JUNIPER NETWORKS

Junos Packet Vision

Published: 2014-04-27

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Table of Contents

List of Figures

List of Tables

About the Documentation

Documentation and Release Notes

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Supported Platforms

For the features described in this document, the following platforms are supported:

- M Series
- T Series
- MX Series

Using the Examples in This Manual

If you want to use the examples in this manual, you can use the **load merge** or the **load merge relative** command. These commands cause the software to merge the incoming configuration into the current candidate configuration. The example does not become active until you commit the candidate configuration.

If the example configuration contains the top level of the hierarchy (or multiple hierarchies), the example is a *full example*. In this case, use the **load merge** command.

If the example configuration does not start at the top level of the hierarchy, the example is a *snippet*. In this case, use the **load merge relative** command. These procedures are described in the following sections.

Merging a Full Example

To merge a full example, follow these steps:

1. From the HTML or PDF version of the manual, copy a configuration example into a text file, save the file with a name, and copy the file to a directory on your routing platform.

   For example, copy the following configuration to a file and name the file **ex-script.conf**. Copy the **ex-script.conf** file to the **/var/tmp** directory on your routing platform.

   ```
   system {
     scripts {
       commit {
         file ex-script.xsl;
       }
     }
   }
   interfaces {
     fxp0 {
       disable;
       unit 0 {
         family inet {
           address 10.0.0.1/24;
         }
       }
     }
   }
   ```

2. Merge the contents of the file into your routing platform configuration by issuing the **load merge** configuration mode command:

   ```
   [edit]
   user@host# load merge /var/tmp/ex-script.conf
   load complete
   ```

Merging a Snippet

To merge a snippet, follow these steps:

1. From the HTML or PDF version of the manual, copy a configuration snippet into a text file, save the file with a name, and copy the file to a directory on your routing platform.

   For example, copy the following snippet to a file and name the file **ex-script-snippet.conf**. Copy the **ex-script-snippet.conf** file to the **/var/tmp** directory on your routing platform.

   ```
   commit {
     file ex-script-snippet.xsl; }
   ```

2. Move to the hierarchy level that is relevant for this snippet by issuing the following configuration mode command:

```
[edit]
user@host# edit system scripts
[edit system scripts]
```

3. Merge the contents of the file into your routing platform configuration by issuing the **load merge relative** configuration mode command:

```
[edit system scripts]
user@host# load merge relative /var/tmp/ex-script-snippet.conf
load complete
```

For more information about the **load** command, see the *CLI User Guide*.

Documentation Conventions

Table 1 on page xi defines notice icons used in this guide.

Table 1: Notice Icons

Icon	Meaning	Description
	Informational note	Indicates important features or instructions.
	Caution	Indicates a situation that might result in loss of data or hardware damage.
	Warning	Alerts you to the risk of personal injury or death.
	Laser warning	Alerts you to the risk of personal injury from a laser.
	Tip	Indicates helpful information.
	Best practice	Alerts you to a recommended use or implementation.

Table 2 on page xi defines the text and syntax conventions used in this guide.

Table 2: Text and Syntax Conventions

Convention	Description	Examples
Bold text like this	Represents text that you type.	To enter configuration mode, type the **configure** command: user@host> **configure**

