source identity feeds: any
```

```
Destination identity feeds: any
```

```
Action: permit, firewall authentication
```

```
Policy: exp2, State: enabled, Index: 8, Scope Policy: 0, Sequence number: 2, Log Profile ID: 0
```

```
Source vrf group: any
```

```
Destination vrf group: any
```

```
Source addresses: any
```

```
Destination addresses: any
```

```

Applications: any
Dynamic Applications: any
Source identities: any
Source identity feeds: any
Destination identity feeds: any
Action: permit

```

```
user@host> show services web-proxy explicit-proxy statistics
```

```
Explicit Proxy :
```

```

Active Explicit HTTPS proxy sessions      0
Active Explicit HTTP proxy sessions        0
Total Explicit HTTPS proxy sessions        0
Total Explicit HTTP proxy sessions         0
Sessions Dropped due to rate limit         0
Listen port conflicts with system port     0

```

```
user@host> show security policies explicit-proxy hit-count
```

```
Logical system: root-logical-system
```

Index	Explicit Proxy Profile	Name	Policy count	Action
1	exp1	expp1	0	Permit
2	exp1	expp2	0	Permit

```
Number of policy: 2
```

Meaning

The sample output shows the traffic allowed to the explicit proxy service session.

Identity Management Verification

Purpose

Verify the statistical data about the batch queries sent to the JIMS server and the responses received from JIMS.

Action

From operational mode, enter **show services user-identification identity-management counters session** and **show services user-identification identity-management status**.

```
user@host> show services user-identification identity-management counters session
```

```

Primary server :
Address                : 10.209.96.248
Batch queries sent     : 1316
Batch queries returned  : 1316
Batch query error received : 1
Auth entry lookup queries sent : 1
Auth entry lookup queries returned : 1
Auth entry lookup query errors encountered : 0
Auth entry lookup time, average(ms) : 10
Auth entry lookup time, max(ms) : 20
Certificate revocation requests sent : 0
Certificate revocation responses received : 0
Certificates revoked    : 0
Secondary server :
Address                : Not configured

```

```
user@host> show services user-identification identity-management status
```

```

Primary server :
Address                : 10.209.96.248*
Port                   : 443
Source                 : Automatic
Interface              : Automatic
Routing-instance       : Automatic
Connection method      : HTTPS
Connection status      : Online
Last received status message : OK (200)
Access token           : 053d2b80-e264-46e8-8469-2da9f51d8b2f
Token expire time      : 2023-12-13 15:07:25

Secondary server :
Address                : Not configured

```

Meaning

The sample output shows that the JIMS server is online. The output also shows which server is responding to queries from the SRX Series Firewall.

Appendix 1: set Commands on SRX Series Firewall

set command output on all devices:

```
set system services web-management http port 80
set system services web-management http interface ge-0/0/2
set system services web-management https pki-local-certificate server_nodomain
set services ssl proxy profile pr1 root-ca MYCERT
set services ssl proxy profile pr1 actions ignore-server-auth-failure
set services web-proxy explicit-proxy profile exp1 listening-port 9443
set services web-proxy explicit-proxy profile exp1 ssl-proxy profile-name pr1
set services user-identification identity-management authentication-entry-timeout 25
set services user-identification identity-management invalid-authentication-entry-timeout 20
set services user-identification identity-management connection connect-method https
set services user-identification identity-management connection port 443
set services user-identification identity-management connection primary address 10.209.96.248
set services user-identification identity-management connection primary client-id test
set services user-identification identity-management connection primary client-secret
"$9$sUYJD.mT3/t5Q"
set services user-identification identity-management batch-query items-per-batch 100
set services user-identification identity-management batch-query query-interval 60
set security policies explicit-proxy profile exp1 policy exp1 match source-address any
set security policies explicit-proxy profile exp1 policy exp1 match destination-address any
set security policies explicit-proxy profile exp1 policy exp1 match application any
set security policies explicit-proxy profile exp1 policy exp1 match source-identity
unauthenticated-user
set security policies explicit-proxy profile exp1 policy exp1 match dynamic-application any
set security policies explicit-proxy profile exp1 policy exp1 then permit firewall-
authentication user-firewall access-profile ldap_profile
set security policies explicit-proxy profile exp1 policy exp1 then permit firewall-
authentication user-firewall web-redirect
set security policies explicit-proxy profile exp1 policy exp1 then permit firewall-
authentication user-firewall web-redirect-to-https
set security policies explicit-proxy profile exp1 policy exp1 then permit firewall-
authentication push-to-identity-management
set security policies explicit-proxy profile exp1 policy exp2 match source-address any
```

