



Junos[®] OS

OpenConfig Feature Guide

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Junos[®] OS OpenConfig Feature Guide

17.2

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Table of Contents

	About the Documentation	vii
	Documentation and Release Notes	vii
	Supported Platforms	vii
	Using the Examples in This Manual	vii
	Merging a Full Example	viii
	Merging a Snippet	viii
	Documentation Conventions	ix
	Documentation Feedback	xi
	Requesting Technical Support	xi
	Self-Help Online Tools and Resources	xi
	Opening a Case with JTAC	xii
Part 1	Overview	
Chapter 1	OpenConfig Overview	3
	OpenConfig Overview	3
	OpenConfig Data Model Version	4
	Installing the OpenConfig Package	4
Chapter 2	gRPC Overview	7
	Understanding OpenConfig and gRPC on Junos Telemetry Interface	7
	Network Agent Software	7
	Using OpenConfig for Junos OS to Enable Junos Telemetry Interface	8
	Using gRPC to Stream Data	8
	Installing the Network Agent Package (Junos Telemetry Interface)	10
	gRPC Service Definition for OpenConfig Telemetry	12
	Guidelines for gRPC Sensors (Junos Telemetry Interface)	15
	Supported gRPC Sensors	15
	Example: gRPC Subscription for Telemetry Data	34
Chapter 3	OpenConfig to Junos Mapping	39
	Mapping OpenConfig BGP Commands to Junos Configuration	39
	Mapping OpenConfig BGP RIB Commands to Junos Operation	49
	Mapping OpenConfig Interface Commands to Junos Configuration	50
	Mapping OpenConfig LLDP Commands to Junos Configuration	54
	Mapping OpenConfig Local Routing Commands to Junos Configuration	55
	Mapping OpenConfig MPLS Commands to Junos Configuration	56
	Mapping OpenConfig Routing Policy Commands to Junos Configuration	66
Chapter 4	Configuration Statements	71
	netconf	72

List of Tables

	About the Documentation	vii
	Table 1: Notice Icons	ix
	Table 2: Text and Syntax Conventions	x
Part 1	Overview	
Chapter 1	OpenConfig Overview	3
	Table 3: OpenConfig Data Model Versions	4
Chapter 2	gRPC Overview	7
	Table 4: Telemetry RPCs	9
	Table 5: gRPC Sensors	15
Chapter 3	OpenConfig to Junos Mapping	39
	Table 6: Global BGP Configuration	39
	Table 7: Global AFI-SAFI Configuration	40
	Table 8: Global Apply-Policy Configuration	43
	Table 9: Peer-Group Configuration	43
	Table 10: Neighbors Configuration	45
	Table 11: Sensor for BGP RIB routing table	49
	Table 12: VRRP Configuration	50
	Table 13: IPv4 and IPv6 Address Configuration	51
	Table 14: Interface AE Configuration	52
	Table 15: LACP Configuration	52
	Table 16: Member Interface Configuration	53
	Table 17: Ethernet Configuration	53
	Table 18: IFD Configuration	53
	Table 19: IFL Configuration	54
	Table 20: Global LLDP Configuration	54
	Table 21: Interface Configuration	55
	Table 22: Static Route Configuration	55
	Table 23: Local Aggregate Configuration	55
	Table 24: Global MPLS Configuration	56
	Table 25: TE Global Attributes	57
	Table 26: TE Interface Attributes	58
	Table 27: RSVP Signaling Protocols	59
	Table 28: Label Switched Paths	60
	Table 29: RSVP P2P Tunnel	63
	Table 30: Defined Set Configuration	66
	Table 31: BGP Defined Set Configuration	67
	Table 32: Policy Definition Configuration	67

About the Documentation

- Documentation and Release Notes on page vii
- Supported Platforms on page vii
- Using the Examples in This Manual on page vii
- Documentation Conventions on page ix
- Documentation Feedback on page xi
- Requesting Technical Support on page xi

Documentation and Release Notes

To obtain the most current version of all Juniper Networks[®] technical documentation, see the product documentation page on the Juniper Networks website at <http://www.juniper.net/techpubs/>.

If the information in the latest release notes differs from the information in the documentation, follow the product Release Notes.

Juniper Networks Books publishes books by Juniper Networks engineers and subject matter experts. These books go beyond the technical documentation to explore the nuances of network architecture, deployment, and administration. The current list can be viewed at <http://www.juniper.net/books>.

Supported Platforms

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

- MX Series
- PTX Series
- EX 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.xml;
    }
  }
}
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.xml; }
```

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 [CLI Explorer](#).

Documentation Conventions

Table 1 on page ix 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 x 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
Fixed-width text like this	Represents output that appears on the terminal screen.	user@host> show chassis alarms No alarms currently active
<i>Italic text like this</i>	<ul style="list-style-type: none"> Introduces or emphasizes important new terms. Identifies guide names. Identifies RFC and Internet draft titles. 	<ul style="list-style-type: none"> A policy <i>term</i> is a named structure that defines match conditions and actions. <i>Junos OS CLI User Guide</i> RFC 1997, <i>BGP Communities Attribute</i>
<i>Italic text like this</i>	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 <i>domain-name</i>
Text like this	Represents names of configuration statements, commands, files, and directories; configuration hierarchy levels; or labels on routing platform components.	<ul style="list-style-type: none"> 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 <i>metric</i> >;
(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 (<i>string1</i> <i>string2</i> <i>string3</i>)
# (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]
Indentation and braces ({ })	Identifies a level in the configuration hierarchy.	[edit] routing-options { static { route default { nexthop <i>address</i> ; retain; } } }
;(semicolon)	Identifies a leaf statement at a configuration hierarchy level.	

GUI Conventions

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

Convention	Description	Examples
Bold text like this	Represents graphical user interface (GUI) items you click or select.	<ul style="list-style-type: none"> In the Logical Interfaces box, select All Interfaces. To cancel the configuration, click Cancel.
> (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:

- Online feedback rating system—On any page of the Juniper Networks TechLibrary site at <http://www.juniper.net/techpubs/index.html>, simply click the stars to rate the content, and use the pop-up form to provide us with information about your experience. Alternately, you can use the online feedback form at <http://www.juniper.net/techpubs/feedback/>.
- E-mail—Send your comments to techpubs-comments@juniper.net. Include the document or topic name, URL or page number, and software version (if applicable).

Requesting Technical Support

Technical product support is available through the Juniper Networks Technical Assistance Center (JTAC). If you are a customer with an active J-Care or Partner Support Service support contract, or are covered under warranty, and need post-sales technical support, you can access our tools and resources online or open a case with JTAC.

- JTAC policies—For a complete understanding of our JTAC procedures and policies, review the *JTAC User Guide* located at <http://www.juniper.net/us/en/local/pdf/resource-guides/7100059-en.pdf>.
- Product warranties—For product warranty information, visit <http://www.juniper.net/support/warranty/>.
- JTAC hours of operation—The JTAC centers have resources available 24 hours a day, 7 days a week, 365 days a year.

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- Find CSC offerings: <http://www.juniper.net/customers/support/>
- Search for known bugs: <http://www2.juniper.net/kb/>
- Find product documentation: <http://www.juniper.net/techpubs/>
- Find solutions and answer questions using our Knowledge Base: <http://kb.juniper.net/>
- Download the latest versions of software and review release notes: <http://www.juniper.net/customers/csc/software/>
- Search technical bulletins for relevant hardware and software notifications: <http://kb.juniper.net/InfoCenter/>
- Join and participate in the Juniper Networks Community Forum: <http://www.juniper.net/company/communities/>
- Open a case online in the CSC Case Management tool: <http://www.juniper.net/cm/>

To verify service entitlement by product serial number, use our Serial Number Entitlement (SNE) Tool: <https://tools.juniper.net/SerialNumberEntitlementSearch/>

Opening a Case with JTAC

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/>.
- Call 1-888-314-JTAC (1-888-314-5822 toll-free in the USA, Canada, and Mexico).

For international or direct-dial options in countries without toll-free numbers, see <http://www.juniper.net/support/requesting-support.html>.

PART 1

Overview

- [OpenConfig Overview on page 3](#)
- [gRPC Overview on page 7](#)
- [OpenConfig to Junos Mapping on page 39](#)

CHAPTER 1

OpenConfig Overview

- [OpenConfig Overview on page 3](#)
- [Installing the OpenConfig Package on page 4](#)

OpenConfig Overview

OpenConfig is a collaborative effort in the networking industry to move toward a more dynamic, programmable method for configuring and managing multivendor networks. OpenConfig supports the use of vendor-neutral data models to configure and manage the network. These data models define the configuration and operational state of network devices for common network protocols or services. The data models are written in YANG, a standards-based, data modeling language that is modular, easy to read, and supports remote procedure calls (RPCs). Using industry standard models greatly benefits an operator with devices in a network from multiple vendors. The goal of OpenConfig is for operators to be able to use a single set of data models to configure and manage all the network devices that support the OpenConfig initiative.

OpenConfig for Junos OS supports the YANG data models and uses RPC frameworks to facilitate communications between a client and the router. You have the flexibility to configure your router directly by using Junos OS, or by using a third-party schema, such as OpenConfig. OpenConfig modules define a data model through its data, and the hierarchical organization of and constraints on that data. Each module is uniquely identified by a namespace URL to avoid possible conflicts with the Junos OS name.

The configuration and operational statements in Junos OS have corresponding path statements in OpenConfig. The following is a list of data modules for which mapping of OpenConfig and Junos OS configuration and operational statements is supported:

- BGP
- Routing policy
- Telemetry
- Local routing
- Interfaces
- MPLS
- LLDP

For more information on the OpenConfig initiative, see <http://www.openconfig.net/>.

OpenConfig Data Model Version

Table 3 on page 4 lists the OpenConfig data model versions.

Table 3: OpenConfig Data Model Versions

OpenConfig Data Model	Junos OS Version	OpenConfig Supported Version
BGP	Release 16.1 R3	2.0.1
	Release 17.1 R1	2.1.1
Interfaces	Release 16.1 R3 and 17.1 R1	1.0.2
LACP	Release 16.1 R3 and 17.1 R1	1.0.2
Local routing	Release 16.1 R3 and 17.1 R1	1.0.0
Telemetry	Release 16.1 R3 and 17.1 R1	0.2.0
RPC	Release 16.1 R3 and 17.1 R1	0.1.0
LLDP	Release 17.1 R1	0.1.0
Platform	Release 16.1 R3 and 17.1 R1	0.4.0
Routing policy	Release 16.1 R3	2.0.0
	Release 17.1 R1	2.0.1
MPLS RSVP	Release 16.1 R3 and 17.1 R1	1.0.1

- Related Documentation**
- *Understanding YANG on Devices Running Junos OS*
 - *NETCONF XML Management Protocol Developer Guide*

Installing the OpenConfig Package

OpenConfig for Junos OS corresponds to OpenConfig YANG data module releases and contain translation scripts and deviation modules for each supported Junos OS release. Each package includes the following files:

- OpenConfig set of data models written in YANG.
- Translation scripts that translate OpenConfig configuration schemas to Junos OS configuration schemas for each supported Junos OS release.

- Deviation modules that specify the unsupported nodes within the schema for each supported Junos OS release.
- Augmentation modules that specify additions to various OpenConfig specified models.
- Dynamic rendering files that map operational state data for each supported Junos OS release.

OpenConfig for Junos OS software package have the following naming convention:

```
junos-openconfig-XX.YY.ZZ.JJ-signed.tgz (Junos OS)
junos-openconfig-x86-32-XX.YY.ZZ.JJ.tgz (Junos OS with Upgraded FreeBSD)
```

where:

- XX represents the OpenConfig major release number.
- YY represents the OpenConfig minor release number.
- ZZ represents the OpenConfig patch release number.
- JJ represents the Juniper Networks release number.



NOTE: The `junos-openconfig-x86-32-XX.YY.ZZ.JJ.tgz` package supports both 32 and 64 bit systems.

To install the OpenConfig for Junos OS software package, use the **request system software add** command, for example:

```
user@router> request system software add junos-openconfig-XX.YY.ZZ.JJ-signed.tgz
```

or

```
user@router> request system software add junos-openconfig-x86-32-XX.YY.ZZ.JJ.tgz
```

For more details on the OpenConfig for Junos OS software package, see Release Notes available with the package on the [Juniper Software Download website](#).

Related Documentation

- *Understanding YANG on Devices Running Junos OS*
- *NETCONF XML Management Protocol Developer Guide*
- *Understanding Junos OS with Upgraded FreeBSD*

CHAPTER 2

gRPC Overview

- [Understanding OpenConfig and gRPC on Junos Telemetry Interface on page 7](#)
- [Installing the Network Agent Package \(Junos Telemetry Interface\) on page 10](#)
- [gRPC Service Definition for OpenConfig Telemetry on page 12](#)
- [Guidelines for gRPC Sensors \(Junos Telemetry Interface\) on page 15](#)
- [Example: gRPC Subscription for Telemetry Data on page 34](#)

Understanding OpenConfig and gRPC on Junos Telemetry Interface

Starting in Junos OS Release 16.1R3, you can use a set of remote procedure call (RPC) interfaces to configure the Junos Telemetry Interface and stream telemetry data using the gRPC framework. OpenConfig supports the use of vendor-neutral data models for configuring and managing multivendor networks. gRPC is an open source framework that provides secure and reliable transport of data.



NOTE: OpenConfig for Junos OS and gRPC are supported only on MPCs on MX Series and on PTX Series routers starting with Junos OS Release 16.1R3.

Starting with Junos OS Release 17.2R1, OpenConfig and gRPC are also supported on QFX10000 switches, QFX5200 switches, and PTX1000 routers.

The Junos Telemetry Interface is not supported on MX80 and MX104 routers.

-
- [Network Agent Software on page 7](#)
 - [Using OpenConfig for Junos OS to Enable Junos Telemetry Interface on page 8](#)
 - [Using gRPC to Stream Data on page 8](#)

Network Agent Software

Implementing OpenConfig with gRPC for Junos Telemetry Interface requires that you download and install a package called Network Agent if your Juniper Networks device is running a version of Junos OS with Upgraded FreeBSD. For all other versions of Junos OS, the Network Agent functionality is embedded in the software. Network Agent functions as a gRPC server and terminates the OpenConfig RPC interfaces. It is also responsible for streaming the telemetry data according to the OpenConfig specification. To view the

OpenConfig specification for telemetry, see the [OpenConfig Telemetry specification](#). For more information about OpenConfig for Junos OS, see the *OpenConfig Feature Guide*.

The Network Agent component also supports server-based Secure Sockets Layer (SSL) authentication. Client-based SSL authentication is not supported. You must install SSL certificates on your Juniper Networks device.

For information about installing the Network Agent package, see “[Installing the Network Agent Package](#)” on page 10.

Using OpenConfig for Junos OS to Enable Junos Telemetry Interface

OpenConfig for Junos OS specifies an RPC model to enable the Junos Telemetry Interface. You must download and install the OpenConfig for Junos OS package and YANG Models on your Juniper Networks device. Using a Web browser, navigate to the All Junos Platforms software download URL on the Juniper Networks webpage:

<http://www.juniper.net/support/downloads/>. From the **Network Management** tab, scroll down to select **OpenConfig**. Select the **Software** tab. Select the appropriate version of OpenConfig module. Two versions are available, one for devices running Junos OS with Upgraded FreeBSD and another for devices running all other versions of Junos OS. Select **YANG Models**. For more information see “[Installing the OpenConfig Package](#)” on page 4.

The programmatic interface **OpenConfigTelemetry** that is installed by the Network Agent package defines the telemetry gRPC service. The **telemetrySubscribe** RPC specifies the following subscription parameters:

- OpenConfig path that identifies the system resource to stream telemetry data, for example:
`/interfaces/interface/state/counters/`
- Interval at which data is reported and streamed to the collector server, in milliseconds, for example:
`sample_frequency = 4000`

The **telemetrySubscribe** RPC is used by a streaming server, or collector, to request an inline subscription from for data at the specified path. The device should then send telemetry data back on the same connection as the subscription request.

Using gRPC to Stream Data

Per the OpenConfig specification, only gRPC-based transport is supported for streaming data. The gRPC server that is installed by the Network Agent package terminates the gRPC sessions from the management system that runs the client. RPC calls trigger the creation of Junos OS sensors that either stream data periodically or report events, which are then funneled onto the appropriate gRPC channel by Network Agent.

See [Table 4 on page 9](#) for a list and descriptions of the RPCs implemented to the support the Junos Telemetry Interface.

Table 4: Telemetry RPCs

RPC Name	Description
telemetrySubscribe	Specify telemetry parameters and stream data for the specified list of OpenConfig paths.
getTelemetrySubscriptions	Retrieve the list of subscriptions that are created through telemetrySubscribe .
cancelSubscription	Unsubscribe a subscription created through telemetrySubscribe .

Data streamed through gRPC is formatted in OpenConfig key/value pairs in Google protocol buffers (gpb) messages. In this universal format, keys are strings that correspond to the path of the system resources in the OpenConfig schema for the device being monitored. The values correspond to integers or strings that identify the operational state of the system resource, such as statistics counters and the state of a resource.

The following shows the universal key/value format:

```

message KeyValue {
    string key          = 1 [(telemetry_options).is_key = true];
    uint64 int_value    = 2;
    string str_value    = 3;
    string prefix_str   = 4;
}

message TelemetryStream {
    // router name or export IP address
    required string system_id = 1 [(telemetry_options).is_key = true];