Table 2: Text and Syntax Conventions *(continued)*

Convention	Description	Examples
`Fixed-width text like this`	Represents output that appears on the terminal screen.	`user@host>` **show chassis alarms** `No alarms currently active`
Italic text like this	• Introduces or emphasizes important new terms. • Identifies guide names. • Identifies RFC and Internet draft titles.	• A policy *term* is a named structure that defines match conditions and actions. • *Junos OS CLI User Guide* • RFC 1997, *BGP Communities Attribute*
Italic text like this	Represents variables (options for which you substitute a value) in commands or configuration statements.	Configure the machine's domain name: [edit] root@# **set system domain-name** *domain-name*
Text like this	Represents names of configuration statements, commands, files, and directories; configuration hierarchy levels; or labels on routing platform components.	• To configure a stub area, include the **stub** statement at the **[edit protocols ospf area area-id]** hierarchy level. • The console port is labeled **CONSOLE**.
< > (angle brackets)	Encloses optional keywords or variables.	**stub <default-metric** ***metric*****>;**
| (pipe symbol)	Indicates a choice between the mutually exclusive keywords or variables on either side of the symbol. The set of choices is often enclosed in parentheses for clarity.	**broadcast | multicast** **(*string1* | *string2* | *string3*)**
# (pound sign)	Indicates a comment specified on the same line as the configuration statement to which it applies.	**rsvp { # Required for dynamic MPLS only**
[ ] (square brackets)	Encloses a variable for which you can substitute one or more values.	**community name members [** ***community-ids*** **]**

Indention and braces ({ })	Identifies a level in the configuration hierarchy.	[edit]
		routing-options {
		  static {
		  route default {
		  nexthop *address*;
		  retain;
		  }
		  }
		}

; (semicolon)	Identifies a leaf statement at a configuration hierarchy level.	
GUI Conventions		
Bold text like this	Represents graphical user interface (GUI) items you click or select.	• In the Logical Interfaces box, select **All Interfaces**. • To cancel the configuration, click **Cancel**.

Table 2: Text and Syntax Conventions *(continued)*

Convention	Description	Examples
> (bold right angle bracket)	Separates levels in a hierarchy of menu selections.	In the configuration editor hierarchy, select **Protocols>Ospf**.

Documentation Feedback

We encourage you to provide feedback, comments, and suggestions so that we can improve the documentation. You can provide feedback by using either of the following methods:

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You can open a case with JTAC on the Web or by telephone.

- Use the Case Management tool in the CSC at http://www.juniper.net/cm/.
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For international or direct-dial options in countries without toll-free numbers, see http://www.juniper.net/support/requesting-support.html.

PART 1

Overview

CHAPTER 1

Junos Packet Vision

Understanding Junos Packet Vision

Junos Capture Vision (previously known as dynamic flow capture) enables you to capture packet flows on the basis of dynamic filtering criteria, using Dynamic Tasking Control Protocol (DTCP) requests. Junos Packet Vision is a Junos OS application that performs lawful intercept of packet flows, using Dynamic Tasking Control Protocol (DTCP). The application extends the use of DTCP to intercept IPv4 and IPv6 packets in an active monitoring router and send a copy of packets that match filter criteria to one or more content destinations. Junos Packet Vision was previously know as flow-tap application.

Junos Packet Vision data can be used in the following applications:

- Flexible trend analysis for detection of new security threats
- Lawful intercept

Junos Packet Vision is supported on M Series and T Series routers, except M160 and TX Matrix routers. Junos Packet Vision filters are applied on all IPv4 traffic and do not add any perceptible delay in the forwarding path. Junos Packet Vision filters can also be applied on IPv6 traffic. For security, filters installed by one client are not visible to others and the CLI configuration does not reveal the identity of the monitored target. A lighter version of the application is supported on MX Series routers only.

Related Documentation

- Junos Packet Vision Architecture on page 3
- Configuring Junos Packet Vision on page 9
- Configuring FlowTapLite on page 12
- Examples: Configuring Junos Packet Vision on page 15

Junos Packet Vision Architecture

The Junos Packet Vision (previously known as Flow-Tap) architecture consists of one or more *mediation devices* that send requests to a Juniper Networks router to monitor

incoming data and forward any packets that match specific filter criteria to a set of one or more *content destinations*:

