



# Nokia Service Router Linux

## Release 23.7

### System Management Guide

---

3HE 19556 AAAA TQZZA  
Edition: 01  
August 2023

Nokia is committed to diversity and inclusion. We are continuously reviewing our customer documentation and consulting with standards bodies to ensure that terminology is inclusive and aligned with the industry. Our future customer documentation will be updated accordingly.

---

This document includes Nokia proprietary and confidential information, which may not be distributed or disclosed to any third parties without the prior written consent of Nokia.

This document is intended for use by Nokia's customers ("You"/"Your") in connection with a product purchased or licensed from any company within Nokia Group of Companies. Use this document as agreed. You agree to notify Nokia of any errors you may find in this document; however, should you elect to use this document for any purpose(s) for which it is not intended, You understand and warrant that any determinations You may make or actions You may take will be based upon Your independent judgment and analysis of the content of this document.

Nokia reserves the right to make changes to this document without notice. At all times, the controlling version is the one available on Nokia's site.

No part of this document may be modified.

NO WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY OF AVAILABILITY, ACCURACY, RELIABILITY, TITLE, NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, IS MADE IN RELATION TO THE CONTENT OF THIS DOCUMENT. IN NO EVENT WILL NOKIA BE LIABLE FOR ANY DAMAGES, INCLUDING BUT NOT LIMITED TO SPECIAL, DIRECT, INDIRECT, INCIDENTAL OR CONSEQUENTIAL OR ANY LOSSES, SUCH AS BUT NOT LIMITED TO LOSS OF PROFIT, REVENUE, BUSINESS INTERRUPTION, BUSINESS OPPORTUNITY OR DATA THAT MAY ARISE FROM THE USE OF THIS DOCUMENT OR THE INFORMATION IN IT, EVEN IN THE CASE OF ERRORS IN OR OMISSIONS FROM THIS DOCUMENT OR ITS CONTENT.

Copyright and trademark: Nokia is a registered trademark of Nokia Corporation. Other product names mentioned in this document may be trademarks of their respective owners.

The registered trademark Linux® is used pursuant to a sublicense from the Linux Foundation, the exclusive licensee of Linus Torvalds, owner of the mark on a worldwide basis.

© 2023 Nokia.

# Table of contents

<b>1</b>	<b>About this guide.....</b>	<b>8</b>
1.1	Precautionary and information messages.....	8
1.2	Conventions.....	8
<b>2</b>	<b>What's new.....</b>	<b>10</b>
<b>3</b>	<b>CLI interface.....</b>	<b>11</b>
3.1	CLI access and use.....	11
3.1.1	Accessing the CLI.....	11
3.1.2	Using the CLI help functions.....	11
3.1.3	Using the CLI auto-complete function.....	12
3.1.4	CLI keyboard shortcuts.....	13
3.1.5	Closing the CLI.....	13
3.1.5.1	Administrative commands.....	14
3.2	Configuration modes.....	28
3.2.1	Configuration candidates.....	29
3.2.1.1	Exclusive mode.....	29
3.2.1.2	Shared mode.....	29
3.2.1.3	Private mode.....	30
3.2.1.4	Name mode.....	30
3.2.2	Setting the configuration mode.....	30
3.2.3	Managing configuration conflicts.....	31
3.2.4	Committing a configuration in candidate mode.....	32
3.2.5	Deleting configurations.....	33
3.2.6	Annotating the configuration.....	34
3.2.7	Discarding a configuration in candidate mode.....	35
3.3	CLI output formatting and filtering.....	35
3.3.1	Specifying output format.....	35
3.3.2	Using Linux output modifiers.....	36
3.3.3	Using output filters.....	38
3.3.4	Directing output to a file.....	40
3.4	CLI environment customization.....	40
3.4.1	Configuring the CLI prompt.....	41
3.4.2	Configuring the bottom toolbar text.....	41