    // line card / RE (slot number)
    optional uint32 component_id = 2 [(telemetry_options).is_key = true];

    // PFE (if applicable)
    optional uint32 sub_component_id = 3 [(telemetry_options).is_key = true];

    // timestamp (common to all entries in the kv array)
    optional uint64 timestamp = 4 [(telemetry_options).is_timestamp = true];

    // key / value pairs
    repeated KeyValue kv;
}

```

The following example shows how a set of counters for an interface can be represented:

```

key = "/interfaces/counters/rx-bytes",    int_value = 1000
key = "/interfaces/counters/tx-bytes",    int_value = 2000
key = "/interfaces/counters/rx-packets",  int_value = 10
key = "/interfaces/counters/rx-bytes",    int_value = 20
key = "/interfaces/counters/oper-state",  str_value = "up"

```

The Network Agent package provides a mapping table that maps field names to the OpenConfig key strings.

Release History Table

Release	Description
17.2R1	Starting with Junos OS Release 17.2R1, OpenConfig and gRPC are also supported on QFX10000 switches, QFX5200 switches, and PTX1000 routers.
16.1R3	Starting in Junos OS Release 16.1R3, you can use a set of remote procedure call (RPC) interfaces to configure the Junos Telemetry Interface and stream telemetry data using the gRPC framework.
16.1R3	OpenConfig for Junos OS and gRPC are supported only on MPCs on MX Series and on PTX Series routers starting with Junos OS Release 16.1R3.

Related Documentation

- [Installing the Network Agent Package \(Junos Telemetry Interface\) on page 10](#)
- [Understanding Junos OS with Upgraded FreeBSD](#)

Installing the Network Agent Package (Junos Telemetry Interface)

Starting with Junos OS Release 16.1R3, the Junos Network Agent software package provides a framework to support OpenConfig and gRPC for the Junos Telemetry Interface on MX Series routers and PTX5000 routers. The Network Agent package functions as a gRPC server that terminates the OpenConfig remote procedure call (RPC) interfaces and streams the telemetry data according to the OpenConfig specification. The Junos Network Agent package, which runs on the Routing Engine, implements local statistics collection and reports data to active telemetry stream subscribers.

The Junos Telemetry Interface is not supported on MX80 and MX104 routers.

Starting with Junos OS Release 17.2R1, the Junos Network Agent Package is also supported on QFX10000 switches and QFX5200 switches.

The Junos Network Agent is available as a separate package only for Junos OS with Upgraded FreeBSD. For other versions of Junos OS, Network Agent functionality is embedded in the software. For more information about Junos OS with Upgraded FreeBSD, see *Understanding Junos OS with Upgraded FreeBSD*.

Network Agent for Junos OS software package has the following naming conventions:

- Package Name—This is **Network-Agent**.
- Architecture—This field indicates the CPU architecture of the platforms, such as **x86**.
- Application Binary Interface (ABI)—This field indicates the “word length” of the CPU architecture. Values include **32** for 32-bit architectures and **64** for 64-bit architectures.
- Release—This field indicates the Junos OS release number, such as **16.1R3.16**.
- Package release and spin number—This field indicates the package version and spin number, such as **C1.1**.

All Junos Network Agent packages are in tarred and gzipped (**.tgz**) format.



NOTE: Each version of the Network Agent package is supported on a single release of Junos OS only. The Junos OS version supported is identified by the Junos OS release number included in the Network Agent package name.

Examples of valid Network Agent package names including the following:

- `network-agent-x86-64-16.1R3.16-C1.0.tgz`
- `network-agent-x86-32-16.1R4.12-C1.1.tgz`

Before you begin:

- Install Junos OS Release 16.1R3 or later.
- Install the OpenConfig for Junos OS module and YANG Models. Using a Web browser, navigate to the All Junos Platforms software download URL on the Juniper Networks webpage: <http://www.juniper.net/support/downloads/>. From the **Network Management** tab, scroll down to select **OpenConfig**. Select the **Software** tab. Select the **OpenConfig Package (Junos with upgraded FreeBSD)**. Select **YANG Models**. For more information, see “Installing the OpenConfig Package” on page 4.
- Install Secure Sockets Layer (SSL) certificates of authentication on your Juniper Networks device.



NOTE: Only server-based SSL authentication is supported. Client-based authentication is not supported.

To download and install the Network Agent package:

1. Using a Web browser, navigate to the All Junos Platforms software download URL on the Juniper Networks webpage: <http://www.juniper.net/support/downloads/>.
2. Select the name of the Junos OS platform for the software that you want to download.
3. Select the release number (the number of the software version that you want to download) from the **Release** drop-down list to the right of the Download Software page.
4. Select the **Software** tab.
5. In the **Tools** section of the **Software** tab, select the **Junos Network Agent** package for the release.
6. Log in to the Juniper Networks authentication system using the username (generally your e-mail address) and password supplied by a Juniper Networks representative.

7. Download the software to a local host.
8. Copy the software to Juniper Networks device or to your internal software distribution site.
9. Install the new **network-telemetry** package on the device by issuing the **request system software add package-name** from the operational mode:

For example:

```
user@host > request system software add
network-telemetry-x86-64-16.1R3.16-C1.0.tgz
```



NOTE: The command uses the **validate** option by default. This option validates the software package against the current configuration as a prerequisite to adding the software package to ensure that the device reboots successfully. This is the default behavior when the software package being added is a different release.

10. Issue the **show version | grep na\ telemetry** command to verify that the Network Agent package was successfully installed.

```
user@host> show version | grep na\ telemetry
JUNOS na telemetry
[20161109.201405_builder_junos_161_r3]
```

For information about configuring gRPC services on your Juniper Networks device, see *Configuring gRPC for the Junos Telemetry Interface*.

Release History Table

Release	Description
17.2R1	Starting with Junos OS Release 17.2R1, the Junos Network Agent Package is also supported on QFX10000 switches and QFX5200 switches.
16.1R3	Starting with Junos OS Release 16.1R3, the Junos Network Agent software package provides a framework to support OpenConfig and gRPC for the Junos Telemetry Interface on MX Series routers and PTX5000 routers.

Related Documentation

- [Understanding OpenConfig and gRPC on Junos Telemetry Interface on page 7](#)

gRPC Service Definition for OpenConfig Telemetry

Like many RPC systems, gRPC is based on defining a service, specifying the methods that can be called remotely with their parameters and return types. By default, gRPC uses protocol buffers as the Interface Definition Language (IDL) for describing both the service interface and the structure of the payload messages.

Following is the gRPC service definition for the **telemetrySubscribe** RPC:

```
//
// na-openconfig-telemetry.proto
// network-agent-gprc
//   This file defines the telemetry gRPC service implemented by the
//   Network Agent that runs on Juniper devices.
//
syntax = "proto3";
package Telemetry;

service OpenConfigTelemetry {
  // Request an inline subscription for data at the specified path
  rpc telemetrySubscribe(SubscriptionRequest) returns (SubscriptionResponse)
  {}

  // Get the list of current telemetry subscriptions from the
  // target. This command returns a list of existing subscriptions
  // not including those that are established via configuration."
  rpc getTelemetrySubscriptions() returns (SubscriptionResponse) {}
  // Terminates and removes an existing telemetry subscription
  rpc cancelTelemetrySubscription(SubscriptionId) returns ( ) {}
  // Retrieve operational state values of the given OC paths
  rpc getOperational(OpDataRequest) returns (OpDataReply) {}
  // Get the capabilities of the network device
  rpc getCapabilities() returns (capabilities) {}
}

message SubscriptionRequest {
  // List of optional collector endpoints to send data for
  // this subscription, specified as an ip+port combination.
  // If no collector destinations are specified, the collector
  // destination is inferred from requester on the rpc channel
  repeated Collector collectors = 1;
  // The DSCP code point to be set on telemetry messages
  uint32 export_dscp_marking = 2;
  // List of paths for which telemetry is desired
  repeated Resource resources = 3;
}

message Collector {
  // IP address of collector end point
  string ip_address = 1;
  // Transport protocol port number for destination
  uint32 port = 2;
}

message Resource {
  // Datamodel path of interest
  Path path = 1;

  // Regular expression used to filter out non interesting leaf nodes
  string filter = 2;

  // The interval at which the value of a counter is reported
  int32 sample-frequency = 3;
}

message SubsscriptionResponse {
  SubscriptionId id = 1;
  SubscriptionRequest actualSubscription = 2;
}
```

```
message SubscriptionId {
    uint32 id = 1;
}

message OpDataRequest {
    // Request header
    RequestHeader header = 1;

    // List of paths
    repeated Path paths = 2;

    // True if only operational paths need to be retrieved
    uint32 opOnly = 3;
}

message RequestHeader {
    // Request ID
    uint64 reqId = 1;
}

message Path {
    // Name of the Path
    string path = 1;
}

message OpDataReply {
    // Reply header
    ReplyHeader header = 1;
    // Response in path-value format
    repeated OpData keyvalues = 2;
}

message ReplyHeader {
    // Request ID
    uint64 reqId = 1;
    // Response code, success or failure
    uint32 rspCode = 2;
    // Info or error message
    string rspMsg = 3;
}

message OpData {
    // Name of the path
    string path = 1;
    // Value of the path
    string value = 2;
}

message Capabilities {
    // List of the paths
    repeated Capability capabilities = 1;
}