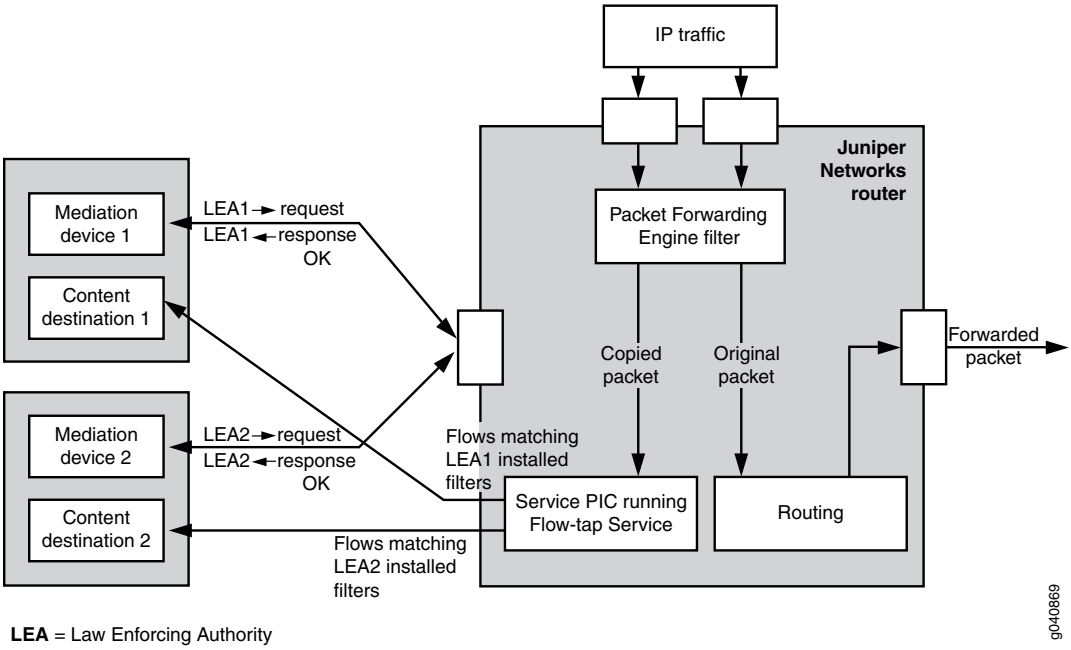
- Mediation device—A client that monitors electronic data or voice transfer over the network. The mediation device sends filter requests to the Juniper Networks router using the DTCP. The clients are not identified for security reasons, but have permissions defined by a set of special login classes. Each system can support up to 16 different mediation devices for each user, up to a maximum of 64 mediation devices for the whole system.
- Monitoring platform—An M Series or T Series router containing one or more Adaptive Services (AS) or Multiservices PICs, which are configured to support the Junos Packet Vision application. The monitoring platform processes the requests from the mediation devices, applies the dynamic filters, monitors incoming data flows, and sends the matched packets to the appropriate content destinations.
- Content destination—Recipient of the matched packets from the monitoring platform. Typically the matched packets are sent using an IP Security (IPsec) tunnel from the monitoring platform to another router connected to the content destination. The content destination and the mediation device can be physically located on the same host. For more information about IPsec tunnels, see *Junos VPN Site Secure*.
- Dynamic filters—Firewall filters automatically generated by the Packet Forwarding Engine and applied to all routing instances. Each term in the filter includes a **flow-tap** action that is similar to the existing **sample** or **port-mirroring** actions. As long as one of the filter terms matches an incoming packet, the router copies the packet and forwards it to the Adaptive Services or Multiservices PIC that is configured for Junos Packet Vision service. The Adaptive Services or Multiservices PIC runs the packet through the client filters and sends a copy to each matching content destination.

Following is a sample filter configuration; note that it is dynamically generated by the router (no user configuration is required):

```
filter combined_LEA_filter {
    term LEA1_filter {
        from {
            source-address 1.2.3.4;
            destination-address 3.4.5.6;
        }
        then {
            flow-tap;
        }
    }
    term LEA2_filter {
        from {
            source-address 10.1.1.1;
            source-port 23;
        }
        then {
            flow-tap;
        }
    }
}
```

Figure 1 on page 5 shows a sample topology that uses two mediation devices and two content destinations.