```

set security policies explicit-proxy profile exp1 policy exp2 match destination-address any
set security policies explicit-proxy profile exp1 policy exp2 match application any
set security policies explicit-proxy profile exp1 policy exp2 match source-identity any
set security policies explicit-proxy profile exp1 policy exp2 match dynamic-application any
set security policies explicit-proxy profile exp1 policy exp2 then permit
set interfaces ge-0/0/1 unit 0 family inet address 203.0.113.254/24
set interfaces ge-0/0/2 unit 0 family inet address 192.0.3.100/24 web-authentication http
set interfaces ge-0/0/2 unit 0 family inet address 192.0.3.100/24 web-authentication https
set interfaces ge-0/0/2 unit 0 explicit-proxy profile exp1
set access firewall-authentication web-authentication default-profile ldap_profile
set access profile ldap_profile authentication-order ldap
set access profile ldap_profile ldap-options base-distinguished-name dc=juniper,dc=com
set access profile ldap_profile ldap-options search search-filter CN=
set access profile ldap_profile ldap-options search admin-search distinguished-name
CN=Administrator,CN=Users,DC=juniper,DC=com
set access profile ldap_profile ldap-options search admin-search password
"$9$Bmf1hreK8x7Vrl24ZGiHkqmPQ36/t00R"
set access profile ldap_profile ldap-server 192.168.3.10

```

Appendix 2: show Configuration Output on SRX Series Firewall

show command output on the firewall:

From configuration mode, confirm your configuration by entering the `show security policies`, `show interfaces`, `show services ssl`, `show access`, and `show services user-identification identity-management` commands. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct the configuration.

```

user@host# show access
profile ldap_profile {
  authentication-order ldap;
  ldap-options {
    base-distinguished-name dc=juniper,dc=com;
    search {
      search-filter CN=;
      admin-search {
        distinguished-name CN=Administrator,CN=Users,DC=juniper,DC=com;
        password "$9$Bmf1hreK8x7Vrl24ZGiHkqmPQ36/t00R"; ## SECRET-DATA
      }
    }
  }
  ldap-server {

```

```

        192.168.3.10;
    }
}
firewall-authentication {
    web-authentication {
        default-profile ldap_profile;
    }
}

```

```

user@host# show system services
web-management {
    http {
        port 80;
        interface ge-0/0/2.0;
    }
    https {
        pki-local-certificate server_nodomain;
    }
}

```

```

user@host# show services ssl
proxy {
    profile pr1 {
        root-ca MYCERT;
        actions {
            ignore-server-auth-failure;
            log {
                all;
            }
        }
    }
}

```

```

user@host# show services web-proxy explicit-proxy
profile exp1 {
    listening-port 9443;
    ssl-proxy {

```

```

        profile-name pr1;
    }
}

```

```

user@host# show interfaces
ge-0/0/2 {
    unit 0 {
        family inet {
            address 192.0.3.100/24 {
                web-authentication {
                    http;
                    https;
                }
            }
        }
        explicit-proxy {
            profile exp1;
        }
    }
}
ge-0/0/1 {
    unit 0 {
        family inet {
            address 203.0.113.254/24;
        }
    }
}

```

```

user@host# show security policies
explicit-proxy {
    profile exp1 {
        policy exp1 {
            match {
                source-address any;
                destination-address any;
                application any;
                source-identity unauthenticated-user;
                dynamic-application any;
            }
            then {

```

```

        permit {
            firewall-authentication {
                user-firewall {
                    ##
                    ## Warning: access-profile must be defined or access to profile is
disabled for tenants
                    ## Warning: access-profile must be defined or access to profile is
disabled for tenants
                    ##
                    access-profile ldap_profile;
                    web-redirect;
                    web-redirect-to-https;
                }
                push-to-identity-management;
            }
        }
    }
}
policy exp2 {
    match {
        source-address any;
        destination-address any;
        application any;
        source-identity any;
        dynamic-application any;
    }
    then {
        permit;
    }
}
}
}

```