message Capability {
    // The resource path
    Path path = 1;
    // The recommended polling interval
    uint32 polling_interval = 2;
    // Whether this path supports filtering with regular expressions
    string filter_supported = 3;
}
```

}

- Related Documentation
- [Understanding OpenConfig and gRPC on Junos Telemetry Interface on page 7](#)

Guidelines for gRPC Sensors (Junos Telemetry Interface)

Starting with Junos OS Release 16.1R3, the Junos Telemetry Interface supports gRPC remote procedure calls (gRPC) to provision sensors and to subscribe to and receive telemetry data on MX Series routers and PTX Series routers. The Junos Telemetry Interface is not supported on MX80 and MX104 routers.

Starting with Junos OS Release 17.2R1, QFX10000 switches, QFX5200 switches, and PTX1000 routers are also supported. See [Table 5 on page 15](#) for information about which sensors are supported on which platforms.

The following sensors are supported with gRPC. To activate a sensor, use the corresponding resource path. Each resource path enables data streaming for the system resource globally, that is, systemwide. You can also modify each resource path, such as to specify a specific logical or physical interface. For example, to specify a specific interface, include the following at the end of the path: `[name='interface-name']/`

Supported gRPC Sensors

See [Table 5 on page 15](#) for a description of supported gRPC sensors and the subscription path you use to provision the sensors.

Table 5: gRPC Sensors

resource path	Description
<code>/junos/services/label-switched-path/usage/</code> <code>mpls/lsp/constrained-path/tunnels/tunnel/</code>	<p>Sensor for LSP statistics. Only ingress LSPs are supported. On MX Series routers only, the following are also supported: bidirectional LSPs for ultimate-hop popping (UHP).</p> <p>Starting with Junos OS Release 17.2R1, QFX10000 switches and PTX1000 routers are also supported.</p> <p>You can also specify an LSP name and source IP address at the end of the path: <code>[name='lsp-name', source=ip-address]</code></p> <p>NOTE: When you enable a sensor for LSP statistics only, you must also configure the <code>sensor-based-stats</code> statement at the <code>[edit protocols mpls]</code> hierarchy level. MX Series routers should operate in enhanced mode. If not enabled by default, include either the <code>enhanced-ip</code> statement or the <code>enhanced-ethernet</code> statement at the <code>[edit chassis network-services]</code> hierarchy level.</p>

Table 5: gRPC Sensors (*continued*)

resource path	Description
<div>/mpls/lsp</div> <div>/mpls/signaling-protocols</div>	<p>Sensor for LSP events and properties.</p> <p>Supported on MX Series and PTX Series routers and QFX10000 switches starting with Junos OS Release 17.2R1.</p> <p>LSP events and properties are exported for ingress point-to-point LSPs, point-to-multipoint LSPs, bypass LSPs, and dynamically created LSPs.</p> <p>When you enable a sensor for LSP events and messages, you must also configured the <i>lsp-telemetry</i> statement at the [edit routing-options] hierarchy level.</p> <p>The following paths are also supported:</p> <ul style="list-style-type: none"> • /mpls/lsp/constrained-path/tunnels/tunnel/p2p-tunnel-attributes/p2p-primary-paths/lsp-instances/state/notify-status • /mpls/lsp/constrained-path/tunnels/tunnel/p2p-tunnel-attributes/p2p-primary-paths/state/notify-status • /mpls/signaling-protocols/rsvp-te/sessions/session/state/notify-status • /mpls/lsp/constrained-path/tunnels/tunnel/p2p-tunnel-attributes/p2p-primary-paths/lsp-instances/state/bandwidth • /mpls/lsp/constrained-path/tunnels/tunnel/p2p-tunnel-attributes/p2p-primary-paths/lsp-instances/state/metric • /mpls/lsp/constrained-path/tunnels/tunnel/p2p-tunnel-attributes/p2p-primary-paths/state/explicit-path-name • /mpls/lsp/constrained-path/tunnels/tunnel/p2p-tunnel-attributes/p2p-primary-paths/lsp-instances/state/max-avg-bandwidth <p>NOTE: To specify a specific LSP name and source address, include [name='lsp-name',source='address'] after mpls/lsp/constrained-path-tunnels/tunnel/ in any of the supported paths. If do not include a specific LSP name, data is exported for all configured LSPs.</p>
<div>/junos/npu-memory/</div> <div>/components/component [name="FPC<fpc-id>:NPU<npu-id>"]/properties/property</div>	<p>Sensor for network processing unit (NPU) memory, NPU memory utilization, and total memory available for each memory type</p> <p>Supported on QFX10000 switches and PTX1000 routers starting with Junos OS Release 17.2R1.</p>
<div>/junos/system/linecard/cpu/memory/</div> <div>/components/component [name="FPC<fpc-id>:CPU0"]/properties/property</div>	<p>Sensor for CPU memory.</p> <p>Supported on QFX10000 switches and PTX1000 routers starting with Junos OS Release 17.2R1.</p>

Table 5: gRPC Sensors (*continued*)

resource path	Description
/bgp/neighbors/neighbor/	Sensor for BGP peer information.
/bgp/peer-groups/peer-group/	Supported on QFX10000 switches and QFX5200 switches starting with Junos OS Release 17.2R1.
/bgp/global/	<p>NOTE:</p> <p>You can also include the following at the end path to /bgp/neighbors/neighbor/:</p> <ul style="list-style-type: none"> • state/session-state • state/messages/sent/update • state/messages/received/update • transport/state/local-address • transport/state/remote-address • state/peer-as • afi-safis/afi-safi/state/prefix-limit/state/max-prefixes • state/session-status • state/session-admin-status • state/session-established-transitions • state/interface-error • state/prefix-limited-exceeded • state/last-established • established-transitions <p>You can also include the following at the end path to /bgp/global/:</p> <ul style="list-style-type: none"> • afi-safis/afi-safi/state/total-prefixes <p>You can also include the following at the end path to /bgp/peer-groups/peer-group/:</p> <ul style="list-style-type: none"> • afi-safis/afi-safi/add-paths/eligible-prefix-policy

Table 5: gRPC Sensors (*continued*)

resource path	Description
<code>/junos/task-memory-information/</code>	<p>Sensor for memory utilization for routing protocol task.</p> <p>Supported on QFX10000 switches and QFX5200 switches starting with Junos OS Release 17.2R1.</p> <p>You can also include the following at the end path to <code>/junos/task-memory-information/</code>:</p> <ul style="list-style-type: none"> <code>task-memory-overall-report/task-size-block-list/task-size-block/tsb-size</code> <code>task-memory-overall-report/task-size-block-list/task-size-block/tsb-alloc-bytes</code> <code>task-memory-overall-report/task-size-block-list/task-size-block/tsb-allocs</code> <code>task-memory-overall-report/task-size-block-list/task-size-block/tsb-max-allocs</code> <code>task-memory-overall-report/task-size-block-list/task-size-block/tsb-max-bytes</code> <code>task-memory-overall-report/task-size-block-list/task-size-block/tsb-free-bytes</code> <code>task-memory-overall-report/task-memory-total-bytes</code> <code>task-memory-overall-report/task-memory-total-max-bytes</code> <code>task-memory-information/task-memory-overall-report/task-memory-total-free-bytes</code> <code>task-memory-allocator-report/task-block-list/task-block/tb-name</code> <code>task-memory-allocator-report/task-block-list/task-block/tb-size</code> <code>task-memory-allocator-report/task-block-list/task-block/tb-alloc-size</code> <code>task-memory-allocator-report/task-block-list/task-block/tb-alloc-blocks</code> <code>task-memory-allocator-report/task-block-list/task-block/tb-alloc-bytes</code> <code>task-memory-allocator-report/task-block-list/task-block/tb-max-alloc-blocks</code> <code>task-memory-allocator-report/task-lite-page-list/task-lite-page/tlp-name</code> <code>task-memory-allocator-report/task-lite-page-list/task-lite-page/tlp-alloc-bytes</code> <code>task-memory-allocator-report/task-memory-total-bytes</code> <code>task-memory-information/task-memory-allocator-report/task-memory-total-max-bytes</code> <code>task-memory-malloc-usage-report/task-malloc-list/task-malloc/tm-name</code> <code>task-memory-malloc-usage-report/task-malloc-list/task-malloc/tm-allocs</code> <code>task-memory-malloc-usage-report/task-malloc-list/task-malloc/tm-alloc-bytes</code> <code>task-memory-malloc-usage-report/task-malloc-list/task-malloc/tm-max-allocs</code> <code>task-memory-malloc-usage-report/task-malloc-list/task-malloc/tm-max-alloc-bytes</code> <code>task-memory-malloc-usage-report/task-malloc-list/task-malloc/tm-function-calls</code> <code>task-memory-malloc-usage-report/task-memory-total-bytes</code> <code>task-memory-malloc-usage-report/task-memory-total-max-bytes</code> <code>task-memory-max-dynamic-allocs</code> <code>task-memory-bss-bytes</code> <code>task-memory-max-bss-bytes</code> <code>task-memory-page-data-bytes</code> <code>task-memory-max-page-data-bytes</code> <code>task-memory-dir-bytes</code> <code>task-memory-max-dir-bytes</code> <code>task-memory-total-bytes-in-use</code> <code>task-memory-total-bytes-percent</code>

Table 5: gRPC Sensors (*continued*)

resource path	Description
/junos/system/linecard/firewall/	Sensor for firewall filter counters and policer counters. Each line card reports counters separately.
/junos/firewall/firewall-stats/	<p>Supported on QFX10000 switches starting with Junos OS Release 17.2R1.</p> <p>NOTE: Hierarchical policer statistics are collected for MX Series routers only. Traffic-class counter statistics are collected for PTX Series routers and QFX10000 switches only.</p> <p>Firewall counters are exported even if the interface to which the firewall filter is attached is operationally down.</p> <p>The following paths are also supported:</p> <ul style="list-style-type: none"> • junos/firewall/firewall-stats/[name='filter-name']/timestamp • /junos/firewall/firewall-stats/[name='filter-name']/memory-usage/[name='memory-type']/allocated • /junos/firewall/firewall-stats/[name='filter-name']/counter-stats/[name='counter-name']/packets • /junos/firewall/firewall-stats/[name='filter-name']/counter-stats/[name='counter-name']/bytes • /junos/firewall/firewall-stats/[name='filter-name']/policer-stats/[name='policer-name']/out-of-spec-packets • /junos/firewall/firewall-stats/[name='filter-name']/policer-stats/[name='policer-name']/out-of-spec-bytes • /junos/firewall/firewall-stats/[name='filter-name']/policer-stats/[name='policer-name']/offered-packets • /junos/firewall/firewall-stats/[name='filter-name']/policer-stats/[name='policer-name']/offered-bytes • /junos/firewall/firewall-stats/[name='filter-name']/policer-stats/[name='policer-name']/transmitted-packets • /junos/firewall/firewall-stats/[name='filter-name']/policer-stats/[name='policer-name']/transmitted-bytes • /junos/firewall/firewall-stats/[name='filter-name']/hierarchical-policer-stats/[name='hierarchical-policer-name']/premium-packets (MX Series only) • /junos/firewall/firewall-stats/[name='filter-name']/hierarchical-policer-stats/[name='hierarchical-policer-name']/premium-bytes (MX Series only) • /junos/firewall/firewall-stats/[name='filter-name']/hierarchical-policer-stats/[name='hierarchical-policer-name']/aggregate-packets (MX Series only) • /junos/firewall/firewall-stats/[name='filter-name']/hierarchical-policer-stats/[name='hierarchical-policer-name']/aggregate-bytes (MX Series only)

Table 5: gRPC Sensors (*continued*)

resource path	Description
/interfaces/interface/	

Table 5: gRPC Sensors (*continued*)

resource path	Description
	<p>Sensor for physical interface traffic.</p> <p>NOTE: For PTX Series routers, for a specific interface, queue statistics are exported for each line card. For MX series routers, interface queue statistics are exported only from slot on which an interface is configured.</p> <p>For Aggregated Ethernet interfaces, statistics are exported for the member physical interfaces. You must aggregate the counters at the destination server, or collector.</p> <p>If a physical interface is administratively down or operationally down, interface counters are not exported.</p> <p>Only fields with a non-zero value are exported.</p> <p>Supported on QFX10000 switches and PTX1000 routers starting with Junos OS Release 17.2R1.</p> <p>The following paths are also supported:</p> <ul style="list-style-type: none"> • /interfaces/interface[name='interface-name']/parent_ae_name • /interfaces/interface[name='interface-name']/oper-status • /interfaces/interface[name='interface-name']/carrier-transitions • /interfaces/interface[name='interface-name']/last-change • /interfaces/interface[name='interface-name']/high-speed • /interfaces/interface[name='interface-name']/counters/out-octets • /interfaces/interface[name='interface-name']/counters/out-unicast-pkts • /interfaces/interface[name='interface-name']/counters/out-multicast-pkts • /interfaces/interface[name='interface-name']/counters/out-broadcast-pkts • /interfaces/interface[name='interface-name']/counters/out-errors • /interfaces/interface[name='interface-name']/counters/in-octets • /interfaces/interface[name='interface-name']/counters/in-unicast-pkts • /interfaces/interface[name='interface-name']/counters/in-multicast-pkts • /interfaces/interface[name='interface-name'] • /interfaces/interface[name='interface-name']/counters/in-broadcast-pkts • /interfaces/interface[name='interface-name']/counters/in-errors • /interfaces/interface[name='interface-name']/in-pause-pkts • /interfaces/interface[name='interface-name']/out-pause-pkts • /interfaces/interface[name='interface-name']/in-queue [queue-number=queue_number]/ • /interfaces/interface[name='interface-name']/in-queue [queue-number=queue_number]/ pkts • /interfaces/interface[name='interface-name']/in-queue [queue-number=queue_number]/bytes • /interfaces/interface[name='interface-name']/in-queue [queue-number=queue_number]/tail-drop-pkts • /interfaces/interface[name='interface-name']/in-queue [queue-number=queue_number]/ rl-drop-pkts • /interfaces/interface[name='interface-name']/in-queue [queue-number=queue_number]/ rl-drop-bytes

Table 5: gRPC Sensors (*continued*)

resource path	Description
	<ul style="list-style-type: none"> • /interfaces/interface[name='interface-name']/in-queue[queue-number=quene_number]/avg-buffer-occupancy • /interfaces/interface[name='interface-name']/in-queue[queue-number=quene_number]/cur-buffer-occupancy • /interfaces/interface[name='interface-name']/in-queue[queue-number=quene_number]/peak-buffer-occupancy • /interfaces/interface[name='interface-name']/in-queue[queue-number=quene_number]/allocated-buffer-size • /interfaces/interface[name='interface-name']/out-queue[queue-number=quene_number]/pkts • /interfaces/interface[name='interface-name']/out-queue[queue-number=quene_number]/bytes • /interfaces/interface[name='interface-name']/out-queue[queue-number=quene_number]/tail-drop-pkts • /interfaces/interface[name='interface-name']/out-queue[queue-number=quene_number]/rl-drop-pkts • /interfaces/interface[name='interface-name']/out-queue[queue-number=quene_number]/rl-drop-bytes • /interfaces/interface[name='interface-name']/out-queue[queue-number=quene_number]/red-drop-pkts • /interfaces/interface[name='interface-name']/out-queue[queue-number=quene_number]/red-drop-bytes • /interfaces/interface[name='interface-name']/out-queue[queue-number=quene_number]/avg-buffer-occupancy • /interfaces/interface[name='interface-name']/out-queue[queue-number=quene_number]/cur-buffer-occupancy • /interfaces/interface[name='interface-name']/out-queue[queue-number=quene_number]/peak-buffer-occupancy • /interfaces/interface[name='interface-name']/out-queue[queue-number=quene_number]/allocated-buffer-size

Table 5: gRPC Sensors (*continued*)

resource path	Description
/interfaces/interface/subinterfaces/	Sensor for logical interface traffic.
/interfaces/interface[name='interface-name']/subinterfaces/	<p>NOTE: If a logical interface is operationally down, interface statistics continue to be exported.</p> <p>Supported on QFX10000 switches starting with Junos OS Release 17.2R1.</p> <p>The following paths are also supported:</p> <ul style="list-style-type: none"> • /interfaces/interface/subinterfaces/subinterface/name • /interfaces/interface/subinterfaces/subinterface/ifindex • /interfaces/interface/subinterfaces/subinterface/snmp_index • /interfaces/interface/subinterfaces/subinterface/admin_status • /interfaces/interface/subinterfaces/subinterface/oper_status • /interfaces/interface/subinterfaces/subinterface/last_change • /interfaces/interface/subinterfaces/subinterface/high_speed • /interfaces/interface/subinterfaces/subinterface/description • /interfaces/interface/subinterfaces/subinterface/enabled • /interfaces/interface/subinterfaces/subinterface/subunit • /interfaces/interface/subinterfaces/subinterface/oob_states/in_octets • /interfaces/interface/subinterfaces/subinterface/oob_states/in_unicast_pkts • /interfaces/interface/subinterfaces/subinterface/oob_states/in_broadcast_pkts • /interfaces/interface/subinterfaces/subinterface/oob_states/in_multicast_pkts • /interfaces/interface/subinterfaces/subinterface/oob_states/in_discards • /interfaces/interface/subinterfaces/subinterface/oob_states/in_errors • /interfaces/interface/subinterfaces/subinterface/oob_states/in_unknown_protos • /interfaces/interface/subinterfaces/subinterface/oob_states/out_octets • /interfaces/interface/subinterfaces/subinterface/oob_states/out_unicast_pkts • /interfaces/interface/subinterfaces/subinterface/oob_states/out_broadcast_pkts • /interfaces/interface/subinterfaces/subinterface/oob_states/out_multicast_pkts • /interfaces/interface/subinterfaces/subinterface/oob_states/out_discards • /interfaces/interface/subinterfaces/subinterface/oob_states/out_errors • /interfaces/interface/subinterfaces/subinterface/oob_states/last_clear
/junos/system/linecard/optics/	<p>Sensor for various optical interface performance metrics, such as transmit and receive power levels.</p> <p>Supported on QFX10000 switches starting with Junos OS Release 17.2R1.</p>

Table 5: gRPC Sensors (*continued*)

resource path	Description
<code>/junos/rsvp-interface-information/</code>	<p>Sensor for events and properties for RSVP interfaces.</p> <p>NOTE: For 100 RSVP logical interfaces, configure a sampling interval equal to 60 seconds. For 200 RSVP logical interfaces, configure a sampling interval equal to 180 seconds.</p> <p>Supported on QFX10000 switches and QFX5200 switches starting with Junos OS Release 17.2R1.</p> <p>You can also add the following to the end path for <code>/junos/rsvp-interface-information/</code>:</p> <ul style="list-style-type: none"> • <code>active-count</code> • <code>rsvp-interface/interface-name</code> • <code>rsvp-interface/index</code> • <code>rsvp-interface/rsvp-status</code> • <code>rsvp-interface/authentication-flag</code> • <code>rsvp-interface/aggregate-flag</code> • <code>rsvp-interface/ack-flag</code> • <code>rsvp-interface/protect-flag</code> • <code>rsvp-interface/hello-interval</code> • <code>rsvp-interface/interface-address</code> • <code>message-statistics/rsvp-message</code> • <code>rsvp-interface/message-statistics/messages-sent</code> • <code>rsvp-interface/message-statistics/messages-received</code> • <code>rsvp-interface/message-statistics/messages-sent-5seconds</code> • <code>rsvp-interface/message-statistics/messages-received-5seconds</code> • <code>rsvp-interface/rsvp-telink/active-reservation</code> • <code>rsvp-interface/rsvp-telink/preemption-count</code> • <code>rsvp-interface/rsvp-telink/update-threshold</code> • <code>rsvp-interface/rsvp-telink/subscription</code> • <code>rsvp-interface/rsvp-telink/static-bandwidth</code> • <code>rsvp-interface/rsvp-telink/available-bandwidth</code> • <code>rsvp-interface/rsvp-telink/reserved-bandwidth/bandwidth-priority</code> • <code>rsvp-interface/rsvp-telink/reserved-bandwidth/total-reserved-bandwidth</code>