Figure 1: Junos Packet Vision Topology



LEA = Law Enforcing Authority

Related Documentation

- Understanding Junos Packet Vision on page 3
- [edit services flow-tap] Hierarchy Level on page 9
- Configuring Junos Packet Vision on page 9
- Examples: Configuring Junos Packet Vision on page 15

PART 2

Configuration

CHAPTER 2

Configuration Tasks

[edit services flow-tap] Hierarchy Level

To configure flow-tap services, include the **flow-tap** statement at the **[edit services]** hierarchy level. You can also specify whether you want to apply the flow-tap service to IPv4 traffic or IPv6 traffic by including the **family inet | inet6** statement. If the **family** statement is not included in the configuration, the flow-tap service is applied only to the IPv4 traffic.

```
flow-tap {
    interface interface-name;
    family inet | inet6;
}
```

Other statements are configured at the **[edit interfaces]** and **[edit system]** hierarchy levels.

Related Documentation

- Junos Packet Vision Architecture on page 3
- Configuring Junos Packet Vision on page 9
- Configuring FlowTapLite on page 12

Configuring Junos Packet Vision

This topic explains Junos Packet Vision (previously known as Flow-Tap) configuration, and contains the following sections:

Configuring the Junos Packet Vision Interface

To configure an adaptive services interface for flow-tap service, include the **interface** statement at the **[edit services flow-tap]** hierarchy level:

```
interface sp-fpc/pic/port.unit-number;
```

You can assign any Adaptive Services or Multiservices PIC in the active monitoring router for Junos Packet Vision, and use any logical unit on the PIC.

You can specify the type of traffic for which you want to apply the Junos Packet Vision service by including the **family inet | inet6** statement. If the **family** statement is not included, the Junos Packet Vision service is, by default, applied to the IPv4 traffic. To apply Junos Packet Vision service to IPv6 traffic, you must include the **family inet6** statement in the configuration. To enable the Junos Packet Vision service for IPv4 and IPv6 traffic, you must explicitly configure the **family** statement for both **inet** and **inet6** families.

NOTE: You cannot configure Junos Capture Vision (previously known as dynamic flow capture) and Junos Packet Vision services on the same router simultaneously.

You must also configure the logical interface at the **[edit interfaces]** hierarchy level:

```
interface sp-fpc/pic/port {
  unit logical-unit-number {
    family inet;
    family inet6;
  }
}
```

NOTE: If you do not include the family inet6 statement in the configuration, IPv6 flows will not be intercepted.

Strengthening Junos Packet Vision Security

You can add an extra level of security to Dynamic Tasking Control Protocol (DTCP) transactions between the mediation device and the router by enabling DTCP sessions on top of the SSH layer. To configure SSH settings, include the **flow-tap-dtcp** statement at the **[edit system services]** hierarchy level:

```
flow-tap-dtcp {
  ssh {
    connection-limit value;
    rate-limit value;
  }
}
```

To configure client permissions for viewing and modifying Junos Packet Vision configurations and for receiving tapped traffic, include the **permissions** statement at the **[edit system login class *class-name*]** hierarchy level:

permissions [*permissions*];

The permissions needed to use Junos Packet Vision features are as follows:

- **flow-tap**—Can view Junos Packet Vision configuration
- **flow-tap-control**—Can modify Junos Packet Vision configuration
- **flow-tap-operation**—Can tap flows

You can also specify user permissions on a RADIUS server, for example:

```
Bob Auth-Type := Local, User-Password = = “abc123”
Juniper-User-Permissions = “flow-tap-operation”
```

For details on **[edit system]** and RADIUS configuration, see the *Junos OS Administration Library for Routing Devices*.