3.4.3	Configuring the SR Linux CLI engine type.....	42
3.4.4	Configuring the CLI output format.....	43
3.4.5	Configuring CLI command aliases.....	43
3.4.6	Configuring command auto-completion.....	44
3.4.7	Displaying the CLI environment configuration.....	45
3.4.8	Managing CLI environment settings.....	45
<b>4</b>	<b>YANG data models.....</b>	<b>47</b>
4.1	SR Linux data models.....	47
4.2	OpenConfig data models.....	47
4.2.1	Implementation in SR Linux.....	47
4.2.2	Interaction with SR Linux data models.....	48
4.2.2.1	Viewing OpenConfig to SR Linux mapping files.....	48
4.2.3	Enabling access to OpenConfig data models.....	50
4.2.4	Specifying the data model mode.....	50
4.2.4.1	Specifying the data model in SSH mode.....	50
4.2.4.2	Specifying the data model in Linux bash mode.....	50
4.2.4.3	Specifying the data model in CLI mode.....	51
4.2.5	Verifying the OpenConfig operational state.....	51
4.2.6	Specifying the data model mode for the gNMI server.....	52
<b>5</b>	<b>RPC overview and supporting interfaces.....</b>	<b>53</b>
5.1	RPC overview.....	53
5.1.1	gNMI path convention.....	53
5.2	Configuring a gNMI or JSON server.....	54
<b>6</b>	<b>gNMI.....</b>	<b>55</b>
6.1	Common notification messages.....	55
6.1.1	Timestamps.....	55
6.1.2	Path prefix.....	55
6.1.3	Paths.....	56
6.1.4	Data node values.....	57
6.1.4.1	Structured data types.....	57
6.2	Data model selection using gNMI origin.....	58
6.2.1	CLI configuration with gNMI origin.....	59
6.3	gNMI Get RPC.....	60

6.3.1	GetRequest message.....	60
6.3.2	GetResponse message.....	60
6.4	gNMI Set RPC.....	61
6.4.1	SetRequest message.....	61
6.4.2	SetResponse message.....	62
6.5	gNMI Subscribe RPC.....	62
6.5.1	SubscribeRequest message.....	62
6.5.1.1	SubscriptionList message.....	63
6.5.2	SubscribeResponse message.....	64
6.6	gNMI Capabilities RPC.....	64
6.6.1	CapabilityRequest message.....	64
6.6.2	CapabilityResponse message.....	64
6.7	Candidate mode.....	65
6.8	gNMI examples.....	65
6.8.1	gnmi_get examples.....	65
6.8.2	gnmi_set examples.....	67
6.8.3	gnmi_cli examples.....	69
6.8.4	gnmi_capabilities example.....	72
<b>7</b>	<b>gNOI.....</b>	<b>73</b>
7.1	gNOI OS service.....	73
7.1.1	Install RPC.....	73
7.1.2	Activate RPC.....	74
7.1.3	Verify RPC.....	74
7.2	gNOI File service.....	74
7.2.1	Get RPC.....	75
7.2.2	Put RPC.....	75
7.2.3	Stat RPC.....	75
7.2.4	Remove RPC.....	76
7.3	gNOI System service.....	76
7.3.1	Ping RPC.....	76
7.3.2	Traceroute RPC.....	77
7.3.3	Time RPC.....	77
7.3.4	SwitchControlProcessor RPC.....	77
7.3.5	Reboot RPC.....	77
7.3.6	CancelReboot RPC.....	78