Table 5: gRPC Sensors (*continued*)

resource path	Description
/components/component/	
/chassis-inventory/chassis-modules/	

Table 5: gRPC Sensors (*continued*)

resource path	Description
	<p>Sensor for operational state of Routing Engines, power supply modules, Switch Fabric Boards, Control Boards, Switch Interface Boards, Modular Interface Cards, and Physical Interface Cards.</p> <p>NOTE:</p> <p>Supported on QFX10000 switches and QFX5200 switches starting with Junos OS Release 17.2R1.</p> <p>The following paths are also supported:</p> <ul style="list-style-type: none"> • /chassis-inventory/chassis-modules/chassis-module/name • /chassis-inventory/chassis-modules/chassis-module/cidx • /chassis-inventory/chassis-modules/chassis-module/version • /chassis-inventory/chassis-modules/chassis-module/part_number • /chassis-inventory/chassis-modules/chassis-module/serial_number • /chassis-inventory/chassis-modules/chassis-module/description • /chassis-inventory/chassis-modules/chassis-module/clei_code • /chassis-inventory/chassis-modules/chassis-module/model • /chassis-inventory/chassis-modules/chassis-module/vendor_name • /chassis-inventory/chassis-modules/chassis-module/properties/property/state • /chassis-inventory/chassis-modules/chassis-module/properties/property/state_offline_reason (MX Series only) • /chassis-inventory/chassis-modules/chassis-module/properties/property/power_usage • /chassis-inventory/chassis-modules/chassis-module/properties/property/power_maximum • /chassis-inventory/chassis-modules/chassis-module/properties/property/temperature_intake • /chassis-inventory/chassis-modules/chassis-module/properties/property/temperature_exhaust_a (not supported on PTX1000 and PTX3000 routers) • /chassis-inventory/chassis-modules/chassis-module/properties/property/temperature_exhaust_b (not supported on PTX1000 and PTX3000 routers) • /chassis-inventory/chassis-modules/chassis-module/properties/property/temperature_exhaust (not supported on PTX1000 and PTX5000 routers) • /chassis-inventory/chassis-modules/chassis-module/properties/property/cpu_utilization_total • /chassis-inventory/chassis-modules/chassis-module/properties/property/memory_dram_used • /chassis-module/properties/property/memory_utilization_heap • /chassis-inventory/chassis-modules/chassis-module/properties/property/memory_utilization_buffer • /chassis-inventory/chassis-modules/chassis-module/properties/property/uptime <p>The following paths are also supported only for Routing Engine statistics:</p>

Table 5: gRPC Sensors (*continued*)

resource path	Description
	<ul style="list-style-type: none"> • /chassis-inventory/chassis-modules/chassis-module/properties/property/mastership-state • /chassis-inventory/chassis-modules/chassis-module/properties/property/mastership-priority • /chassis-inventory/chassis-modules/chassis-module/properties/property/temperature-cpu • /chassis-inventory/chassis-modules/chassis-module/properties/property/memory-dram-installed • /chassis-inventory/chassis-modules/chassis-module/properties/property/cpu-utilization-user • /chassis-inventory/chassis-modules/chassis-module/properties/property/cpu-utilization-background • /chassis-inventory/chassis-modules/chassis-module/properties/property/cpu-utilization-kernel • /chassis-inventory/chassis-modules/chassis-module/properties/property/cpu-utilization-idle • /chassis-inventory/chassis-modules/chassis-module/properties/property/reboot-reason <p>The following paths are also supported for power modules:</p>

Table 5: gRPC Sensors (*continued*)

resource path	Description
	<ul style="list-style-type: none"> • /chassis-inventory/chassis-modules/chassis-module/properties/property/power-zone-upper-capacity • /chassis-inventory/chassis-modules/chassis-module/properties/property/power-zone-upper-maximum • /chassis-inventory/chassis-modules/chassis-module/properties/property/power-zone-upper-allocated • /chassis-inventory/chassis-modules/chassis-module/properties/property/power-zone-upper-remaining • /chassis-inventory/chassis-modules/chassis-module/properties/property/power-zone-upper-usage • /chassis-inventory/chassis-modules/chassis-module/properties/property/power-zone-lower-capacity • /chassis-inventory/chassis-modules/chassis-module/properties/property/power-zone-lower-maximum • /chassis-inventory/chassis-modules/chassis-module/properties/property/power-zone-lower-allocated • /chassis-inventory/chassis-modules/chassis-module/properties/property/power-zone-lower-remaining • /chassis-inventory/chassis-modules/chassis-module/properties/property/power-zone-lower-usage • /chassis-inventory/chassis-modules/chassis-module/properties/property/power-zone-0-capacity • /chassis-inventory/chassis-modules/chassis-module/properties/property/power-zone-0-maximum • /chassis-inventory/chassis-modules/chassis-module/properties/property/power-zone-0-allocated • /chassis-inventory/chassis-modules/chassis-module/properties/property/power-zone-0-remaining • /chassis-inventory/chassis-modules/chassis-module/properties/property/power-zone-0-usage • /chassis-inventory/chassis-modules/chassis-module/properties/property/power-zone-1-capacity • chassis-inventory/chassis-modules/chassis-module/properties/property/power-zone-1-maximum • /chassis-inventory/chassis-modules/chassis-module/properties/property/power-zone-1-allocated • /chassis-inventory/chassis-modules/chassis-module/properties/property/power-zone-1-remaining • chassis-inventory/chassis-modules/chassis-module/properties/property/power-zone-1-usage • /chassis-inventory/chassis-modules/chassis-module/properties/property/power-system-capacity • /chassis-inventory/chassis-modules/chassis-module/properties/property/power-system-allocated • /chassis-inventory/chassis-modules/chassis-module/properties/property/power-system-remaining • /chassis-inventory/chassis-modules/chassis-module/properties/property/power-system-usage • /chassis-inventory/chassis-modules/chassis-module/

Table 5: gRPC Sensors (*continued*)

resource path	Description
	<p>properties/property/temperature-ambient</p> <p>The following paths are supported for either Switch Fabric Board or Control Boards or both:</p> <ul style="list-style-type: none"> • /chassis-inventory/chassis-modules/chassis-module/properties/property/temperature-zone-0-intake (SFB only) • /chassis-inventory/chassis-modules/chassis-module/properties/property/temperature-zone-0-intake-a (both SFB and CB) • /chassis-inventory/chassis-modules/chassis-module/properties/property/temperature-zone-1-intake-b (both SFB and CB) • /chassis-inventory/chassis-modules/chassis-module/properties/property/temperature-zone-0-exhaust (SFB only) • /chassis-inventory/chassis-modules/chassis-module/properties/property/temperature-zone-1-exhaust (SFB only) • /chassis-inventory/chassis-modules/chassis-module/properties/property/temperature-zone-0-intake-c (CB only) • /chassis-inventory/chassis-modules/chassis-module/properties/property/temperature-zone-0-exhaust-a (CB only) • /chassis-inventory/chassis-modules/chassis-module/properties/property/temperature-zone-1-exhaust-b (CB only)
/lacp/	<p>Sensor for operational state of aggregated Ethernet interfaces configured with the Link Aggregation Control Protocol.</p> <p>Supported on QFX10000 switches and QFX5200 switches starting with Junos OS Release 17.2R1.</p> <p>You can also add the following to the end of the path for /lacp/:</p> <ul style="list-style-type: none"> • state/system-priority • interfaces/interface[name='aggregate-interface-name']/state/ • interfaces/interface[name='aggregate-interface-name']/members/member[interface='interface-name']/state/ • interfaces/interface[name='aggregate-interface-name']/members/member[interface='interface-name']/state/counters/ • interfaces/interface[name='aggregate-interface-name']/members/member[interface='interface-name']/state/port-num • interfaces/interface[name='aggregate-interface-name']/members/member[interface='interface-name']/state/partner-port-num • interfaces/interface[name='aggregate-interface-name']/members/member[interface='interface-name']/state/mux-state

Table 5: gRPC Sensors (*continued*)

resource path	Description
/lldp/	<p>Sensor for operational state of Ethernet interfaces enabled with the Link Layer Discovery Protocol.</p> <p>Supported on QFX10000 switches and QFX5200 switches starting with Junos OS Release 17.2R1.</p> <p>You can also add the following to the end of the path for /lldp/:</p> <ul style="list-style-type: none"> • state/ • state/enabled • state/hello-timer • state/system-name • state/system-description • state/chassis-id • state/loc-port-id-type • interfaces/interface[name='interface-name']/state/ • interfaces/interface[name='interface-name']/state/counters/ • interfaces/interface[name='interface-name']/neighbors/
/arp-information/	<p>Sensor for Address Resolution Protocol (ARP) statistics.</p> <p>Supported on QFX10000 and QFX5200 switches starting with Junos OS Release 17.2R1.</p> <p>You can also add the following to the end path for /arp-information/:</p> <ul style="list-style-type: none"> • ipv4 • ipv4/neighbors • ipv4/neighbors/neighbor • ipv4/neighbors/neighbor/ip • ipv4/neighbors/neighbor/link-layer-address • ipv4/neighbors/neighbor/origin • ipv4/neighbors/neighbor/host-name • ipv4/neighbors/neighbor/rtb-id • ipv4/neighbors/neighbor/state • ipv4/neighbors/neighbor/expiry • ipv4/neighbors/neighbor/ispublish • ipv4/neighbors/neighbor/interface-name • ipv4/neighbors/neighbor/logical-router-id

Table 5: gRPC Sensors (*continued*)

resource path	Description
<code>/interfaces/interface[name='interface-name']/</code>	

Table 5: gRPC Sensors (*continued*)

resource path	Description
	<p>Sensor for Routing Engine internal interfaces.</p> <p>NOTE: On MX Series routers, you can specify the following interfaces: fxp0, em0, and em1</p> <p>On PTX Series routers, you can specify the following interfaces: em0, ixlv0, ixlv1</p> <p>On PTX Series routers with dual Routing Engines, you can specify the following interfaces: em0, ixgbe0, ixgbe1</p> <p>The following end paths are also supported:</p> <ul style="list-style-type: none"> • <code>/interfaces/interface/state/type</code> • <code>/interfaces/interface/state/mtu</code> • <code>/interfaces/interface/state/name</code> • <code>/interfaces/interface/state/description</code> • <code>/interfaces/interface/state/enabled</code> • <code>/interfaces/interface/state/ifindex</code> • <code>/interfaces/interface/state/admin-status</code> • <code>/interfaces/interface/state/oper-status</code> • <code>/interfaces/interface/state/last-change</code> • <code>/interfaces/interface/state/speed</code> • <code>/interfaces/interface/state/counters/in-octets</code> • <code>/interfaces/interface/state/counters/in-unicast-pkts</code> • <code>/interfaces/interface/state/counters/in-broadcast-pkts</code> • <code>/interfaces/interface/state/counters/in-multicast-pkts</code> • <code>/interfaces/interface/state/counters/in-discards</code> • <code>/interfaces/interface/state/counters/in-errors</code> • <code>/interfaces/interface/state/counters/in-unknown-protos</code> • <code>/interfaces/interface/state/counters/out-octets</code> • <code>/interfaces/interface/state/counters/out-unicast-pkts</code> • <code>/interfaces/interface/state/counters/out-broadcast-pkts</code> • <code>/interfaces/interface/state/counters/out-multicast-pkts</code> • <code>/interfaces/interface/state/counters/out-discards</code> • <code>/interfaces/interface/state/counters/out-errors</code> • <code>/interfaces/interface/state/counters/last-clear</code> • <code>/interfaces/interface/state/counters/in-pkts</code> • <code>/interfaces/interface/state/counters/in-sec-pkts</code> • <code>/interfaces/interface/state/counters/in-sec-octets</code> • <code>/interfaces/interface/state/counters/in-pause-pkts</code> • <code>/interfaces/interface/state/counters/out-pkts</code> • <code>/interfaces/interface/state/counters/out-sec-pkts</code> • <code>/interfaces/interface/state/counters/out-sec-octets</code> • <code>/interfaces/interface/state/counters/out-pause-pkts</code> • <code>/interfaces/interface/state/counters/in-drops</code> • <code>/interfaces/interface/state/counters/in-frame-errors</code>

Table 5: gRPC Sensors (*continued*)

resource path	Description
	<ul style="list-style-type: none"> • /interfaces/interface/state/counters/in-runs • /interfaces/interface/state/counters/in-lchan-errors • /interfaces/interface/state/counters/in-l-mismatch-errors • /interfaces/interface/state/counters/in-fifo-errors • /interfaces/interface/state/counters/in-giants • /interfaces/interface/state/counters/in-resource-errors • /interfaces/interface/state/counters/out-drops • /interfaces/interface/state/counters/carrier-transitions • /interfaces/interface/state/counters/mtu-errors • /interfaces/interface/state/counters/out-resource-errors • /interfaces/interface/subinterfaces/subinterface/index • /interfaces/interface/subinterfaces/subinterface/state/index • /interfaces/interface/subinterfaces/subinterface/state/name • /interfaces/interface/subinterfaces/subinterface/state/description • /interfaces/interface/subinterfaces/subinterface/state/enabled • /interfaces/interface/subinterfaces/subinterface/state/ifindex • /interfaces/interface/subinterfaces/subinterface/state/admin-status • /interfaces/interface/subinterfaces/subinterface/state/oper-status • /interfaces/interface/subinterfaces/subinterface/state/last-change • /interfaces/interface/subinterfaces/subinterface/state/counters/in-pkts • /interfaces/interface/subinterfaces/subinterface/state/counters/in-octets • /interfaces/interface/subinterfaces/subinterface/state/counters/in-unicast-pkts • /interfaces/interface/subinterfaces/subinterface/state/counters/in-broadcast-pkts • /interfaces/interface/subinterfaces/subinterface/state/counters/in-multicast-pkts • /interfaces/interface/subinterfaces/subinterface/state/counters/in-discards • /interfaces/interface/subinterfaces/subinterface/state/counters/in-errors • /interfaces/interface/subinterfaces/subinterface/state/counters/in-unknown-protos • /interfaces/interface/subinterfaces/subinterface/state/counters/out-octets • /interfaces/interface/subinterfaces/subinterface/state/counters/out-unicast-pkts • /interfaces/interface/subinterfaces/subinterface/state/counters/out-broadcast-pkts • /interfaces/interface/subinterfaces/subinterface/state/counters/out-multicast-pkts • /interfaces/interface/subinterfaces/subinterface/state/counters/out-discards • /interfaces/interface/subinterfaces/subinterface/state/counters/out-errors • /interfaces/interface/subinterfaces/subinterface/state/counters/last-clear • /interfaces/interface/subinterfaces/subinterface/state/counters/out-pkts

Table 5: gRPC Sensors (*continued*)

resource path	Description
/nd6-information/	<p>Sensor for Network Discovery Protocol (NDP) table state.</p> <p>Supported on QFX10000 and QFX5200 switches starting with Junos OS Release 17.2R1.</p> <p>You can also add the following to the end path for nd6-information/</p> <ul style="list-style-type: none"> • ipv6 • ipv6/neighbors • ipv6/neighbors/neighbor • ipv6/neighbors/neighbor/ip • ipv6/neighbors/neighbor/link-layer-address • ipv6/neighbors/neighbor/origin • ipv6/neighbors/neighbor/isrouter • ipv6/neighbors/neighbor/state • ipv6/neighbors/neighbor/rtb-id • ipv6/neighbors/neighbor/issecure • ipv6/neighbors/neighbor/ispublish • ipv6/neighbors/neighbor/expiry • ipv6/neighbors/neighbor/interface-name • ipv6/neighbors/neighbor/logical-router-id
/ipv6-ra/	Sensor for NDP router-advertisement statistics.

Release History Table

Release	Description
17.2R1	Starting with Junos OS Release 17.2R1, QFX10000 switches, QFX5200 switches, and PTX1000 routers are also supported.
16.1R3	Starting with Junos OS Release 16.1R3, the Junos Telemetry Interface supports gRPC remote procedure calls (gRPC) to provision sensors and to subscribe to and receive telemetry data on MX Series routers and PTX Series routers. The Junos Telemetry Interface is not supported on MX80 and MX104 routers.

Related Documentation

- [Understanding OpenConfig and gRPC on Junos Telemetry Interface on page 7](#)

Example: gRPC Subscription for Telemetry Data

This example shows how to use gRPC remote procedure calls (gRPC) to provision a sensor for logical interface statistics and to subscribe to and receive telemetry data. A management station serves as the collector for telemetry data streamed from the Juniper Networks device.

Before you begin, complete the following steps on your Juniper Networks device:

- Download and install the OpenConfig for Junos OS module.

Install the OpenConfig for Junos OS module and YANG Models. Using a Web browser, navigate to the All Junos Platforms software download URL on the Juniper Networks webpage: <http://www.juniper.net/support/downloads/>. From the **Network Management** tab, scroll down to select **OpenConfig**. Select the **Software** tab. Select the **OpenConfig Package (Junos with upgraded FreeBSD)** Select **YANG Models**. For more information, see “Installing the OpenConfig Package” on page 4.

- If your Juniper Networks device is running a version of the Junos OS with the upgraded FreeBSD kernel, download and install the Network Agent package. For more information, see “Installing the Network Agent Package” on page 10.



NOTE: Junos Telemetry Interface and gRPC are supported on QFX10000 switches, QFX5200 switches, and PTX1000 routers starting with Junos OS Release 17.2R1.

In this example, the management station requesting telemetry data has Python programming language modules installed. Python is used to write a program to specify the following parameters of the gRPC subscription request:

- Path of the system resource—**/interfaces**. This path specifies to stream data for all logical interfaces.
- Interval at which to report data, in milliseconds—**sample_frequency = 4000**

The **telemetrySubscribe** RPC is used to initiate the subscription. Data is returned in an OpenConfig key/value format in a Google protocol buffers (gpb) message.

Telemetry Python Client Code