Restrictions on Junos Packet Vision Services

The following restrictions apply to Junos Packet Vision services:

- You cannot configure Junos Capture Vision and Junos Packet Vision features on the same router simultaneously.
- On routers that support LMNR-based FPCs, you cannot configure the Junos Packet Vision for IPv6 along with port mirroring or sampling of IPv6 traffic. This restriction applies even if the router does not have any LMNR-based FPC installed in it. However, there is no restriction on configuring Junos Packet Vision on routers that are configured for port mirroring or sampling of IPv4 traffic.
- Junos Packet Vision does not support interception of MPLS and virtual private LAN service (VPLS).
- Junos Packet Vision cannot intercept Address Resolution Protocol (ARP) and other Layer 2 exceptions.
- IPv4 and IPv6 intercept filters can coexist on a system, subject to a combined maximum of 100 filters.
- When Junos Capture Vision process or the Adaptive Services or Multiservices PIC configured for Junos Packet Vision restarts, all filters are deleted and the mediation devices are disconnected.
- Only the first fragment of an IPv4 fragmented packet stream is sent to the content destination.
- Port mirroring might not work in conjunction with Junos Packet Vision.
- Running the Junos Packet Vision over an IPsec tunnel on the same router can cause packet loops and is not supported.
- M10i routers do not support the standard Junos Packet Vision, but do support FlowTapLite (see “Configuring FlowTapLite” on page 12). Junos Packet Vision and FlowTapLite cannot be configured simultaneously on the same chassis.

- PIC-based flow-tap is not supported on M7i and M10i routers equipped with an Enhanced Compact Forwarding Engine Board (CFEB-E).
- You cannot configure Junos Packet Vision on channelized interfaces.

Related Documentation

- Configuring FlowTapLite on page 12

Configuring FlowTapLite

A lighter version of the flow-tap application is available on MX Series routers and also on M320 routers with Enhanced III Flexible PIC Concentrators (FPCs). All of the functionality resides in the Packet Forwarding Engine rather than a service PIC or Dense Port Concentrator (DPC).

NOTE: On M320 routers only, if the replacement of FPCs results in a mode change, you must restart the dynamic flow capture process manually by disabling and then re-enabling the CLI configuration.

FlowTapLite uses the same DTCP-SSH architecture to install the Dynamic Tasking Control Protocol (DTCP) filters and authenticate the users as the original flow-tap application and supports up to 3000 filters per chassis.

NOTE: The original flow-tap application and FlowTapLite cannot be used at the same time.

To configure FlowTapLite, include the **flow-tap** statement at the **[edit services]** hierarchy level:

```
flow-tap {
    tunnel-interface interface-name;
}
```

For the Packet Forwarding Engine to encapsulate the intercepted packet, it must send the packet to a tunnel logical (**vt-**) interface. You need to allocate a tunnel interface and assign it to the dynamic flow capture process for FlowTapLite to use. To create the tunnel interface, include the following configuration:

```
chassis {
    fpc number {
        pic number {
            tunnel-services {
                bandwidth (1g | 10g);
            }
        }
    }
}
```

NOTE: Currently FlowTapLite supports only one tunnel interface per instance.

For more information about this configuration, see the *Junos OS Administration Library for Routing Devices*.

To configure the logical interfaces and assign them to the dynamic flow capture process, include the following configuration:

```
interfaces {
   vt-fpc/pic/port {
      unit 0 {
         family inet;
         family inet6;
      }
   }
}
```

NOTE: If a service PIC or DPC is available, you can use its tunnel interface for the same purpose.

NOTE: If you do not include the family inet6 statement in the configuration, IPv6 flows will not be intercepted.

NOTE: With FlowTapLite configured and traceoptions enabled, if you add more than two content destinations by including the X-JTAP-CDEST-DEST-ADDRESS line in the Dynamic Tasking Control Protocol (DTCP) parameter file and initiate a DTCP session by sending a DTCP ADD message, a '400 BAD request' message is received. Although you can specify more than two content destinations in the DTCP file that is sent from the mediation device, this error message occurs when the DTCP ADD message is sent. This behavior is expected with more than two content destinations. You must specify only two content destinations per DTCP ADD message.