7.3.7	RebootStatus RPC.....	78
7.3.8	KillProcess RPC.....	78
7.4	gNOI configuration.....	79
<b>8</b>	<b>JSON interface.....</b>	<b>80</b>
8.1	JSON message structure.....	80
8.1.1	method options.....	81
8.1.2	params options.....	81
8.2	JSON responses.....	82
8.3	Candidate mode.....	83
8.4	Logical expressions.....	83
8.5	JSON examples.....	83
8.5.1	JSON get examples.....	83
8.5.2	JSON set examples.....	86
8.5.3	JSON delete example.....	88
8.5.4	JSON validate example.....	89
8.5.5	JSON CLI example.....	90
<b>9</b>	<b>Configuring SNMP.....</b>	<b>92</b>
<b>10</b>	<b>General and operational commands.....</b>	<b>93</b>
<b>11</b>	<b>Pre-defined show reports.....</b>	<b>100</b>
11.1	ACL show reports.....	100
11.1.1	ACL descriptions.....	100
11.2	ARPND show reports.....	101
11.2.1	ARPND descriptions.....	101
11.3	Interface show reports.....	102
11.3.1	Interface descriptions.....	102
11.4	LAG show reports.....	103
11.4.1	LAG descriptions.....	103
11.5	MPLS show reports.....	104
11.5.1	MPLS descriptions.....	104
11.6	Network-instance show reports.....	104
11.6.1	Network-instance descriptions.....	106
11.7	Platform show reports.....	112
11.7.1	Platform descriptions.....	113

---

11.8	System show reports.....	113
11.8.1	System descriptions.....	114
11.9	Tunnel show reports.....	115
11.9.1	Tunnel descriptions.....	115
11.10	Tunnel-interface show reports.....	115
11.10.1	Tunnel-interface descriptions.....	115
11.11	Version show reports.....	116
11.11.1	Version descriptions.....	117

# 1 About this guide

This document describes the interfaces used with the Nokia Service Router Linux (SR Linux). These include:

- CLI
- gNMI
- JSON

This document also provides an overview to CLI plug-ins and details Nokia defined general and operation commands, and show commands.

This document is intended for network technicians, administrators, operators, service providers, and others who need to understand how to interface with the SR Linux.

**Note:**

This manual covers the current release and may also contain some content that will be released in later maintenance loads. See the for *SR Linux Release Notes* information about features supported in each load.

Configuration and command outputs shown in this guide are examples only; actual displays may differ depending on supported functionality and user configuration.

## 1.1 Precautionary and information messages

The following are information symbols used in the documentation.



**DANGER:** Danger warns that the described activity or situation may result in serious personal injury or death. An electric shock hazard could exist. Before you begin work on this equipment, be aware of hazards involving electrical circuitry, be familiar with networking environments, and implement accident prevention procedures.



**WARNING:** Warning indicates that the described activity or situation may, or will, cause equipment damage, serious performance problems, or loss of data.



**Caution:** Caution indicates that the described activity or situation may reduce your component or system performance.



**Note:** Note provides additional operational information.



**Tip:** Tip provides suggestions for use or best practices.

## 1.2 Conventions

Nokia SR Linux documentation uses the following command conventions.



- **Bold** type indicates a command that the user must enter.
- Input and output examples are displayed in `Courier` text.
- An open right-angle bracket indicates a progression of menu choices or simple command sequence (often selected from a user interface). Example: **start > connect to**.
- A vertical bar (|) indicates a mutually exclusive argument.
- Square brackets ([ ]) indicate optional elements.
- Braces ({ }) indicate a required choice. When braces are contained within square brackets, they indicate a required choice within an optional element.
- *Italic* type indicates a variable.

Generic IP addresses are used in examples. Replace these with the appropriate IP addresses used in the system.

## 2 What's new

Topic	Location
gNMI origin, including CLI origin, support is added in gNMI paths to specify a particular data model.	<a href="#">Data model selection using gNMI origin</a>
Show reports added for <b>show network-instance bridge-table proxy-nd</b> .	<a href="#">Network-instance show reports</a>
Updated Ethernet interface output to include <b>linecard</b> and <b>forwarding-complex</b> in <b>info from state</b> output example.	<a href="#">Using output filters</a>

## 3 CLI interface

The CLI is an interface for configuring, monitoring, and maintaining the SR Linux. This chapter describes basic features of the CLI and how to use them.

### 3.1 CLI access and use

The following sections describe how to access and use the CLI.