```
ip = "192.0.2.1"
port = 50051
_TIMEOUT_SECONDS = 55000000

def collectData (ip, port):
    channel = implementations.insecure_channel(ip, port)
    with agent_pb2.beta_create_OpenConfigTelemetry_stub(channel) as stub:
        try:
            # From subscription request for /interfaces with reporting rate
            # of 4000 millisecs
            # PS: It should be noted that SubscriptionRequest can take list of
            # paths and their reporting rates. Here just for a simple example,
            # only one path is demonstrated
            sub_req = agent_pb2.SubscriptionRequest()
            path_list = sub_req.path_list.add()
            path_list.path = "/interfaces"
            path_list.sample_frequency = 4000

            # Request: Subscribe for the above path and get the below resplies
            # 1. List of accepted paths and the reporting rate
            # 2. OpenConfig data
            data_itr = stub.telemetrySubscribe(sub_req, _TIMEOUT_SECONDS)

            # Reply 1: SubscriptionReply - Get the list of accepted paths as part
            # of telemetrySubscribe. This will be filled as meta-data
            # in the gRPC channel as a key-value pair with
            # "init-response" as key

            metadata = data_itr.initial_metadata()
            if metadata:
                if metadata[0][0] == "init-response":
                    metainfo = metadata[0][1]

                    # Format the meta-data to SubscriptionReply
                    subreply = agent_pb2.SubscriptionReply()
                    subreply.SetInParent()
                    google.protobuf.text_format.Merge(metainfo, subreply)
                    print "\r\n"
                    print "Subscription Reply in the form of Meta data"
                    print "-----"
                    print subreply

            # Reply 2: OpenConfigData - Get the OpenConfig data
            # streamed from the device
            print "\r\n"
            print "OpenConfigData reply as streaming response"
            print "-----"
            for data in data_itr:
                if not data:
                    print "Server returned NULL"
                    next
                oc_data = ParseOpenConfigData(data)
                print oc_data

        except Exception, e:
            print 'Exception: ' + str(e)

def ParseOpenConfigData(data):
    msg = ""
```



```

    #if data.system_id :
    msg += "\nsystem_id:" + data.system_id + "\n"
    #if data.component_id:
    msg += "component_id:" + str(data.component_id) + "\n"

    if data.sub_component_id:
        msg += "sub_component_id:" + str(data.sub_component_id) + "\n"

    if data.path:
        msg += "path:" + data.path + "\n"

    msg += "sequence_number:" + str(data.sequence_number) + "\n"

    if data.timestamp:
        msg += "timestamp:" + str(data.timestamp) + "\n"

    for kv in data.kv:
        msg += "kv {\n"
        if kv.key :
            msg += "    " + "key:" + kv.key + "\n"

        oneofType = kv.WhichOneof("value")
        if oneofType == "int_value" :
            msg += "    " + "int_value:" + str(kv.int_value) + "\n"
        elif oneofType == "double_value" :
            msg += "    " + "double_value:" + str(kv.double_value) + "\n"
        elif oneofType == "uint_value" :
            msg += "    " + "uint_value:" + str(kv.uint_value) + "\n"
        elif oneofType == "sint_value" :
            msg += "    " + "sint_value:" + str(kv.sint_value) + "\n"
        elif oneofType == "bool_value" :
            msg += "    " + "bool_value:" + str(kv.bool_value) + "\n"
        elif oneofType == "str_value" :
            msg += "    " + "str_value:" + kv.str_value + "\n"
        elif oneofType == "bytes_value" :
            msg += "    " + "bytes_value:" + str(kv.bytes_value) + "\n"
        msg += "    }\n"

    return msg

def run():
    collectData(ip, port)

if __name__ == '__main__':
    run()

```

After you initiate the subscription using this program, the following subscription reply is returned:

```

response {
  subscription_id: 1
}
path_list {
  path: "/interfaces"
  sample_frequency: 4000
}

```

Data is then streamed to the management station console as shown below:

```
system_id:choc-mx240-f
component_id:1
path:sensor_1000_1_2:/junos/system/linecard/interface/logical/usage/:/junos/system/linecard/interface/logical/usage/:PFE
sequence_number:0
timestamp:1477077921468
kv {
  key:__timestamp__
  uint_value:1477077921434
}
kv {
  key:__prefix__
  str_value:/interfaces/interface[name='ge-1/0/0']/subinterfaces/subinterface[index='0']/
}
kv {
  key:init-time
  int_value:1475784511
}
kv {
  key:operational-state
  str_value:down
}
kv {
  key:__prefix__
  str_value:/interfaces/interface[name='ge-1/0/0']/subinterfaces/subinterface[index='1']/
}
.
.
.
.
.
.
```

- Related Documentation**
- [Understanding OpenConfig and gRPC on Junos Telemetry Interface on page 7](#)
 - [Guidelines for gRPC Sensors \(Junos Telemetry Interface\) on page 15](#)

CHAPTER 3

OpenConfig to Junos Mapping

- [Mapping OpenConfig BGP Commands to Junos Configuration on page 39](#)
- [Mapping OpenConfig BGP RIB Commands to Junos Operation on page 49](#)
- [Mapping OpenConfig Interface Commands to Junos Configuration on page 50](#)
- [Mapping OpenConfig LLDP Commands to Junos Configuration on page 54](#)
- [Mapping OpenConfig Local Routing Commands to Junos Configuration on page 55](#)
- [Mapping OpenConfig MPLS Commands to Junos Configuration on page 56](#)
- [Mapping OpenConfig Routing Policy Commands to Junos Configuration on page 66](#)

Mapping OpenConfig BGP Commands to Junos Configuration

Table 6 on page 39 to Table 10 on page 45 show the mapping of OpenConfig BGP commands with the relevant configuration in Junos.

Table 6: Global BGP Configuration

Command Name	OpenConfig Command Path	Junos Configuration
Command path prefix: /bgp/global		
As	/config/as	set routing-options autonomous-system <i>as_number</i>
Router-ID	/config/router-id	set routing-options router-id <i>router-id</i>
External-Route-Distance	/default-route-distance/config/external-route-distance	set protocols bgp group <i>name</i> preference <i>preference</i>
Internal-Route-Distance	/default-route-distance/config/internal-route-distance	set protocols bgp group <i>name</i> preference <i>preference</i>
Confederation	/confederation/config/enable /confederation/config/identifier /confederation/config/member-as	set routing-options confederation <i>confederation_as</i> set routing-options confederation members <i>value</i>

Table 6: Global BGP Configuration (*continued*)

Command Name	OpenConfig Command Path	Junos Configuration
Allow-Multiple-AS	/use-multiple-paths/config/enabled /use-multiple-paths/ebgp/config/allow-multiple-as	set protocols bgp group <i>name</i> multipath multiple-as
EBGP-Maximum-Paths	/use-multiple-paths/config/enabled /use-multiple-paths/ebgp/config/maximum-paths	set chassis maximum-ecmp <i>number-of-next-hops</i>
IBGP-Maximum-Paths	/use-multiple-paths/ibgp/config/maximum-paths	set chassis maximum-ecmp <i>number-of-next-hops</i>
Graceful-Restart	/graceful-restart/config/enabled /graceful-restart/config/restart-time /graceful-restart/config/stale-routes-time /graceful-restart/config/helper-only	set protocols bgp graceful-restart disable set protocols bgp graceful-restart restart-time <i>restart -time</i> set protocols bgp graceful-restart stale-routes-time <i>stale- routes -time</i>

Table 7: Global AFI-SAFI Configuration

Command Name	OpenConfig Command Path	Junos Configuration
Command path prefix: /bgp/global/afi-safi/afi-safi		
AFI-SAFI	/config/afi-safi-name /config/enabled	set protocols bgp family <i>family</i>
Always-Compare-MED	/route-selection-options/config/ always-compare-med	set protocols bgp path-selection always-compare-med
Ignore-AS-Path-Length	/route-selection-options/config/ ignore-as-path-length	set protocols bgp path-selection as-path-ignore
Enable-AIGP	/route-selection-options/config/enable-aigp	set protocols bgp family <i>family</i> aigp
Ignore-Nexthop-IGP-Metric	/route-selection-options/config/ ignore-next-hop-igp-metric	Not supported
Use-Multiple-Paths	/use-multiple-paths/ebgp/config/ /use-multiple-paths/ibgp/config/	Not supported
Apply-Policy	/apply-policy/	Not supported
IPv4-Unicast: Max-Prefixes	/ipv4-unicast/prefix-limit/config/ max-prefixes	set protocols bgp family inet unicast accepted-prefix-limit maximum <i>maximum</i>
IPv4-Unicast: Shutdown-Threshold-PCT	/ipv4-unicast/prefix-limit/config/shutdown-threshold-pct	set protocols bgp family inet unicast accepted-prefix-limit teardown <i>limit-threshold</i>

Table 7: Global AFI-SAFI Configuration (*continued*)

Command Name	OpenConfig Command Path	Junos Configuration
IPv4-Unicast: Restart-Timer	/ipv4-unicast/prefix-limit/config/restart-timer	set protocols bgp family inet unicast accepted-prefix-limit teardown idle-timeout <i>timeout</i>
IPv4-Unicast: Send-Default-Route	/ipv4-unicast/config/send-default-route	Not supported
IPv6-Unicast: Max-Prefixes	/ipv6-unicast/prefix-limit/config/max-prefixes	set protocols bgp family inet6 unicast accepted-prefix-limit maximum <i>maximum</i>
IPv6-Unicast: Shutdown-Threshold-PCT	/ipv6-unicast/prefix-limit/ config/shutdown-threshold-pct	set protocols bgp family inet6 unicast accepted-prefix-limit teardown <i>limit-threshold</i>
IPv6-Unicast: Restart-Timer	/ipv6-unicast/prefix-limit/config/restart-timer	set protocols bgp family inet6 unicast accepted-prefix-limit teardown idle-timeout <i>timeout</i>
IPv6-Unicast: Send-Default-Route	/ipv6-unicast/config/send-default-route	Not supported
IPv4-Lbl-Unicast: Max-Prefixes	/ipv4-labeled-unicast/prefix-limit/ config/max-prefixes	set protocols bgp family inet labeled-unicast accepted-prefix-limit maximum <i>maximum</i>
IPv4-Lbl-Unicast: Shutdown-Threshold-PCT	/ipv4-labelled-unicast/prefix-limit/ config/shutdown-threshold-pct	set protocols bgp family inet labeled-unicast accepted-prefix-limit teardown <i>limit-threshold</i>
IPv4-Lbl-Unicast: Restart-Timer	/ipv4-labelled-unicast/prefix-limit/ config/restart-timer	set protocols bgp family inet labeled-unicast accepted-prefix-limit teardown idle-timeout <i>timeout</i>
IPv6-Lbl-Unicast: Max-Prefixes	/ipv6-labelled-unicast/prefix-limit/ config/max-prefixes	set protocols bgp family inet6 labeled-unicast accepted-prefix-limit maximum <i>maximum</i>
IPv6-Lbl-Unicast: Shutdown-Threshold-PCT	/ipv6-labelled-unicast/prefix-limit/ config/shutdown-threshold-pct	set protocols bgp family inet6 labeled-unicast accepted-prefix-limit teardown <i>limit-threshold</i>
IPv6-Lbl-Unicast: Restart-Timer	/ipv6-labelled-unicast/prefix-limit/ config/restart-timer	set protocols bgp family inet6 labeled-unicast accepted-prefix-limit teardown idle-timeout <i>timeout</i>
L3VPN-IPv4-Ucast: Max-Prefixes	/l3vpn-ipv4-unicast/prefix-limit/ config/max-prefixes	set protocols bgp family inet-vpn unicast accepted-prefix-limit maximum <i>maximum</i>
L3VPN-IPv4-Ucast: Shutdown-Threshold-PCT	/l3vpn-ipv4-unicast/prefix-limit/ config/shutdown-threshold-pct	set protocols bgp family inet-vpn unicast accepted-prefix-limit teardown <i>limit-threshold</i>

Table 7: Global AFI-SAFI Configuration (*continued*)

Command Name	OpenConfig Command Path	Junos Configuration
L3VPN-IPv4-Ucast: Restart-Timer	/l3vpn-ipv4-unicast/prefix-limit/config/restart-timer	set protocols bgp family inet-vpn unicast accepted-prefix-limit teardown idle-timeout <i>timeout</i>
L3VPN-IPv6-Ucast: Max-Prefixes	/l3vpn-ipv6-unicast/prefix-limit/config/max-prefixes	set protocols bgp family inet6-vpn unicast accepted-prefix-limit maximum <i>maximum</i>
L3VPN-IPv6-Ucast: Shutdown-Threshold-PCT	/l3vpn-ipv6-unicast/prefix-limit/config/shutdown-threshold-pct	set protocols bgp family inet6-vpn unicast accepted-prefix-limit teardown <i>limit-threshold</i>
L3VPN-IPv4-Ucast: Restart-Timer	/l3vpn-ipv6-unicast/prefix-limit/config/restart-timer	set protocols bgp family inet6-vpn unicast accepted-prefix-limit teardown idle-timeout <i>timeout</i>
L3VPN-IPv4-Mcast: Max-Prefixes	/l3vpn-ipv4-multicast/prefix-limit/config/max-prefixes	set protocols bgp family inet-vpn multicast accepted-prefix-limit maximum <i>maximum</i>
L3VPN-IPv4-Mcast: Shutdown-Threshold-PCT	/l3vpn-ipv4-multicast/prefix-limit/config/shutdown-threshold-pct	set protocols bgp family inet-vpn multicast accepted-prefix-limit maximum <i>maximum</i>
L3VPN-IPv4-Mcast: Restart-Timer	/l3vpn-ipv4-multicast/prefix-limit/config/restart-timer	set protocols bgp family inet-vpn multicast accepted-prefix-limit teardown idle-timeout <i>timeout</i>
L3VPN-IPv6-Mcast: Max-Prefixes	/l3vpn-ipv6-multicast/prefix-limit/config/max-prefixes	set protocols bgp family inet6-vpn multicast accepted-prefix-limit maximum <i>maximum</i>
L3VPN-IPv6-Mcast: Shutdown-Threshold-PCT	/l3vpn-ipv6-multicast/prefix-limit/config/shutdown-threshold-pct	set protocols bgp family inet6-vpn multicast accepted-prefix-limit teardown <i>limit-threshold</i>
L3VPN-IPv6-Mcast: Restart-Timer	/l3vpn-ipv6-multicast/prefix-limit/config/restart-timer	set protocols bgp family inet6-vpn multicast accepted-prefix-limit teardown idle-timeout <i>timeout</i>
L2VPN-VPLS: Max-Prefixes	/l2vpn-vpls/prefix-limit/config/max-prefixes	set protocols bgp family l2vpn signaling accepted-prefix-limit maximum <i>maximum</i>
L2VPN-VPLS: Shutdown-Threshold-PCT	/l2vpn-vpls/prefix-limit/config/shutdown-threshold-pct	set protocols bgp family l2vpn signaling accepted-prefix-limit teardown <i>limit-threshold</i>
L2VPN-VPLS: Restart-Timer	/l2vpn-vpls/prefix-limit/config/restart-timer	set protocols bgp family l2vpn signaling accepted-prefix-limit teardown idle-timeout <i>timeout</i>
L2VPN-EVPN: Max-Prefixes	/l2vpn-evpn/prefix-limit/config/max-prefixes	set protocols bgp family evpn signaling accepted-prefix-limit maximum <i>maximum</i>

Table 7: Global AFI-SAFI Configuration (*continued*)

Command Name	OpenConfig Command Path	Junos Configuration
L2VPN-EVPN: Shutdown-Threshold-PCT	/l2vpn-evpn/prefix-limit/ config/shutdown-threshold-pct	set protocols bgp family evpn signaling accepted-prefix-limit teardown <i>limit-threshold</i>
L2VPN-EVPN: Restart-Timer	/l2vpn-evpn/prefix-limit/config/restart-timer	set protocols bgp family evpn signaling accepted-prefix-limit teardown idle-timeout <i>timeout</i>

Table 8: Global Apply-Policy Configuration

Command Name	OpenConfig Command Path	Junos Configuration
Command path prefix: /bgp/global/apply-policy		
Import-Policies	/import-policies	set protocols bgp import <i>value</i>
Default-Import-Policy	/default-import-policy	set protocols bgp import <i>value</i>
Export-Policies	/export-policies	set protocols bgp export <i>value</i>
Default-Export-Policy	/default-export-policy	set protocols bgp export <i>value</i>

Table 9: Peer-Group Configuration

Command Name	OpenConfig Command Path	Junos Configuration
Command path prefix: /bgp/peer-groups/peer-group		
Peer-Group-Name	/config/peer-group-name	set protocols bgp group <i>group-name</i>
Peer-AS	/config/peer-as	set protocols bgp group <i>group-name</i> peer-as <i>peer-as</i>
Peer-Type	/config/peer-type	set protocols bgp group <i>group-name</i> type <external internal>
Auth-Password	/config/auth-password	set protocols bgp group <i>group-name</i> authentication-key <i>authentication-key</i>

Table 9: Peer-Group Configuration (*continued*)

Command Name	OpenConfig Command Path	Junos Configuration
Remove-Private-AS	/config/remote-private-as	set protocols bgp group <i>group-name</i> remove-private all set protocols bgp group <i>group-name</i> remove-private all replace
Route-Flap-Damping	/config/route-flap-damping	set protocols bgp group <i>group-name</i> damping
Send-Community	/config/send-community	Not supported
Description	/config/description	set protocols bgp group <i>group-name</i> description <i>description</i>
Timers: Connect-Retry	/timers/config/connect-retry	set protocols bgp group <i>group-name</i> connect-retry-interval <i>connect-retry</i>
Timers: Hold-Time	/timers/config/hold-time	set protocols bgp group <i>group-name</i> hold-time <i>hold-time</i>
Timers: Keepalive-Interval	/timers/config/keepalive-interval	Not supported
Timers: Minimum-Advertisement-Interval	/timers/config/minimum-advertisement-interval	set protocols bgp group <i>group-name</i> out-delay <i>out-delay</i>
Timers: Send-Update-Delay	/timers/config/send-update-delay	Not supported
Transport: TCP-MSS	/transport/config/tcp-mss	set protocols bgp group <i>group-name</i> tcp-mss <i>tcp-mss</i>
Transport: MTU-Discovery	/transport/config/mtu-discovery	set protocols bgp group <i>group-name</i> mtu-discovery
Transport: Passive-Mode	/transport/config/passive-mode	set protocols bgp group <i>group-name</i> passive
Transport: Local-Address	/transport/config/local-address	set protocols bgp group <i>group-name</i> local-address <i>local-address</i>
Error-Handling: Treat-AS-Withdraw	/error-handling/config/treat-as-withdraw	set protocols bgp group <i>group-name</i> bgp-error-tolerance
Logging-Options: Log-Neighbor-State-Changes	/logging-options/config/log-neighbor-state-changes	set protocols bgp group <i>group-name</i> log-updown
EBGP-MultiHop: MultiHop-TTL	/ebgp-multihop/config/multihop-ttl	set protocols bgp group <i>group-name</i> multihop ttl <i>ttl</i>

Table 9: Peer-Group Configuration (*continued*)

Command Name	OpenConfig Command Path	Junos Configuration
Route-Reflector: Route-Reflector-Cluster-ID	/route-reflector/config/route-reflector-cluster-id	set protocols bgp group <i>group-name</i> cluster <i>cluster</i>
Route-Reflector: Route-Reflector-Client	/route-reflector/config/route-reflector-client	set protocols bgp group <i>group-name</i> no-client-reflect
AS-Path-Options: Allow-Own-AS	/as-path-options/config/allow-own-as	set protocols bgp group <i>group-name</i> local-as loops <i>loops</i>
AS-Path-Options: Replace-Peer-AS	/as-path-options/config/replace-peer-as	set protocols bgp group <i>group-name</i> as-override
Add-Paths: Receive	/add-paths/config/receive	set protocols bgp group <i>group-name</i> family <i>family</i> add-path receive
Add-Paths: Send-Max	/add-paths/config/send-max	set protocols bgp group <i>group-name</i> family <i>family</i> add-path send path-count <i>path-count</i>
Add-Paths: Eligible Prefix Policy	/add-paths/config/eligible-prefix-policy	set protocols bgp group <i>group-name</i> family <i>family</i> add-path send prefix-policy <i>policy</i>
AFI-SAFI	/afi-safi/afi-safi/	Not supported
Graceful-Restart	/graceful-restart/config/	Not supported
Apply-Policy	/apply-policy/	Not supported

Table 10: Neighbors Configuration

Command Name	OpenConfig Command Path	Junos Configuration
Command path prefix: /bgp/neighbors/neighbor		
Neighbor-Address	/neighbor-address	set protocols bgp group <i>group-name</i> neighbor address
Peer-AS	/config/peer-as	set protocols bgp group <i>group-name</i> neighbor address peer-as <i>peer-as</i>
Peer-Type	/config/peer-type	set protocols bgp group <i>group-name</i> type <external internal>

Table 10: Neighbors Configuration (*continued*)

Command Name	OpenConfig Command Path	Junos Configuration
Auth-Password	/config/auth-password	set protocols bgp group <i>group-name</i> neighbor address authentication-key <i>authentication-key</i>
Remove-Private-AS	/config/remote-private-as	set protocols bgp group <i>group-name</i> neighbor address remove-private all set protocols bgp group <i>group-name</i> neighbor address remove-private all replace
Route-Flap-Damping	/config/route-flap-damping	set protocols bgp group <i>group-name</i> neighbor address damping
Send-Community	/config/send-community	Not supported
Description	/config/description	set protocols bgp group <i>group-name</i> neighbor address description
Peer-Group	/config/peer-group	set protocols bgp group <i>group-name</i> neighbor address
Timers – Connect-Retry	/timers/config/connect-retry	set protocols bgp group <i>group-name</i> neighbor address connect-retry-interval
Timers – Hold-Time	/timers/config/hold-time	set protocols bgp group <i>group-name</i> neighbor address hold-time <i>hold-time</i>
Timers - Keepalive-Interval	/timers/config/keepalive-interval	Not supported
Timers – Minimum-Advertisement-Interval	/timers/config/minimum-advertisement-interval	set protocols bgp group <i>group-name</i> neighbor address out-delay <i>out-delay</i>
Timers - Send-Update-Delay	/timers/config/send-update-delay	Not supported
Transport – TCP-MSS	/transport/config/tcp-mss	set protocols bgp group <i>group-name</i> neighbor address tcp-mss <i>tcp-mss</i>
Transport – MTU-Discovery	/transport/config/mtu-discovery	set protocols bgp group <i>group-name</i> neighbor address mtu-discovery

Table 10: Neighbors Configuration (*continued*)

Command Name	OpenConfig Command Path	Junos Configuration
Transport – Passive-Mode	/transport/config/passive-mode	set protocols bgp group <i>group-name</i> neighbor <i>address</i> passive
Transport – Local-Address	/transport/config/local-address	set protocols bgp group <i>group-name</i> neighbor <i>address</i> local-address <i>local-address</i>
Error-Handling – Treat-AS-Withdraw	/error-handling/config/treat-as-withdraw	set protocols bgp group <i>group-name</i> neighbor <i>address</i> bgp-error-tolerance
Logging-Options – Log-Neighbor-State-Changes	/logging-options/config/log-neighbor-state-changes	set protocols bgp group <i>group-name</i> neighbor <i>address</i> log-updown
EBGP-Multihop – Multihop-TTL	/ebgp-multihop/config/multihop-ttl	set protocols bgp group <i>group-name</i> neighbor <i>address</i> multihop ttl <i>ttl</i>
Route-Reflector – Route-Reflector-Cluster-ID	/route-reflector/config/route-reflector-cluster-id	set protocols bgp group <i>group-name</i> neighbor <i>address</i> cluster <i>cluster</i>
Route-Reflector – Route-Reflector-Client	/route-reflector/config/route-reflector-client	set protocols bgp group <i>group-name</i> neighbor <i>address</i> no-client-reflect
AS-Path-Options – Allow-Own-AS	/as-path-options/config/allow-own-as	set protocols bgp group <i>group-name</i> neighbor <i>address</i> local-as loops <i>loops</i>
AS-Path-Options – Replace-Peer-AS	/as-path-options/config/replace-peer-as	set protocols bgp group <i>group-name</i> neighbor <i>address</i> as-override
Add-Paths - Receive	/add-paths/config/receive	set protocols bgp group <i>group-name</i> neighbor <i>address</i> family <i>family</i> add-path receive
AS-Path-Options – Send-Max	/add-paths/config/send-max	set protocols bgp group <i>group-name</i> neighbor <i>address</i> family <i>family</i> add-path send path-count <i>path-count</i>
Add-Paths: Eligible Prefix Policy	/add-paths/config/eligible-prefix-policy	set protocols bgp group <i>group-name</i> neighbor <i>ip</i> family <i>family</i> add-path send prefix-policy
AFI-SAFI	/afi-safi/afi-safi/	Not supported

Table 10: Neighbors Configuration (*continued*)

Command Name	OpenConfig Command Path	Junos Configuration
Graceful-Restart	/graceful-restart/config/	Not supported
Apply-Policy	/apply-policy/	Not supported

**Related
Documentation**

- [Mapping OpenConfig Routing Policy Commands to Junos Configuration on page 66](#)
- [Mapping OpenConfig Interface Commands to Junos Configuration on page 50](#)
- [Mapping OpenConfig LLDP Commands to Junos Configuration on page 54](#)
- [Mapping OpenConfig Local Routing Commands to Junos Configuration on page 55](#)
- [Mapping OpenConfig MPLS Commands to Junos Configuration on page 56](#)

Mapping OpenConfig BGP RIB Commands to Junos Operation

Table 11: Sensor for BGP RIB routing table

resource path	Description
<p>loc-rib: The main BGP routing table for the local routing instance, containing best-path selections for each prefix. The loc-rib table may contain multiple routes for a given prefix, with an attribute to indicate which was selected as the best path. You can use the following resource paths with loc-rib:</p> <ul style="list-style-type: none"> • <code>/bgp-rib</code> • <code>/bgp-rib/afi-safis/afi-safi/ipv4-unicast/loc-rib</code> • <code>/bgp-rib/afi-safis/afi-safi/ipv6-unicast/loc-rib</code> 	<p>You can also append the following to the <code>/bgp-rib/afi-safis/afi-safi/ipv4-unicast/loc-rib</code> and <code>/bgp-rib/afi-safis/afi-safi/ipv6-unicast/loc-rib</code> paths:</p> <ul style="list-style-type: none"> • <code>/num-routes</code> • <code>/routes/route/prefix</code> • <code>/routes/route/attributes</code> • <code>/routes/route/attributes/origin</code> • <code>/routes/route/attributes/as-path</code> • <code>/routes/route/attributes/next-hop</code> • <code>/routes/route/attributes/med</code> • <code>/routes/route/attributes/local-pref</code> • <code>/routes/route/attributes/atomic-aggr</code> • <code>/routes/route/attributes/aggregator/as</code> • <code>/routes/route/attributes/aggregator/address</code> • <code>/routes/route/ext-attributes/</code> • <code>/routes/route/ext-attributes/community</code> • <code>/routes/route/ext-attributes/originator-id</code> • <code>/routes/route/ext-attributes/cluster-list</code> • <code>/routes/route/ext-attributes/extended-community</code> • <code>/routes/route/ext-attributes/aigp</code> • <code>/routes/route/ext-attributes/path-id</code> • <code>/routes/route/ext-attributes/unknown-attribute</code> • <code>/routes/route/ext-attributes/unknown-attribute/attr-type</code> • <code>/routes/route/ext-attributes/unknown-attribute/attr-len</code> • <code>/routes/route/ext-attributes/unknown-attribute/attr-value</code> • <code>/routes/route/last-modified-date</code> • <code>/routes/route/last-update-received</code> • <code>/routes/route/valid-route</code> • <code>/routes/route/invalid-reason</code> • <code>/routes/route/best-path</code>