```

user@host# show services user-identification identity-management
authentication-entry-timeout 25;
invalid-authentication-entry-timeout 20;
connection {
    connect-method https;
    port 443;
    primary {
        address 10.209.96.248;
    }
}

```



```
    client-id test;
    client-secret "$9$sUYJD.mT3/t5Q"; ## SECRET-DATA
  }
}
batch-query {
  items-per-batch 100;
  query-interval 60;
}
```

Monitoring and Troubleshooting Security Policies

IN THIS SECTION

- [Understanding Security Alarms | 318](#)
- [Example: Generating a Security Alarm in Response to Policy Violations | 318](#)
- [Matching Security Policies | 322](#)
- [Tracking Policy Hit Counts | 324](#)
- [Checking Memory Usage on SRX Series Devices | 324](#)
- [Monitor Security Policy Statistics | 326](#)
- [Verifying Shadow Policies | 327](#)
- [Troubleshooting Security Policies | 330](#)
- [High Availability \(HA\) Synchronization of Address Name Resolving Cache | 333](#)

Monitoring provides a real-time presentation of meaningful data representing the state of access activities on a network. This insight allows you to easily interpret and effect operational conditions. Troubleshooting provides contextual guidance for resolving the access issues on networks. You can then address user concerns and provide resolution in a timely manner.

Understanding Security Alarms

Alarms are triggered when packets are dropped because of a policy violation. A policy violation occurs when a packet matches a reject or deny policy. A policy violation alarm is generated when the system monitors any of the following audited events:

- Number of policy violations by a source network identifier within a specified period
- Number of policy violations to a destination network identifier within a specified period
- Number of policy violations to an application within a specified period
- Policy rule or group of rule violations within a specified period

There are four types of alarms corresponding to these four events. The alarms are based on source IP, destination IP, application, and policy.

When a packet encounters a reject or deny policy, the policy violation counters for all enabled types of alarm are increased. When any counter reaches the specified threshold within a specified period, an alarm is generated. After a specified period, the policy violation counter is reset and reused to start another counting cycle.

To view the alarm information, run the `show security alarms` command. The violation count and the alarm do not persist across system reboots. After a reboot, the violation count resets to zero and the alarm is cleared from the alarm queue.

After taking appropriate actions, you can clear the alarm. The alarm remains in the queue until you clear it (or until you reboot the device). To clear the alarm, run the `clear security alarms` command. After you clear the alarm, a subsequent series of flow policy violations can cause a new alarm to be raised.

SEE ALSO

Example: Setting an Audible Alert as Notification of a Security Alarm

Example: Generating a Security Alarm in Response to Policy Violations

IN THIS SECTION

● [Requirements | 319](#)

- [Overview | 319](#)
- [Configuration | 319](#)
- [Verification | 321](#)

This example shows how to configure the device to generate a system alarm when a policy violation occurs. By default, no alarm is raised when a policy violation occurs.

Requirements

No special configuration beyond device initialization is required before configuring this feature.

Overview

In this example, you configure an alarm to be raised when:

- The application size is 10240 units.
- The source IP violation exceeds 1000 within 20 seconds.
- The destination IP violations exceeds 1000 within 10 seconds.
- The policy match violation exceeds 100, with a size of 100 units.

Configuration

IN THIS SECTION

- [Procedure | 320](#)

Procedure

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the [edit] hierarchy level , and then enter `commit` from configuration mode.

```
set security alarms potential-violation policy application size 10240
set security alarms potential-violation policy source-ip threshold 1000 duration 20
set security alarms potential-violation policy destination-ip threshold 1000 duration 10
set security alarms potential-violation policy policy-match threshold 100 size 100
```

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode* in the [CLI User Guide](#).

To configure policy violation alarms:

1. Enable security alarms.

```
[edit]
user@host# edit security alarms
```

2. Specify that an alarm should be raised when an application violation occurs.

```
[edit security alarms potential-violation policy]
user@host# set application size 10240
```

3. Specify that an alarm should be raised when a source IP violation occurs.

```
[edit security alarms potential-violation policy]
user@host# set source-ip threshold 1000 duration 20
```

4. Specify that an alarm should be raised when a destination IP violation occurs.

```
[edit security alarms potential-violation policy]
user@host# set destination-ip threshold 1000 duration 10
```

5. Specify that an alarm should be raised when a policy match violation occurs.