#### 3.1.1 Accessing the CLI

##### About this task

After the SR Linux device is initialized, you can access the CLI using a console or SSH connection. See the SR Linux hardware documentation for information about establishing a console connection and enabling and connecting to an SSH server.

##### Procedure

Use the following command to connect to the SR Linux and open the CLI using SSH:

```
ssh admin@<IP Address>
```

##### Example:

```
$ ssh admin@172.16.0.3
Hello admin,
Welcome to the srlinux CLI.
Type 'help' (and press <ENTER>) if you need any help using this.
--{ running }--[ ]--
```

#### 3.1.2 Using the CLI help functions

##### About this task

The CLI help functions (**?** and **help**) can assist in understanding command usage and indicate which configuration mode you are in.

##### Procedure

Enter a question mark (**?**) after a command to display the command usage.

Enter **help** at the top level to show the current configuration mode and details on other configuration modes.

**Example: ?**

In this example, entering a question mark after the command **network-instance**, shows its usage.

```
# network-instance ?
usage: network-instance <name>
Network instances configured on the local system
Positional arguments:
  name                [string] A unique name identifying the network instance
```

**Example: help**

The following example shows the system output from the **help** command

```
# help
-----
You are now in the running mode.
Here you can navigate and query the running configuration.
This configuration has been validated, committed and send to the applications.
There are multiple modes you can enter while using the CLI.
Each mode offers its own set of capabilities:
  - running mode: Allows traversing and inspecting of the running configuration.
  - state mode: Allows traversing and inspecting of the state.
  - candidate mode: Allows editing and inspecting of the configuration.
  - show mode: Allows traversing and executing of custom show routines.
To switch mode use 'enter <mode-name>', e.g. 'enter candidate'
To navigate around, you can simply type the node name to enter a context, while
'exit [all]' is used to navigate up.
'{' and '}' are an alternative way to enter and leave contexts.
'?' can be used to see all possible commands, or alternatively,
'<TAB>' can be used to trigger auto-completion.
'tree' displays the tree of possible nodes you can enter.
-----
--{ * running }--[ ]--
```

**Related topics**

[Configuration modes](#)

**3.1.3 Using the CLI auto-complete function****About this task**

To reduce keystrokes or aid in remembering a command name, use the CLI auto-complete function.

**Procedure**

Enter a tab at any mode or level to auto-complete the next command level.

When a command is partially entered, the remainder of the command appears ahead of the prompt in lighter text. Press the Tab key to complete the command.

```
#info network-instance
```

When the Tab key is pressed and there are multiple options, the options are shown in a popup:

```
# info
..      depth      from      system
/       detail     interface use-proto-json
debug   flat       network-instance
```

### 3.1.4 CLI keyboard shortcuts

Use shortcuts to move the cursor on the command line, complete commands, and recall commands previously entered. Shortcuts can also make syntax correction easier. The following table lists common shortcuts.

Table 1: CLI keyboard shortcuts

Task	Keystroke
Move cursor to the beginning of the line	Ctrl-A
Move cursor to the end of the line	Ctrl-E
Move cursor one character to the right	Ctrl-F or Right arrow
Move cursor one character to the left	Ctrl-B or Left arrow
Move cursor forward one word	Esc+F
Move cursor back one word	Esc+B
Transpose the character to the left of the cursor with the character the cursor is placed on	Ctrl-T
Complete a partial command	Enter the first few letters, then press the Tab key
Recall previous entry in the buffer	Page up
Navigate one level up within a context. For example:  <pre>--{running}--[interface ethernet-1/1 subinterface 1]-- # exit --{running}--[interface ethernet-1/1]--</pre>	Type: <b>exit</b>
Return to the root context. For example:  <pre>--{running}--[interface ethernet-1/1 subinterface 1]-- # exit all --{running}--[ ]--</pre>	Type: <b>exit all</b>

### 3.1.5 Closing the CLI

#### Procedure

Close the CLI using one of the following methods:

- Press **Ctrl+D**.
- Enter the **quit** command at the CLI prompt.