Related Documentation

- Understanding Junos Packet Vision on page 3
- [edit services flow-tap] Hierarchy Level on page 9
- Configuring Junos Packet Vision on page 9
- Examples: Configuring Junos Packet Vision on page 15

CHAPTER 3

Example

Examples: Configuring Junos Packet Vision

The following example shows all parts of a complete Junos Packet Vision configuration with IPv4 and IPv6 flow intercepts

```
services {
   flow-tap {
      interface sp-1/2/0.100;
   }
}
interfaces {
   sp-1/2/0 {
      unit 100 {
         family inet;
         family inet6;
      }
   }
}
system {
   services {
      flow-tap-dtcp {
         ssh {
            connection-limit 5;
            rate-limit 5;
         }
      }
   }
   login {
      class ft-class {
         permissions flow-tap-operation;
      }
      user ft-user1 {
         class ft-class;
         authentication {
            encrypted-password “xxxx”;
         }
      }
   }
}
```

The following example shows a FlowTapLite configuration that intercepts IPv4 and IPv6 flows:

```
system {
    login {
        class flowtap {
            permissions flow-tap-operation;
        }
        user ftap {
            uid 2000;
            class flowtap;
            authentication {
                encrypted-password "$1$nZfwNn4L$TWi/oxFwFZyOyyxN/87Jv0"; ##
                    SECRET-DATA
            }
        }
    }
    services {
        flow-tap-dtcp {
            ssh;
        }
    }
}
    chassis {
        fpc 0 {
            pic 0 {
                tunnel-services {
                    bandwidth 10g;
                }
            }
        }
    }
    interfaces {
        vt-0/0/0 {
            unit 0 {
                family inet;
                family inet6;
            }
        }
    }
    services {
        flow-tap {
            tunnel-interface vt-0/0/0.0;
        }
    }
```

Related Documentation

- Understanding Junos Packet Vision on page 3
- [edit services flow-tap] Hierarchy Level on page 9
- Configuring Junos Packet Vision on page 9
- Configuring FlowTapLite on page 12

CHAPTER 4

Configuration Statements

flow-tap

Syntax

```
flow-tap {
    (interface interface-name | tunnel-interface interface-name | family (inet | inet6));
}
```

Hierarchy Level [edit services]

Release Information Statement introduced in Junos OS Release 8.1.

Description Enable the flow-tap or FlowTapLite application on an interface. FlowTapLite is a lighter version of the flow-tap application that is available on MX Series platforms, M120 routers, and M320 routers with Enhanced III FPCs only.

Options

interface *interface-name*—Specify the interface name for the flow-tap application.

tunnel-interface *interface-name*—Specify the tunnel interface name for the FlowTapLite application.

The remaining statements are explained separately.

Required Privilege Level

interface—To view this statement in the configuration.
interface-control—To add this statement to the configuration.

Related Documentation

- *[edit services flow-tap] Hierarchy Level*
- Configuring Junos Packet Vision on page 9

interface (Services Flow Tap)

Syntax interface sp-*fpc/pic/port.logical-unit-number*;

Hierarchy Level [edit services flow-tap]

Release Information Statement introduced in Junos OS Release 8.1.

Description Specify the AS PIC interface used with the flow-tap application. Any AS PIC available in the router can be assigned, and any logical interface on the AS PIC can be used.

Options ***interface-name***—Name of the DFC interface.

You cannot configure flow-tap services on channelized interfaces.

Required Privilege Level interface—To view this statement in the configuration.
interface-control—To add this statement to the configuration.

Related Documentation

- Configuring the Junos Packet Vision Interface on page 10

PART 3

Index

Index