```
[edit security alarms potential-violation policy]
user@host# set policy-match threshold 100 size 100
```

Results

From configuration mode, confirm your configuration by entering the `show security alarms` command. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```
policy {
  source-ip {
    threshold 1000;
    duration 20;
  }
  destination-ip {
    threshold 1000;
    duration 10;
  }
  application {
    size 10240;
  }
  policy-match {
    threshold 100;
    size 100;
  }
}
```

If you are done configuring the device, enter `commit` from configuration mode.

Verification

To confirm that the configuration is working properly, from operational mode, enter the `show security alarms` command.

Matching Security Policies

The `show security match-policies` command allows you to troubleshoot traffic problems using the match criteria: source port, destination port, source IP address, destination IP address, and protocol. For example, if your traffic is not passing because either an appropriate policy is not configured or the match criteria is incorrect, the `show security match-policies` command allows you to work offline and identify where the problem actually exists. It uses the search engine to identify the problem and thus enables you to use the appropriate match policy for the traffic.

The `result-count` option specifies how many policies to display. The first enabled policy in the list is the policy that is applied to all matching traffic. Other policies below it are “shadowed” by the first and are never encountered by matching traffic.

NOTE: The `show security match-policies` command is applicable only to security policies; IDP policies are not supported.

Example 1: show security match-policies

```
user@host> show security match-policies from-zone z1 to-zone z2 source-ip 10.10.10.1
destination-ip 192.0.2.1 source-port 1 destination-port 21 protocol tcp
Policy: p1, action-type: permit, State: enabled, Index: 4
Sequence number: 1
From zone: z1, To zone: z2
Source addresses:
  a2: 203.0.113.1/25
  a3: 10.10.10.1/32
Destination addresses:
  d2: 203.0.113.129/25
  d3: 192.0.2.1/24
Application: junos-ftp
IP protocol: tcp, ALG: ftp, Inactivity timeout: 1800
Source port range: [0-0]
Destination port range: [21-21]
```

Example 2: Using the result-count Option

By default, the output list contains the policy that will be applied to traffic with the specified characteristics. To list more than one policy that match the criteria, use the `result-count` option. The first policy listed is always the policy that will be applied to matching traffic. If the `result-count` value is from 2 to 16, the output includes all policies that match the criteria up to the specified `result-count`. All policies listed after the first are “shadowed” by the first policy and are never applied to matching traffic.

Use this option to test the positioning of a new policy or to troubleshoot a policy that is not applied as expected for particular traffic.

In the following example, the traffic criteria matches two policies. The first policy listed, p1, contains the action applied to the traffic. Policy p15 is shadowed by the first policy, and its action, therefore, will not be applied to matching traffic.

```

user@host> show security match-policies from-zone zone-A to-zone zone-B source-ip 10.10.10.1
destination-ip 192.0.2.1 source-port 1004 destination-port 80 protocol tcp result-count 5
Policy: p1, action-type: permit, State: enabled, Index: 4
  Sequence number: 1
  From zone: zone-A, To zone: zone-B
  Source addresses:
    sa1: 10.10.0.0/16
  Destination addresses:
    da5: 192.0.2.0/24
  Application: any
  IP protocol: 1, ALG: 0, Inactivity timeout: 0
  Source port range: [1000-1030]
  Destination port range: [80-80]

Policy: p15, action-type: deny, State: enabled, Index: 18
  Sequence number: 15
  From zone: zone-A, To zone: zone-B
  Source addresses:
    sa11: 10.10.10.1/32
  Destination addresses:
    da15: 192.0.2.5/24
  Application: any
  IP protocol: 1, ALG: 0, Inactivity timeout: 0
  Source port range: [1000-1030]
  Destination port range: [80-80]

```

SEE ALSO

[Understanding Security Policy Rules | 96](#)

[Understanding Security Policy Elements | 95](#)

Tracking Policy Hit Counts

Use the `show security policies hit-count` command to display the utility rate of security policies according to the number of hits they receive. You can use this feature to determine which policies are being used on the device, and how frequently they are used. Depending on the command options that you choose, the number of hits can be listed without an order or sorted in either ascending or descending order, and they can be restricted to the number of hits that fall above or below a specific count or within a range. Data is shown for all zones associated with the policies or named zones.