- Related Documentation**
- [Mapping OpenConfig BGP Commands to Junos Configuration on page 39](#)
 - [Mapping OpenConfig Interface Commands to Junos Configuration on page 50](#)
 - [Mapping OpenConfig LLDP Commands to Junos Configuration on page 54](#)
 - [Mapping OpenConfig Local Routing Commands to Junos Configuration on page 55](#)
 - [Mapping OpenConfig MPLS Commands to Junos Configuration on page 56](#)
 - [Mapping OpenConfig Routing Policy Commands to Junos Configuration on page 66](#)

Mapping OpenConfig Interface Commands to Junos Configuration

Table 12 on page 50 to Table 19 on page 54 shows the mapping of OpenConfig interface commands to the relevant configuration in Junos.

Table 12: VRRP Configuration

Command Name	OpenConfig Command Path	Junos Configuration
Virtual Router ID	ifa/vrrp/vrrp-group/config/virtual-router-id	set interfaces <i>interface-name</i> unit <i>unit-number</i> family inet address <i>address</i> vrrp-group <i>virtual-router-id</i> set interfaces <i>interface-name</i> unit <i>unit-number</i> family inet6 address <i>address</i> vrrp-inet6-group <i>virtual-router-id</i>
Virtual Address	ifa/vrrp/vrrp-group/config/virtual-address	set interfaces <i>interface-name</i> unit <i>unit-number</i> family inet address <i>address</i> vrrp-group <i>virtual-router-id</i> virtual-address <i>address</i> set interfaces <i>interface-name</i> unit <i>unit-number</i> family inet6 address <i>address</i> vrrp-inet6-group <i>virtual-router-id</i> virtual-inet6-address
VRRP Priority	ifa/vrrp/vrrp-group/config/priority	set interfaces <i>interface-name</i> unit <i>unit-number</i> family inet address <i>address</i> vrrp-group <i>virtual-router-id</i> priority set interfaces <i>interface-name</i> unit <i>unit-number</i> family inet6 address <i>address</i> vrrp-inet6-group <i>virtual-router-id</i> priority
VRRP Preempt	ifa/vrrp/vrrp-group/config/preempt	set interfaces <i>interface-name</i> unit <i>unit-number</i> family inet address <i>address</i> vrrp-group <i>virtual-router-id</i> preempt set interfaces <i>interface-name</i> unit <i>unit-number</i> family inet6 address <i>address</i> vrrp-inet6-group <i>virtual-router-id</i> preempt
VRRP Preempt Hold Time	ifa/vrrp/vrrp-group/config/preempt-delay	set interfaces <i>interface-name</i> unit <i>unit-number</i> family inet address <i>address</i> vrrp-group <i>virtual-router-id</i> preempt hold-time <i>time</i> set interfaces <i>interface-name</i> unit <i>unit-number</i> family inet6 address <i>address</i> vrrp-inet6-group <i>virtual-router-id</i> preempt hold-time <i>time</i>

Table 12: VRRP Configuration (*continued*)

Command Name	OpenConfig Command Path	Junos Configuration
Accept Data	ifa/vrrp/vrrp-group/config/accept_mode	set interfaces <i>interface-name</i> unit <i>unit-number</i> family inet address <i>address</i> vrrp-group <i>virtual-router-id</i> accept-data set interfaces <i>interface-name</i> unit <i>unit-number</i> family inet6 address <i>address</i> vrrp-inet6-group <i>virtual-router-id</i> accept-data
Advertise Interval	ifa/vrrp/vrrp-group/config/advertisement_interval	set interfaces <i>interface-name</i> unit <i>unit-number</i> family inet address <i>address</i> vrrp-group <i>virtual-router-id</i> advertise-interval set interfaces <i>interface-name</i> unit <i>unit-number</i> family inet6 address <i>address</i> vrrp-inet6-group <i>virtual-router-id</i> inet6-advertise-interval
Track Interface	ifa/vrrp/vrrp-group/interface-tracking/config/track-interface	set interfaces <i>interface-name</i> unit <i>unit-number</i> family inet address <i>address</i> vrrp-group <i>virtual-router-id</i> track interface <i>interface-name</i> set interfaces <i>interface-name</i> unit <i>unit-number</i> family inet6 address <i>address</i> vrrp-inet6-group <i>virtual-router-id</i> track interface <i>interface-name</i>
Priority Cost	ifa/vrrp/vrrp-group/interface-tracking/config/priority-decrement	set interfaces <i>interface-name</i> unit <i>unit-number</i> family inet address <i>address</i> vrrp-group <i>virtual-router-id</i> track interface <i>interface-name</i> priority-cost <i>cost</i> set interfaces <i>interface-name</i> unit <i>unit-number</i> family inet6 address <i>address</i> vrrp-inet6-group <i>virtual-router-id</i> track interface <i>interface-name</i> priority-cost <i>cost</i>
Virtual Link Local Address	ifa/vrrp/vrrp-group/config/virtual-link-local	set interfaces <i>interface-name</i> unit <i>unit-number</i> family inet6 address <i>address</i> vrrp-inet6-group <i>virtual-router-id</i> virtual-link-local-address

Table 13: IPv4 and IPv6 Address Configuration

Command Name	OpenConfig Command Path	Junos Configuration
Configuration Address	ipv4/addresses/address/ip ipv4/addresses/address/prefix-length	set interfaces <i>interface-name</i> unit <i>unit-number</i> family inet address <i>address</i> set interfaces <i>interface-name</i> unit <i>unit-number</i> family inet6 address <i>address</i>

Table 13: IPv4 and IPv6 Address Configuration (*continued*)

Command Name	OpenConfig Command Path	Junos Configuration
Neighbor Address	ipv4/neighbors/neighbor/ip ipv6/neighbors/neighbor/ip	set interfaces <i>interface-name</i> unit <i>unit-number</i> family inet address <i>address</i> arp <i>address</i> set interfaces <i>interface-name</i> unit <i>unit-number</i> family inet6 address <i>address</i> ndp <i>address</i>
Link Layer Address	ip4/neighbors/neighbor/ip/link-layer-address ip6/neighbors/neighbor/ip/link-layer-address	set interfaces <i>interface-name</i> unit <i>unit-number</i> family inet address <i>address</i> arp <i>address</i> mac <i>address</i> set interfaces <i>interface-name</i> unit <i>unit-number</i> family inet6 address <i>address</i> ndp <i>address</i> mac <i>address</i>

Table 14: Interface AE Configuration

Command Name	OpenConfig Command Path	Junos Configuration
LAG Type	/aggregation/config/lag-type/lacp /aggregation/config/lag-type/static	set interfaces <i>ae-name</i> aggregated-ether-options lacp
Minimum Links	/aggregation/config/min-links	set interfaces <i>ae-name</i> aggregated-ether-options minimum-links

Table 15: LACP Configuration

Command Name	OpenConfig Command Path	Junos Configuration
LACP Interval	/lacp/interfaces/interface/config/interval	set interfaces <i>ae-name</i> aggregated-ether-options lacp periodic fast set interfaces <i>ae-name</i> aggregated-ether-options lacp periodic slow
LACP Mode	/lacp/interfaces/interface/config/lacp-mode	set interfaces <i>ae-name</i> aggregated-ether-options lacp active set interfaces <i>ae-name</i> aggregated-ether-options lacp passive
System ID	/lacp/interfaces/interface/config/system-id-mac	set interfaces <i>ae-name</i> aggregated-ether-options lacp system-id <i>address</i>
System Priority	/lacp/interfaces/interface/config/system-priority	set interfaces <i>ae-name</i> aggregated-ether-options lacp system-priority <i>system-priority</i>
Ethernet Options	/lacp/interfaces/interface/members/member	set interface <i>interface</i> gigether-options 802.3ad set interface <i>interface</i> fastether-options 802.3ad set interface <i>interface</i> ether-options 802.3ad

Table 16: Member Interface Configuration

Command Name	OpenConfig Command Path	Junos Configuration
Aggregate ID	/interface/aggregate-id	set interface <i>interface</i> gigether-options 802.3ad <i>aggregate-id</i> set interface <i>interface</i> fastether-options 802.3ad <i>aggregate-id</i> set interface <i>interface</i> ether-options 802.3ad <i>aggregate-id</i>

Table 17: Ethernet Configuration

Command Name	OpenConfig Command Path	Junos Configuration
Auto-negotiate	/ethernet/config/auto-negotiate	set interfaces <i>interface</i> gigether-options <i>auto-negotiation/no-auto-negotiation</i>
MAC Address	/ethernet/config/mac-address	set interfaces <i>interface</i> mac
Duplex Mode	/ethernet/config/duplex-mode	set interfaces <i>interface</i> link-mode
Port Speed	/ethernet/config/port-speed	set interface <i>interface</i> speed
Flow Control	/ethernet/config/enable-flow-control	set interface <i>interface</i> gigether-options flow-control

Table 18: IFD Configuration

Command Name	OpenConfig Command Path	Junos Configuration
Interface Type	/interfaces/ <i>interface</i> /config/type	Not supported. Type is derived from the interface name.
Interface MTU	/interfaces/ <i>interface</i> /config/mtu	set interface <i>interface</i> mtu
Interface Name	/interfaces/ <i>interface</i> /config/name	set interface <i>interface</i>
Interface Description	/interfaces/ <i>interface</i> /config/description	set interface <i>interface</i> description
Interface Enabled/Disabled	/interfaces/ <i>interface</i> /config/enabled	set interface <i>interface</i> disabled set interface <i>interface</i> enabled
Hold Time Up	/interfaces/ <i>interface</i> /config/hold-time/config/up	set interface <i>interface</i> hold-time up
Hold Time Down	/interfaces/ <i>interface</i> /config/hold-time/config/down	set interface <i>interface</i> hold-time down

Table 19: IFL Configuration

Command Name	OpenConfig Command Path	Junos Configuration
Unit Name	<code>/interfaces/interface/subinterfaces/subinterface/config/index</code>	<code>set interfaces interface unit unit</code>
Unnumbered Address	<code>/interfaces/interface/config/subinterfaces/subinterface/config/unnumbered</code>	<code>set interfaces interface unit unit family family unnumbered-address source ifl</code>
Unit Description	<code>/interfaces/interface/subinterfaces/subinterface/config/description</code>	<code>set interfaces interface unit unit description</code>
Unit Enabled/Disabled	<code>/interfaces/interface/subinterfaces/subinterface/config/enabled</code>	<code>set interfaces interface unit unit enabled</code> <code>set interfaces interface unit unit disabled</code>
Interface Alias	<code>/interfaces/interface/subinterfaces/subinterface/config/name</code>	<code>set interfaces interface alias</code>

Related Documentation

- [Mapping OpenConfig Routing Policy Commands to Junos Configuration on page 66](#)
- [Mapping OpenConfig BGP Commands to Junos Configuration on page 39](#)
- [Mapping OpenConfig LLDP Commands to Junos Configuration on page 54](#)
- [Mapping OpenConfig Local Routing Commands to Junos Configuration on page 55](#)
- [Mapping OpenConfig MPLS Commands to Junos Configuration on page 56](#)

Mapping OpenConfig LLDP Commands to Junos Configuration

Table 20 on page 54 and Table 21 on page 55 show the mapping of OpenConfig LLDP commands with the relevant configuration in Junos.

Table 20: Global LLDP Configuration

Command Name	OpenConfig Command Path	Junos Configuration
Enable	<code>/lldp/config/enabled</code>	<code>set protocols lldp enable/disable</code>
Hello time	<code>/lldp/config/hello-timer</code>	<code>set protocols lldp advertisement-interval advertisement-interval</code>
System Information	<code>/lldp/config/suppress-tlv-advertisement</code> <code>/lldp/config/system-name</code> <code>/lldp/config/system-description</code> <code>/lldp/config/chassis-id</code> <code>/lldp/config/chassis-id-type</code>	Not supported

Table 21: Interface Configuration

Command Name	OpenConfig Command Path	Junos Configuration
Interface Config	/lldp/interfaces/interface/config/name /lldp/interfaces/interface/config/enabled	set protocols lldp interface <i>interface-name</i> enable

Related Documentation

- [Mapping OpenConfig Routing Policy Commands to Junos Configuration on page 66](#)
- [Mapping OpenConfig Interface Commands to Junos Configuration on page 50](#)
- [Mapping OpenConfig Local Routing Commands to Junos Configuration on page 55](#)
- [Mapping OpenConfig BGP Commands to Junos Configuration on page 39](#)
- [Mapping OpenConfig MPLS Commands to Junos Configuration on page 56](#)

Mapping OpenConfig Local Routing Commands to Junos Configuration

Table 22 on page 55 and Table 23 on page 55 show the mapping of OpenConfig local routing commands to the relevant configuration in Junos.

Table 22: Static Route Configuration

Command Name	OpenConfig Command Path	Junos Configuration
Command path prefix: /local-routes/static-routes		
Local Static Prefix	/static/config/prefix	set routing-options static route <i>prefix</i>
Local Static Next Hop	/static/config/prefix	set routing-options static route <i>prefix</i> next-hop (<i>address</i> <i>interface</i>)
	/static/config/next-hop/ip-address	
	/static/config/next-hop/local-defined-next-hop	set routing-options static route <i>prefix</i> discard
	/static/config/next-hop/string	
Local Static Tag	/static/config/prefix	set routing-options static route <i>prefix</i> tag <i>tag</i>
	/static/config/set-tag	

Table 23: Local Aggregate Configuration

Command Name	OpenConfig Command Path	Junos Configuration
Command path prefix: /local-routes/local-aggregates		
Local Aggregate Prefix	/aggregate/config/prefix	set routing-options aggregate route <i>prefix</i>

Table 23: Local Aggregate Configuration (*continued*)

Command Name	OpenConfig Command Path	Junos Configuration
Local Aggregate Discard	/aggregate/config/prefix	set routing-options aggregate route <i>prefix</i> discard
	/aggregate/config/discard	
Local Aggregate Tag	/aggregate/config/prefix	set routing-options aggregate route <i>prefix</i> tag <i>tag</i>
	/aggregate/config/set-tag	

Related Documentation

- [Mapping OpenConfig BGP Commands to Junos Configuration on page 39](#)
- [Mapping OpenConfig Interface Commands to Junos Configuration on page 50](#)
- [Mapping OpenConfig LLDP Commands to Junos Configuration on page 54](#)
- [Mapping OpenConfig MPLS Commands to Junos Configuration on page 56](#)
- [Mapping OpenConfig Routing Policy Commands to Junos Configuration on page 66](#)

Mapping OpenConfig MPLS Commands to Junos Configuration

Table 24 on page 56 to Table 29 on page 63 show the mapping of OpenConfig MPLS commands with the relevant configuration in Junos.

Table 24: Global MPLS Configuration

Command Name	OpenConfig Command Path	Junos Configuration
Explicit Null	/mpls/global/config/null-label/explicit	set protocols mpls explicit-null
	/mpls/global/config/null-label/implicit	
Interface	/mpls/global/interface-attributes/interface/config/interface-id	set protocols mpls interface <i>interface</i>
	/mpls/global/interface-attributes/interface/config/mpls-enabled	
	/mpls/global/interface-attributes/interface/interface-ref/config/interface	set protocols mpls interface <i>interface</i> disable
	/mpls/global/interface-attributes/interface/interface-ref/config/subinterface	

Table 25: TE Global Attributes

Command Name	OpenConfig Command Path	Junos Configuration
SRLGs	/mpls/te-global-attributes/srlg/srlg/config/name	Flooded: set routing-options srlg <i>name</i> Static: set routing-options fate-sharing group <i>name</i>
SRLG Value	/mpls/te-global-attributes/srlg/srlg/config/value	set routing-options fate-sharing group <i>name</i> srlg-value <i>value</i>
SRLG Cost	/mpls/te-global-attributes/srlg/srlg/config/cost	Flooded: set routing-options srlg <i>name</i> srlg-cost <i>cost</i> Static: set routing-options fate-sharing group <i>name</i> cost <i>cost</i>
Address	/mpls/te-global-attributes/srlg/srlg/static-srlg-members/members-list/config/from-address /mpls/te-global-attributes/srlg/srlg/static-srlg-members/members-list/config/to-address	set routing-options fate-sharing group <i>name</i> from <i>address</i> to <i>address</i>
Admin Groups	/mpls/te-global-attributes/mpls-admin-groups/admin-group/config/admin-group-name /mpls/te-global-attributes/mpls-admin-groups/admin-group/config/bit-position	Bit position (group-value) 0-31: set protocols mpls admin-groups <i>group-name</i> <i>group-value</i> Bit position (group-value) 32-4294967295: set routing-options admin-groups-extended <i>group-name</i> <i>group-value</i> <i>group-value</i>
Delay	/mpls/te-global-attributes/te-lsp-timers/config/install-delay /mpls/te-global-attributes/te-lsp-timers/config/cleanup-delay /mpls/te-global-attributes/te-lsp-timers/config/reoptimize-timer	set protocols mpls optimize-switchover-delay <i>delay</i> set protocols mpls optimize-hold-dead-delay <i>delay</i> set protocols mpls optimize-timer <i>timer</i>

Table 26: TE Interface Attributes

Command Name	OpenConfig Command Path	Junos Configuration
TE Interface	/mpls/te-interface-attributes/interface/config/interface-id	set protocols ospf area <i>id</i> interface <i>interface</i>
	/mpls/te-interface-attributes/interface/interface-ref/config/interface	
	/mpls/te-interface-attributes/interface/interface-ref/config/subinterface	
TE Metric	/mpls/te-interface-attributes/interface/config/te-metric	set protocols ospf area <i>id</i> interface <i>interface</i> te-metric <i>te-metric</i>
		set protocols isis interface <i>interface</i> level level <i>level</i> te-metric <i>te-metric</i>
SRLG Membership	/mpls/te-interface-attributes/interface/config/srlg-membership	set protocols mpls interface <i>name</i> srlg <i>name</i>
Admin Groups	/mpls/te-interface-attributes/interface/config/admin-group	If protocols mpls admin-groups <i>name</i> is configured:
		set protocols mpls interface <i>name</i> admin-group <i>name</i>
		If routing-options admin-groups-extended <i>name</i> is configured: set protocols mpls interface <i>name</i> admin-group-extended <i>name</i>
IGP Flooding Bandwidth	/mpls/te-interface-attributes/interface/igp-flooding-bandwidth/config/threshold-type	set protocols rsvp interface <i>name</i> update-threshold <i>threshold</i>
	/mpls/te-interface-attributes/interface/igp-flooding-bandwidth/config/delta-percentage	
	/mpls/te-interface-attributes/interface/igp-flooding-bandwidth/config/threshold-specification	Not supported
	/mpls/te-interface-attributes/interface/igp-flooding-bandwidth/config/up-thresholds	
	/mpls/te-interface-attributes/interface/igp-flooding-bandwidth/config/down-thresholds	
	/mpls/te-interface-attributes/interface/igp-flooding-bandwidth/config/up-down-thresholds	

Table 27: RSVP Signaling Protocols

Command Name	OpenConfig Command Path	Junos Configuration
Graceful Restart	/mpls/signaling-protocols/rsvp-te/global/graceful-restart/config/enable	set protocols rsvp graceful-restart enable
	/mpls/signaling-protocols/rsvp-te/global/graceful-restart/config/restart-time	set protocols rsvp graceful-restart maximum-helper-recovery-time <i>time</i>
	/mpls/signaling-protocols/rsvp-te/global/graceful-restart/config/recovery-time	set protocols rsvp graceful-restart maximum-helper-restart-time <i>time</i>
Cleanup Timer	/mpls/signaling-protocols/rsvp-te/global/soft-preemption/config/enable	set protocols rsvp preemption soft-preemption cleanup-timer <i>timer</i>
	/mpls/signaling-protocols/rsvp-te/global/soft-preemption/config/soft-preemption-timeout	
Hello Interval (All Interfaces)	/mpls/signaling-protocols/rsvp-te/global/hellos/config/hello-interval	set protocols rsvp interface all hello-interval <i>interval</i>
	/mpls/signaling-protocols/rsvp-te/global/hellos/config/refresh-reduction	set protocols rsvp interface all no-reliable
Hello Interval (Single Interface)	/mpls/signaling-protocols/rsvp-te/interface-attributes/interface/config/interface-id	set protocols rsvp interface <i>name</i> hello-interval <i>interval</i>
	/mpls/signaling-protocols/rsvp-te/interface-attributes/interface/interface-ref/config/interface	set protocols rsvp interface <i>name</i> no-reliable
	/mpls/signaling-protocols/rsvp-te/interface-attributes/interface/config/interface-name	
	/mpls/signaling-protocols/rsvp-te/interface-attributes/interface/hellos/config/hello-interval	
	/mpls/signaling-protocols/rsvp-te/interface-attributes/interface/hellos/config/refresh-reduction	
Authentication Key	/mpls/signaling-protocols/rsvp-te/interface-attributes/interface/config/interface-id	set protocols rsvp interface <i>name</i> authentication-key <i>key</i>
	/mpls/signaling-protocols/rsvp-te/interface-attributes/interface/interface-ref/config/interface	
	/mpls/signaling-protocols/rsvp-te/interface-attributes/interface/interface-ref/config/subinterface	
	/mpls/signaling-protocols/rsvp-te/interface-attributes/interface/authentication/config/enable	
	/mpls/signaling-protocols/rsvp-te/interface-attributes/interface/authentication/config/authentication-key	

Table 27: RSVP Signaling Protocols (*continued*)

Command Name	OpenConfig Command Path	Junos Configuration
Subscription	/mpls/signaling-protocols/rsvp-te/interface-attributes/ interface/config/interface-id	set protocols rsvp interface <i>name</i> subscription <i>subscription</i>
	/mpls/signaling-protocols/rsvp-te/interface-attributes/ interface/interface-ref/config/interface	
	/mpls/signaling-protocols/rsvp-te/interface-attributes/ interface/interface-ref/config/subinterface	
	/mpls/signaling-protocols/rsvp-te/interface-attributes/ interface/subscription/config/subscription	
Link Protection	/mpls/signaling-protocols/rsvp-te/interface-attributes/ interface/config/interface-id	set protocols rsvp interface <i>name</i> link-protection