#### 3.1.5.1 Administrative commands

The common administrative CLI commands in this section can help you understand a current configuration and perform routine configuration tasks.

##### 3.1.5.1.1 Pinging a destination IP address

#### Procedure

Use the **ping** (IPv4) or **ping6** (IPv6) command to contact an IP address. Use this command in any mode.

#### Example: ping for IPV4

```
--{ running }--[ ]--
# ping 192.168.1.1 network-instance default
Pinging 192.168.1.1 in srbase-default
PING 192.168.1.1 (192.168.1.1) 56(84) bytes of data.
64 bytes from 192.168.1.1: icmp_seq=1 ttl=64 time=0.027 ms
64 bytes from 192.168.1.1: icmp_seq=2 ttl=64 time=0.032 ms
64 bytes from 192.168.1.1: icmp_seq=3 ttl=64 time=0.030 ms
^C
--- 192.168.1.1 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 6165ms
rtt min/avg/max/mdev = 0.027/0.030/0.033/0.005 ms
```

##### 3.1.5.1.2 Tracing the path to a destination

#### Procedure

To display the path a packet takes to a destination, use the **traceroute** (IPv4) or **traceroute6** (IPv6) command.

To trace the route using TCP SYN packets instead of UDP or ICMP echo packets, use the **tcptraceroute** command.

#### Example: traceroute for IPv4

```
--{ running }--[ ]--
# traceroute 1.1.1.1 network-instance mgmt
Using network instance srbase-mgmt
traceroute to 1.1.1.1 (1.1.1.1), 30 hops max, 60 byte packets
 1 172.18.18.1 (172.18.18.1) 1.268 ms 1.260 ms 1.256 ms
 2 172.21.40.1 (172.21.40.1) 1.253 ms 1.848 ms 1.851 ms
 3 172.22.35.230 (172.22.35.230) 1.835 ms 1.834 ms 1.828 ms
 4 66.201.62.1 (66.201.62.1) 3.222 ms 3.222 ms 3.216 ms
 5 66.201.34.17 (66.201.34.17) 5.474 ms 5.475 ms 5.480 ms
```

```

6 * * *
7 206.81.81.10 (206.81.81.10) 32.577 ms 32.542 ms 32.400 ms
8 1.1.1.1 (1.1.1.1) 22.627 ms 22.637 ms 22.638 ms

```

### 3.1.5.1.3 Configuring the network-instance environment variable

#### About this task

When you enter administrative commands such as **ping** and **traceroute**, you can specify the network-instance to be used with the command. If you do not specify a network-instance, then the network-instance configured in the network-instance environment variable is used.

If you do not specify a network-instance, or the network-instance cannot be inferred from the CLI context, then the `<base>` network instance is used when no network-instance is specified in a **ping** or **traceroute** command.

#### Procedure

To configure the network-instance environment variable, use the **environment network-instance** command

#### Example: ping with no network-instance specified

```

--{ running }--[ ]--
# ping 192.168.1.1
Using network instance <base>
PING 192.168.1.1 (192.168.1.1) 56(84) bytes of data.
64 bytes from 192.168.1.1: icmp_seq=1 ttl=64 time=0.027 ms
64 bytes from 192.168.1.1: icmp_seq=2 ttl=64 time=0.032 ms
64 bytes from 192.168.1.1: icmp_seq=3 ttl=64 time=0.030 ms
^C
--- 192.168.1.1 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 6165ms
rtt min/avg/max/mdev = 0.027/0.030/0.033/0.005 ms

```

#### Example: Configure the environment network-instance

```

--{ candidate shared default }--[ ]--
# environment network-instance red