Checking Memory Usage on SRX Series Devices

You can isolate memory issues by comparing memory values before and after policy configurations.

Memory for flow entities such as policies, zones, or addresses on SRX1400, SRX1500, SRX3400, SRX3600, SRX4100, SRX4200, SRX4600, SRX5400, SRX5600, and SRX5800 devices (depending on the Junos OS release in your installation) is dynamically allocated. However, certain practices can help monitor the current memory usage on the device and optimize parameters to better size system configuration, especially during policy implementation.

To check memory usage:

- Use the `show chassis routing-engine` command to check overall Routing Engine (RE) memory usage. The following output from this command shows memory utilization at 39 percent:

```
user@host# show chassis routing-engine
Routing Engine status:
Slot 0:
  Current state           Master
  Election priority       Master (default)
  DRAM                    1024 MB
  Memory utilization      39 percent
  CPU utilization:
    User                   0 percent
    Background             0 percent
    Kernel                 2 percent
    Interrupt              0 percent
    Idle                   97 percent
  Model                   RE-PPC-1200-A
  Start time              2011-07-09 19:19:49 PDT
  Uptime                  37 days, 15 hours, 44 minutes, 13 seconds
```


Last reboot reason	0x3:power cycle/failure watchdog		
Load averages:	1 minute	5 minute	15 minute
	0.22	0.16	0.07

- Use the `show system processes extensive` command to acquire information on the processes running on the Routing Engine.

Use the `find nsd` option in the `show system processes extensive` command to see direct usage on the Network Security Daemon (NSD) with its total memory in use as 10 megabytes and CPU utilization of 0 percent.

```
user@host# show system processes extensive | find nsd
1182 root      1 96    0 10976K 5676K select  2:08 0.00% nsd
1191 root      4  4    0  8724K 3764K select  1:57 0.00% slbd
1169 root      1 96    0  8096K 3520K select  1:51 0.00% jsrpd
1200 root      1  4    0    0K   16K peer_s  1:10 0.00% peer proxy
1144 root      1 96    0  9616K 3528K select  1:08 0.00% lacpd
1138 root      1 96    0  6488K 2932K select  1:02 0.00% ppmd
1130 root      1 96    0  7204K 2208K select  1:02 0.00% craftd
1163 root      1 96    0 16928K 5188K select  0:58 0.00% cosd
1196 root      1  4    0    0K   16K peer_s  0:54 0.00% peer proxy
  47 root      1 -16   0    0K   16K sdflus  0:54 0.00% softdepflush
1151 root      1 96    0 15516K 9580K select  0:53 0.00% appidd
 900 root      1 96    0  5984K 2876K select  0:41 0.00% eventd
```

- Check the configuration file size. Save your configuration file with a unique name before exiting the CLI. Then, enter the `ls -l filename` command from the shell prompt in the UNIX-level shell to check the file size as shown in the following sample output:

```
user@host> start shell
% ls -l config
-rw-r--r--  1 remote  staff  12681 Feb 15 00:43 config
```

SEE ALSO

[Best Practices for Defining Policies on SRX Series Devices | 102](#)

[Security Policies Overview | 2](#)

Monitor Security Policy Statistics

IN THIS SECTION

- Purpose | 326
- Action | 326

Purpose

Monitor and record traffic that Junos OS permits or denies based on previously configured policies.

Action

To monitor traffic, enable the count and log options.

Count—Configurable in an individual policy. If count is enabled, statistics are collected for sessions that enter the device for a given policy, and for the number of packets and bytes that pass through the device in both directions for a given policy. For counts (only for packets and bytes), you can specify that alarms be generated whenever the traffic exceeds specified thresholds. See [count \(Security Policies\)](#).

Log—Logging capability can be enabled with security policies during session initialization (**session-init**) or session close (**session-close**) stage. See [log \(Security Policies\)](#).

- To view logs from denied connections, enable log on **session-init**.
- To log sessions after their conclusion/tear-down, enable log on **session-close**.

NOTE: Session log is enabled at real time in the flow code which impacts the user performance. If both **session-close** and **session-init** are enabled, performance is further degraded as compared to enabling **session-init** only.

For details about information collected for session logs, see [Information Provided in Session Log Entries for SRX Series Services Gateways](#).