	/mpls/signaling-protocols/rsvp-te/interface-attributes/ interface/interface-ref/config/interface	To disable node-protection:
	/mpls/signaling-protocols/rsvp-te/interface-attributes/ interface/interface-ref/config/subinterface	set protocols rsvp interface <i>name</i> link-protection no-node-protection
	/mpls/signaling-protocols/rsvp-te/interface-attributes/interface/ protection/config/link-protection-style-requested/unprotected	set protocols rsvp interface <i>name</i> link-protection optimize-timer <i>timer</i>
	/mpls/signaling-protocols/rsvp-te/interface-attributes/interface/protection/ config/link-protection-style-requested/link-protection-requested	
	/mpls/signaling-protocols/rsvp-te/interface-attributes/interface/protection/ config/link-protection-style-requested/link-node-protection-requested	
	/mpls/signaling-protocols/rsvp-te/interface-attributes/interface/protection/ config/bypass-optimize-interval	

Table 28: Label Switched Paths

Command Name	OpenConfig Command Path	Junos Configuration
Path	/mpls/lsp/constrained-path/named-explicit-paths/config/name	set protocols mpls path <i>name</i> <i>address</i>
	/mpls/lsp/constrained-path/named-explicit-paths/explicit-route-objects/ config/address	<i>hop-type</i>
	/mpls/lsp/constrained-path/named-explicit-paths/explicit-route-objects/ config/hop-type	
	/mpls/lsp/constrained-path/named-explicit-paths/explicit-route-objects/ config/index	
Name	/mpls/lsp/constrained-path/tunnel/config/name	set protocols mpls label-switched-path <i>name</i>
	/mpls/lsp/constrained-path/tunnel/config/type/P2P	
	/mpls/lsp/constrained-path/tunnel/config/ signaling-protocol/path-setup-rsvp	

Table 28: Label Switched Paths (*continued*)

Command Name	OpenConfig Command Path	Junos Configuration
Description	/mpls/lsp/constrained-path/tunnel/config/name	set protocols mpls label-switched-path <i>name</i>
	/mpls/lsp/constrained-path/tunnel/config/type/P2P	
	/mpls/lsp/constrained-path/tunnel/config/description	set protocols mpls label-switched-path <i>name</i> description <i>description</i>
Admin-Status	/mpls/lsp/constrained-path/tunnel/config/name	set protocols mpls label-switched-path <i>name</i>
	/mpls/lsp/constrained-path/tunnel/config/type/P2P	
	/mpls/lsp/constrained-path/tunnel/config/admin-status	set protocols mpls label-switched-path <i>name</i> disable
Preference	/mpls/lsp/constrained-path/tunnel/config/name	set protocols mpls label-switched-path <i>name</i>
	/mpls/lsp/constrained-path/tunnel/config/type/P2P	
	/mpls/lsp/constrained-path/tunnel/config/preference	set protocols mpls label-switched-path <i>name</i> preference <i>preference</i>
Metric	/mpls/lsp/constrained-path/tunnel/config/name	set protocols mpls label-switched-path <i>name</i>
	/mpls/lsp/constrained-path/tunnel/config/type/P2P	
	/mpls/lsp/constrained-path/tunnels/tunnel/config/metric-type	set protocols mpls label-switched-path <i>name</i> metric <i>metric</i>
	/mpls/lsp/constrained-path/tunnels/tunnel/config/shortcut-eligible	
	/mpls/lsp/constrained-path/tunnel/config/metric	
Link Protection	/mpls/lsp/constrained-path/tunnel/config/name	set protocols mpls label-switched-path <i>name</i>
	/mpls/lsp/constrained-path/tunnel/config/type/P2P	
	/mpls/lsp/constrained-path/tunnel/config/protection-style-requested/unprotected	set protocols mpls label-switched-path <i>name</i> link-protection
	/mpls/lsp/constrained-path/tunnel/config/protection-style-requested/link-protection-requested	set protocols mpls label-switched-path <i>name</i> node-link-protection
	/mpls/lsp/constrained-path/tunnel/config/protection-style-requested/link-node-protection-requested	
Optimize Timer	/mpls/lsp/constrained-path/tunnel/config/name	set protocols mpls label-switched-path <i>name</i>
	/mpls/lsp/constrained-path/tunnel/config/type/P2P	
	/mpls/lsp/constrained-path/tunnel/config/reoptimize-timer	set protocols mpls label-switched-path <i>name</i> optimize-timer <i>timer</i>
Source	/mpls/lsp/constrained-path/tunnel/config/name	set protocols mpls label-switched-path <i>name</i>
	/mpls/lsp/constrained-path/tunnel/config/type/P2P	
	/mpls/lsp/constrained-path/tunnel/config/source	set protocols mpls label-switched-path <i>name</i> from <i>from</i>

Table 28: Label Switched Paths (*continued*)

Command Name	OpenConfig Command Path	Junos Configuration
Soft Preemption	/mpls/lsp/constrained-path/tunnel/config/name	set protocols mpls label-switched-path <i>name</i>
	/mpls/lsp/constrained-path/tunnel/config/type/P2P	
	/mpls/lsp/constrained-path/tunnel/config/soft-preemption	set protocols mpls label-switched-path <i>name</i> soft-preemption
Priority	/mpls/lsp/constrained-path/tunnel/config/name	set protocols mpls label-switched-path <i>name</i>
	/mpls/lsp/constrained-path/tunnel/config/type/P2P	
	/mpls/lsp/constrained-path/tunnel/config/setup-priority	set protocols mpls label-switched-path <i>name</i> priority <i>setup reservation</i>
	/mpls/lsp/constrained-path/tunnel/config/hold-priority	
Bandwidth	/mpls/lsp/constrained-path/tunnel/config/name	set protocols mpls label-switched-path <i>name</i>
	/mpls/lsp/constrained-path/tunnel/config/type/P2P	
	/mpls/lsp/constrained-path/tunnel/bandwidth/config/specification-type/specified	set protocols mpls label-switched-path <i>name</i> bandwidth <i>bandwidth</i>
	/mpls/lsp/constrained-path/tunnel/bandwidth/config/set-bandwidth	
Min/Max Bandwidth	/mpls/lsp/constrained-path/tunnel/config/name	set protocols mpls label-switched-path <i>name</i>
	/mpls/lsp/constrained-path/tunnel/config/type/P2P	
	/mpls/lsp/constrained-path/tunnel/bandwidth/config/specification-type/auto	set protocols mpls label-switched-path <i>name</i> minimum-bandwidth <i>minimum</i>
	/mpls/lsp/constrained-path/tunnel/bandwidth/auto-bandwidth/config/enabled	set protocols mpls label-switched-path <i>name</i> maximum-bandwidth <i>maximum</i>
	/mpls/lsp/constrained-path/tunnel/bandwidth/auto-bandwidth/config/min-bw	set protocols mpls label-switched-path <i>name</i> adjust-interval <i>interval</i>
	/mpls/lsp/constrained-path/tunnel/bandwidth/auto-bandwidth/config/max-bw	set protocols mpls label-switched-path <i>name</i> adjust-threshold <i>threshold</i>
	/mpls/lsp/constrained-path/tunnel/bandwidth/auto-bandwidth/config/adjust-interval	
	/mpls/lsp/constrained-path/tunnel/bandwidth/auto-bandwidth/config/adjust-threshold	

Table 28: Label Switched Paths (*continued*)

Command Name	OpenConfig Command Path	Junos Configuration
Overflow Bandwidth	/mpls/lsp/constrained-path/tunnel/config/name	set protocols mpls label-switched-path <i>name</i>
	/mpls/lsp/constrained-path/tunnel/config/type/P2P	
	/mpls/lsp/constrained-path/tunnel/bandwidth/config/specification-type/auto	set protocols mpls label-switched-path <i>name</i> auto-bandwidth adjust-threshold-overflow-limit
	/mpls/lsp/constrained-path/tunnel/auto-bandwidth/overflow/config/enable	
	/mpls/lsp/constrained-path/tunnel/bandwidth/auto-bandwidth/overflow/config/overflow-threshold	
	/mpls/lsp/constrained-path/tunnel/bandwidth/auto-bandwidth/overflow/config/trigger-event-count	
Underflow Bandwidth	/mpls/lsp/constrained-path/tunnel/config/name	set protocols mpls label-switched-path <i>name</i>
	/mpls/lsp/constrained-path/tunnel/config/type/P2P	
	/mpls/lsp/constrained-path/tunnel/bandwidth/config/specification-type/auto	set protocols mpls label-switched-path <i>name</i> auto-bandwidth adjust-threshold-underflow-limit
	/mpls/lsp/constrained-path/tunnel/auto-bandwidth/underflow/config/enable	
	/mpls/lsp/constrained-path/tunnel/bandwidth/auto-bandwidth/underflow/config/underflow-threshold	
	/mpls/lsp/constrained-path/tunnel/bandwidth/auto-bandwidth/underflow/config/trigger-event-count	

Table 29: RSVP P2P Tunnel

Command Name	OpenConfig Command Path	Junos Configuration
Destination	/mpls/lsp/constrained-path/tunnel/config/name	set protocols mpls label-switched-path <i>name</i>
	/mpls/lsp/constrained-path/tunnel/config/type/P2P	
	/mpls/lsp/constrained-path/tunnel/p2p-tunnel-attributes/config/destination	set protocols mpls label-switched-path <i>name</i> to to
Primary Path	/mpls/lsp/constrained-path/tunnel/config/name	set protocols mpls label-switched-path <i>name</i>
	/mpls/lsp/constrained-path/tunnel/config/type/P2P	
	/mpls/lsp/constrained-path/tunnel/p2p-tunnel-attributes/p2p-primary-paths/config/name	

Table 29: RSVP P2P Tunnel (*continued*)

Command Name	OpenConfig Command Path	Junos Configuration
Primary Path - Locally-Computed	/mpls/lsp/constrained-path/tunnel/p2p-tunnel-attributes/ p2p-primary-paths/config/path-computation-method/ locally-computed	set protocols mpls label-switched-path <i>name</i> no-cspf
	/mpls/lsp/constrained-path/tunnel/p2p-tunnel-attributes/ p2p-primary-paths/config/use-cspf	set protocols mpls label-switched-path <i>name</i> random
	/mpls/lsp/constrained-path/tunnel/p2p-tunnel-attributes/ p2p-primary-paths/config/cspf-tiebreaker/random	set protocols mpls label-switched-path <i>name</i> least-fill
	/mpls/lsp/constrained-path/tunnel/p2p-tunnel-attributes/ p2p-primary-paths/config/cspf-tiebreaker/least-fill	set protocols mpls label-switched-path <i>name</i> most-fill
	/mpls/lsp/constrained-path/tunnel/p2p-tunnel-attributes/ p2p-primary-paths/config/cspf-tiebreaker/most-fill	
Primary Path - Externally Queried	/mpls/lsp/constrained-path/tunnel/ p2p-tunnel-attributes/p2p-primary-paths/config/ path-computation-method/externally-queried	set protocols mpls label-switched-path <i>name</i> lsp-external-controller pccd
		set protocols pcep pce <i>name</i> destination-ipv4-address <i>address</i>
		set protocols pcep pce <i>name</i> destination-port 4189
Primary Path - Explicitly Defined	/mpls/lsp/constrained-path/tunnel/ p2p-tunnel-attributes/p2p-primary-paths/config/ path-computation-method/explicitly-defined	set protocols mpls label-switched-path <i>name</i> primary <i>path</i>
	/mpls/lsp/constrained-path/tunnel/p2p-tunnel-attributes/ p2p-primary-paths/config/explicit-path-name	
Primary Path - Preference	/mpls/lsp/constrained-path/tunnel/p2p-tunnel-attributes/ p2p-primary-paths/config/preference	set protocols mpls label-switched-path <i>name</i> primary <i>path</i> preference <i>preference</i>
Primary Path - Priorities	/mpls/lsp/constrained-path/tunnel/p2p-tunnel-attributes/ p2p-primary-paths/config/setup-priority	set protocols mpls label-switched-path <i>name</i> primary <i>path</i> priority <i>setup reservation</i>
	/mpls/lsp/constrained-path/tunnel/p2p-tunnel-attributes/ p2p-primary-paths/config/hold-priority	
Primary Path - Retry Timer	/mpls/lsp/constrained-path/tunnel/p2p-tunnel-attributes/ p2p-primary-paths/config/retry-timer	set protocols mpls label-switched-path <i>name</i> retry-timer
Primary Path - Candidate Secondary Paths	/mpls/lsp/constrained-path/tunnel/p2p-tunnel-attributes/ p2p-primary-paths/candidate-secondary-paths	Not supported

Table 29: RSVP P2P Tunnel (*continued*)

Command Name	OpenConfig Command Path	Junos Configuration
Primary Path – Admin-Groups	/mpls/lsp/constrained-path/tunnel/p2p-tunnel-attributes/p2p-primary-paths/admin-groups/config/exclude-group	set protocols mpls label-switched-path <i>name</i> primary path admin-group exclude <i>group</i>
	/mpls/lsp/constrained-path/tunnel/p2p-tunnel-attributes/p2p-primary-paths/admin-groups/config/include-all-group	set protocols mpls label-switched-path <i>name</i> primary path admin-group exclude <i>group</i>
	/mpls/lsp/constrained-path/tunnel/p2p-tunnel-attributes/p2p-primary-paths/admin-groups/config/include-any-group	set protocols mpls label-switched-path <i>name</i> primary path admin-group include-any <i>group</i>
Secondary Path	/mpls/lsp/constrained-path/tunnel/config/name	set protocols mpls label-switched-path <i>name</i>
	/mpls/lsp/constrained-path/tunnel/config/type/P2P	
	/mpls/lsp/constrained-path/tunnel/p2p-tunnel-attributes/p2p-secondary-paths/config/name	
Secondary Path - Locally-Computed	/mpls/lsp/constrained-path/tunnel/p2p-tunnel-attributes/p2p-secondary-paths/config/path-computation-method/locally-computed	set protocols mpls label-switched-path <i>name</i> secondary <i>path name</i> no-cspf
	/mpls/lsp/constrained-path/tunnel/p2p-tunnel-attributes/p2p-secondary-paths/config/use-cspf	
	/mpls/lsp/constrained-path/tunnel/p2p-tunnel-attributes/p2p-secondary-paths/config/cspf-tiebreaker/random	
	/mpls/lsp/constrained-path/tunnel/p2p-tunnel-attributes/p2p-secondary-paths/config/cspf-tiebreaker/least-fill	
	/mpls/lsp/constrained-path/tunnel/p2p-tunnel-attributes/p2p-secondary-paths/config/cspf-tiebreaker/most-fill	
Secondary Path - Externally Queried	/mpls/lsp/constrained-path/tunnel/p2p-tunnel-attributes/p2p-secondary-paths/config/path-computation-method/externally-queried	Not supported
Secondary Path - Explicitly Defined	/mpls/lsp/constrained-path/tunnel/p2p-tunnel-attributes/p2p-secondary-paths/config/path-computation-method/explicitly-defined	set protocols mpls label-switched-path <i>name</i> secondary <i>path</i>
	/mpls/lsp/constrained-path/tunnel/p2p-tunnel-attributes/p2p-secondary-paths/config/explicit-path-name	
Secondary Path - Preference	/mpls/lsp/constrained-path/tunnel/p2p-tunnel-attributes/p2p-secondary-paths/config/preference	set protocols mpls label-switched-path <i>name</i> secondary <i>path</i> preference <i>preference</i>

Table 29: RSVP P2P Tunnel (*continued*)

Command Name	OpenConfig Command Path	Junos Configuration
Secondary Path - Priorities	/mpls/lsp/constrained-path/tunnel/p2p-tunnel-attributes/ p2p-secondary-paths/config/setup-priority /mpls/lsp/constrained-path/tunnel/p2p-tunnel-attributes/ p2p-secondary-paths/config/hold-priority	set protocols mpls label-switched-path <i>name</i> secondary <i>path</i> priority <i>setup</i> <i>reservation</i>
Secondary Path - Retry Timer	/mpls/lsp/constrained-path/tunnel/p2p-tunnel-attributes/ p2p-secondary-paths/config/retry-timer	set protocols mpls label-switched-path <i>name</i> secondary <i>path</i> retry-timer
Secondary Path - Admin-Groups	/mpls/lsp/constrained-path/tunnel/p2p-tunnel-attributes/ p2p-secondary-paths/admin-groups/config/exclude-group /mpls/lsp/constrained-path/tunnel/p2p-tunnel-attributes/ p2p-secondary-paths/admin-groups/config/include-all-group /mpls/lsp/constrained-path/tunnel/p2p-tunnel-attributes/ p2p-secondary-paths/admin-groups/config/include-any-group	set protocols mpls label-switched-path <i>name</i> secondary <i>path</i> admin-group exclude <i>group</i> set protocols mpls label-switched-path <i>name</i> secondary <i>path</i> admin-group include-all <i>group</i> set protocols mpls label-switched-path <i>name</i> secondary <i>path</i> admin-group include-any <i>group</i>

Related Documentation

- [Mapping OpenConfig BGP Commands to Junos Configuration on page 39](#)
- [Mapping OpenConfig Interface Commands to Junos Configuration on page 50](#)
- [Mapping OpenConfig LLDP Commands to Junos Configuration on page 54](#)
- [Mapping OpenConfig Local Routing Commands to Junos Configuration on page 55](#)
- [Mapping OpenConfig Routing Policy Commands to Junos Configuration on page 66](#)

Mapping OpenConfig Routing Policy Commands to Junos Configuration

Table 30 on page 66 to Table 32 on page 67 show the mapping of OpenConfig routing policy commands to the relevant configuration in Junos.

Table 30: Defined Set Configuration

Command Name	OpenConfig Command Path	Junos Configuration
Prefix Set	/routing-policy/defined-sets/prefix-set	set policy-options prefix-list <i>name</i>
Neighbor Set	/routing-policy/defined-sets/neighbor-set	Not supported
Tag Set	/routing-policy/defined-sets/tag-set	Not supported

Table 31: BGP Defined Set Configuration

Command Name	OpenConfig Command Path	Junos Configuration
Community Set	/routing-policy/defined-sets/bgp-defined-sets/community-set	set policy-options community <i>name</i> members <i>value</i>
AS Path Set	/routing-policy/defined-sets/bgp-defined-sets/as-path-set	Not supported
Ext Community Set	/routing-policy/defined-sets/bgp-defined-sets/ext-community-set	set policy-options community <i>name</i> members <i>value</i>

Table 32: Policy Definition Configuration

Command Name	OpenConfig Command Path	Junos Configuration
Command path prefix: /routing-policy/policy-definition/statement		
Call Policy	/conditions/call-policy	set policy-options policy-statement <i>name</i> from policy <i>value</i>
Prefix Set	/conditions/match-prefix-set/prefix-set	set policy-options policy-statement <i>name</i> from prefix-list <i>name</i> set policy-options policy-statement <i>name</i> from route-filter <i>address</i> prefix-length-range <i>range</i>
Match Set Options	/conditions/match-prefix-set/match-set-options	Not supported
Neighbor Set	/conditions/match-neighbor-set/neighbor-set	set policy-options policy-statement <i>name</i> from neighbor <i>address</i>
Match Neighbor Set	/conditions/match-neighbor-set/match-set-options	Not supported
Tag Set	/conditions/match-tag-set/tag-set	set policy-options policy-statement <i>name</i> from tag <i>tag</i>
Match Tag Set	/conditions/match-tag-set/match-set-options	Not supported
Install Protocol EQ	/conditions/install-protocol-eq	set policy-options policy-statement <i>name</i> from protocol <i>protocol</i>

Table 32: Policy Definition Configuration (*continued*)

Command Name	OpenConfig Command Path	Junos Configuration
IGP Conditions	/conditions/igp-conditions	Not supported
BGP Match Community Set	/conditions/bgp-conditions/match-community-set/community-set	set policy-options policy-statement <i>name</i> from community <i>name</i>
BGP Match Ext Community Set	/conditions/bgp-conditions/match-ext-community-set	set policy-options policy-statement <i>name</i> from community <i>name</i>
BGP Match Ext Community Set Options	/conditions/bgp-conditions/match-ext-community-set/match-set-options	Not supported
BGP Match AS Path Set	/conditions/bgp-conditions/match-as-path-set	Not supported
BGP MED EQ	/conditions/bgp-conditions/med-eq	set policy-options policy-statement <i>name</i> from metric <i>metric</i>
BGP Origin EQ	/conditions/bgp-conditions/origin-eq	set policy-options policy-statement <i>name</i> from origin (egp igp incomplete)
BGP Next Hop	/conditions/bgp-conditions/next-hop-in	set policy-options policy-statement <i>name</i> from next-hop <i>address</i>
BGP Local Preference EQ	/conditions/bgp-conditions/local-pref-eq	set policy-options policy-statement <i>name</i> from local-preference <i>preference</i>
BGP Community Count	/conditions/bgp-conditions/community-count	set policy-options policy-statement <i>name</i> from community-count <i>count</i> (equal orhigher orlower)
BGP AS Path Length	/conditions/bgp-conditions/as-path-length	Not supported
Accept/Reject	/actions/accept-reject	set policy-options policy-statement example-accept then accept set policy-options policy-statement example-accept then reject

Table 32: Policy Definition Configuration (*continued*)

<i>Command Name</i>	<i>OpenConfig Command Path</i>	<i>Junos Configuration</i>
IGP Actions	/actions/igp-actions/set-tag	set policy-options policy-statement <i>name</i> then tag <i>tag</i>
BGP Actions Set AS Path Prepend	/actions/bgp-actions/set-as-path-prepend	Not supported
BGP Actions Set Community	/actions/bgp-actions/set-community	set policy-options policy-statement <i>name</i> then community (set replace add) <i>name</i>
BGP Actions Set Ext Community	/actions/bgp-actions/set-ext-community	set policy-options policy-statement <i>name</i> then community (set replace add) <i>name</i>
BGP Actions Set Route Origin	/actions/bgp-actions/set-route-origin	set policy-options policy-statement <i>name</i> then origin (egp igp incomplete)
BGP Actions Set Local Preferences	/actions/bgp-actions/set-local-pref	set policy-options policy-statement <i>name</i> then local-preference <i>preference</i>
BGP Actions Set Next Hop	/actions/bgp-actions/set-next-hop	set policy-options policy-statement <i>name</i> then next-hop <i>address</i>
BGP Actions Set Med	/actions/bgp-actions/set-med	set policy-options policy-statement <i>name</i> then metric <i>metric</i>

**Related
Documentation**

- [Mapping OpenConfig BGP Commands to Junos Configuration on page 39](#)
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- [Mapping OpenConfig Local Routing Commands to Junos Configuration on page 55](#)
- [Mapping OpenConfig MPLS Commands to Junos Configuration on page 56](#)

CHAPTER 4

Configuration Statements

- [netconf on page 72](#)

netconf

Syntax	<pre>netconf { rfc-compliant; ssh { connection-limit <i>limit</i>; port <i>port</i>; rate-limit <i>limit</i>; } traceoptions { file <filename> <files <i>number</i>> <match <i>regular-expression</i>> <size <i>size</i>> <world-readable no-world-readable>; flag <i>flag</i>; no-remote-trace; on-demand; } }</pre>
Hierarchy Level	[edit system services]
Release Information	Statement introduced in Junos OS Release 7.5.
Description	<p>Configure the NETCONF XML management protocol.</p> <p>The remaining statements are explained separately. See CLI Explorer.</p>
Default	If you do not include the netconf statement, NETCONF connections are not permitted.
Required Privilege Level	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• <i>connection-limit</i>• <i>port (NETCONF)</i>• <i>rate-limit</i>• <i>ssh (NETCONF)</i>• <i>traceoptions (NETCONF and Junos XML Protocol)</i>