Verifying Shadow Policies

IN THIS SECTION

- [Verifying All Shadow Policies | 327](#)
- [Verifying a Policy Shadows One or More Policies | 328](#)
- [Verifying a Policy Is Shadowed by One or More Policies | 329](#)

Verifying All Shadow Policies

IN THIS SECTION

- [Purpose | 327](#)
- [Action | 327](#)
- [Meaning | 328](#)

Purpose

Verify all the policies that shadows one or more policies.

Action

From the operational mode, enter the following commands:

- For logical systems, enter the `show security shadow-policies logical-system lsys-name from-zone from-zone-name to-zone to-zone-name` command.
- For global policies, enter the `show security shadow-policies logical-system lsys-name global` command.

```

root@host> show security shadow-policies from-zone zone-a to-zone zone-b
Policies          Shadowed policies
P1                P3
P1                P4
  
```

P2	P5
----	----

Meaning

The output displays the list of all policies that shadows other policies. In this example, P1 policy shadows P3 and P4 policies and P2 policy shadows P5 policy.

Verifying a Policy Shadows One or More Policies

IN THIS SECTION

- Purpose | 328
- Action | 328
- Meaning | 329

Purpose

Verify if a given policy shadows one or more policies positioned after it.

Action

From the operational mode, enter the following commands:

- For logical systems, enter the `show security shadow-policies logical-system lsys-name from-zone from-zone-name to-zone to-zone-name policy policy-name` command.
- For global policies, enter the `show security shadow-policies logical-system lsys-name global policy policy-name` command.

```
root@host> show security shadow-policies from-zone zone-a to-zone zone-b policy P1
Policies          Shadowed policies
P1                P3
P1                P4
```

Meaning

The output displays all the policies that are shadowed by the given policy. In this example, P1 policy shadows P3 and P4 policies.

Verifying a Policy Is Shadowed by One or More Policies

IN THIS SECTION

- Purpose | 329
- Action | 329
- Meaning | 329

Purpose

Verify if a given policy is shadowed by one or more positioned before it.

Action

From the operational mode, enter the following commands:

- For logical systems, enter the `show security shadow-policies logical-system lsys-name from-zone from-zone-name to-zone to-zone-name policy policy-name reverse` command.
- For global policies, enter the `show security shadow-policies logical-system lsys-name global policy policy-name reverse` command.

```
root@host> show security shadow-policies from-zone zone-a to-zone zone-b policy P4 reverse
Policies          Shadowed policies
P1                P4
```

Meaning

The output displays the given policy shadowed by one or more policies. In this example, P4 policy is shadowed by P1 policy.

RELATED DOCUMENTATION

[Understanding Security Policy Ordering | 237](#)

[Example: Reordering Security Policies | 239](#)

Troubleshooting Security Policies

IN THIS SECTION

- [Synchronizing Policies Between Routing Engine and Packet Forwarding Engine | 330](#)
- [Checking a Security Policy Commit Failure | 331](#)
- [Verifying a Security Policy Commit | 332](#)
- [Debugging Policy Lookup | 333](#)

Synchronizing Policies Between Routing Engine and Packet Forwarding Engine

IN THIS SECTION

- [Problem | 330](#)
- [Solution | 331](#)

Problem

Description

Security policies are stored in the routing engine and the packet forwarding engine. Security policies are pushed from the Routing Engine to the Packet Forwarding Engine when you commit configurations. If the security policies on the Routing Engine are out of sync with the Packet Forwarding Engine, the commit of a configuration fails. Core dump files may be generated if the commit is tried repeatedly. The out of sync can be due to:

- A policy message from Routing Engine to the Packet Forwarding Engine is lost in transit.
- An error with the routing engine, such as a reused policy UID.

Environment

The policies in the Routing Engine and Packet Forwarding Engine must be in sync for the configuration to be committed. However, under certain circumstances, policies in the Routing Engine and the Packet Forwarding Engine might be out of sync, which causes the commit to fail.

Symptoms

When the policy configurations are modified and the policies are out of sync, the following error message displays - error: Warning: policy might be out of sync between RE and PFE <SPU-name(s)> Please request security policies check/resync.

Solution

Use the `show security policies checksum` command to display the security policy checksum value and use the `request security policies resync` command to synchronize the configuration of security policies in the Routing Engine and Packet Forwarding Engine, if the security policies are out of sync.

SEE ALSO

<i>show security policies checksum</i>
<i>request security policies check</i>
<i>request security policies resync</i>

Checking a Security Policy Commit Failure

IN THIS SECTION

- [Problem | 331](#)
- [Solution | 332](#)

Problem

Description

Most policy configuration failures occur during a commit or runtime.

Commit failures are reported directly on the CLI when you execute the CLI command **commit-check** in configuration mode. These errors are configuration errors, and you cannot commit the configuration without fixing these errors.

Solution

To fix these errors, do the following:

1. Review your configuration data.
2. Open the file `/var/log/nsd_chk_only`. This file is overwritten each time you perform a commit check and contains detailed failure information.

Verifying a Security Policy Commit

IN THIS SECTION

- [Problem | 332](#)
- [Solution | 332](#)

Problem

Description

Upon performing a policy configuration commit, if you notice that the system behavior is incorrect, use the following steps to troubleshoot this problem:

Solution

1. Operational **show** Commands—Execute the operational commands for security policies and verify that the information shown in the output is consistent with what you expected. If not, the configuration needs to be changed appropriately.
2. Traceoptions—Set the `traceoptions` command in your policy configuration. The flags under this hierarchy can be selected as per user analysis of the `show` command output. If you cannot determine what flag to use, the flag option `all` can be used to capture all trace logs.

```
user@host# set security policies traceoptions <flag all>
```


You can also configure an optional filename to capture the logs.

```
user@host# set security policies traceoptions <filename>
```

If you specified a filename in the trace options, you can look in the `/var/log/<filename>` for the log file to ascertain if any errors were reported in the file. (If you did not specify a filename, the default filename is `eventd`.) The error messages indicate the place of failure and the appropriate reason.

After configuring the trace options, you must recommit the configuration change that caused the incorrect system behavior.

Debugging Policy Lookup

IN THIS SECTION

● [Problem | 333](#)

● [Solution | 333](#)

Problem

Description

When you have the correct configuration, but some traffic was incorrectly dropped or permitted, you can enable the `lookup` flag in the security policies traceoptions. The `lookup` flag logs the lookup related traces in the trace file.

Solution

```
user@host# set security policies traceoptions <flag lookup>
```

High Availability (HA) Synchronization of Address Name Resolving Cache

The Network security process (NSD) restarts when system reboots, HA failover happens, or if the process crashes. During this time, if there are large number of domain name addresses configured in the security polices, SRX Series Firewalls attempt to send requests to DNS server to get all resolved IP

addresses. A high amount of system resources are consumed when a large number of DNS queries and responses are exchanged. So, SRX Series Firewalls are unable to obtain a response from the DNS server and the address of a hostname in an address book entry might fail to resolve correctly. This can cause traffic to drop as no security policy or session match is found. The new enhancement on SRX Series Firewalls addresses this problem by caching the DNS query results into a local DNS cache file and periodically synchronizing the DNS cache file from HA primary node to HA backup node. The DNS cache file stores IP addresses, domain name, and TTL values. After the HA failover, the previous backup node becomes primary node. Since all DNS cache results are available on new primary node, security policy processing continues and pass-through traffic is allowed as per the policy rules.

Starting in Junos OS Release 19.3R1, the policy DNS cache memory is synchronized into one local DNS cache file on the HA active node and is copied to the HA backup node to suppress DNS queries or responses during NSD restart.

The following steps are performed for the synchronization to take place:

1. The policy DNS cache memory is synchronized into one local policy DNS cache file located at the `/var/db/policy_dns_cache` path every 30 seconds if the policy DNS cache memory content has changed during this period.
2. The local DNS cache file is synchronized from the HA primary node to HA backup node immediately after the local DNS cache file has been updated in Step 1.

The synchronization includes the following content:

- Domain name
- IPv4 address list and its TTL (time to live)
- IPv6 address list and its TTL

When NSD restarts, it reads and parses the local DNS cache file and imports all cache entries into memory. The synchronization ensures that DNS queries are suppressed during an NSD restart. NSD restarts on new primary node during HA failover as the resolved IP addresses for domain names already exist in DNS cache memory when reading policies configurations. Therefore, new pass-through traffic is allowed as per the security policy after HA failover because all resolved IP addresses for domain names exist inside policies on new primary node's Routing Engine and Packet Forwarding Engine.

RELATED DOCUMENTATION

[Security Policies Overview](#) | 2