```

#### Example: ping using implied network-instance

In this example, the network-instance environment variable is set to red, so network instance red is implied when the **ping** or **traceroute** command is entered without a network-instance name; for example:

```

--{ running }--[ ]--
# ping 192.168.1.1
Using network instance srbase-red
PING 192.168.1.1 (192.168.1.1) 56(84) bytes of data.
64 bytes from 192.168.1.1: icmp_seq=1 ttl=64 time=0.027 ms
64 bytes from 192.168.1.1: icmp_seq=2 ttl=64 time=0.032 ms
64 bytes from 192.168.1.1: icmp_seq=3 ttl=64 time=0.030 ms
^C
--- 192.168.1.1 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 6165ms
rtt min/avg/max/mdev = 0.027/0.030/0.033/0.005 ms

```

### 3.1.5.1.4 Using bash mode

#### Procedure

From any mode in the CLI, use the **bash** command to enter the bash shell. To exit the bash shell and return to the CLI, enter **exit**.

You can use the **bash** command to enter Linux commands directly from the SR Linux CLI prompt.

#### Example: Using bash shell

```
--{ running }--[ ]--
# bash
[root@3-node_srlinux-A /]# ls
anaconda-post.log dev          etc    lib    media  opt    root  sbin  sys    tmp  var
bin                    entrypoint.sh home  lib64  mnt    proc  run   srv    tini  usr
[root@3-node_srlinux-A /]# exit
logout
--{ running }--[ ]--
#
```

#### Example: Enter Linux commands using bash

```
--{ running }--[ ]--
# bash cat /etc/hosts
127.0.0.1    localhost
::1         localhost ip6-localhost ip6-loopback
fe00::0     ip6-localnet
ff00::0     ip6-mcastprefix
ff02::1     ip6-allnodes
ff02::2     ip6-allrouters
172.18.18.5  3-node-srlinux-A
### SRLINUX - ANYTHING MODIFIED BEYOND THIS POINT WILL BE OVERWRITTEN ###
127.0.0.1 3-node-srlinux-A
### SRLINUX FOOTER ###
```

### 3.1.5.1.5 Setting commands to execute periodically

#### Procedure

To set a command to execute periodically, use the **watch** command. The **watch** command can be used with any valid command with the exception of interactive commands (for example, **ping**, **monitor**, **packet-trace**, **bash**, and bash oneliners such as **bash cat /etc/hosts** ). An error message is generated if an interactive command is used. Output redirection is supported.

When used, the first page of output displays. The command then re-executes every 2 seconds by default.

The watch command uses the following format:

```
watch <arguments> <command to watch>
```

All arguments must precede the command being watched. Arguments for the **watch** command are:



Arguments	Definition
interval	Sets an interval for the command to re-execute. Range: 1 - 3600 seconds. Default: 2 seconds
differences	For output that is actively changing, highlights the differences between the previous and current execution
cumulative-differences	For output that is actively changing, highlights the differences between the first execution and the current execution
no-colors	When used with differences or cumulative-differences, markers are used to show differences (verses colors)
no-limit	Allows the full output of each execution to display (verses limiting to the height of the terminal)
no-paging	Provides continuous output (verses redrawing the terminal with each execution)
no-title	Turns off the header that shows the interval, command, number of executions that have occurred, and the time

The command being watched does not require double quotes. In addition, the auto complete function can be used to complete a valid command.

To exit the **watch** command, enter **Ctrl-C**.

### Example: Watch interface statistics

In the following example, the watch command is used to show interface statistics (showing in-octets and out-octets in table format). The interval is modified to 10 seconds.

```
# watch interval 10 info from state interface * statistics | as table | filter fields in-
octets out-octets
```

```
Every 10.0s: info from state interface * statistics | as table | filter fields in-octets
out-octets (Executions 2,
Thu 04:47:34PM)
```

Interface	In-octets	Out-octets
ethernet-1/1	812755	812626
ethernet-1/2	811411	810362
ethernet-1/3		
ethernet-1/4		
ethernet-1/5		
ethernet-1/6		
ethernet-1/7		
ethernet-1/8		
ethernet-1/9		

```
| ethernet-1/10
| ethernet-1/11
| ethernet-1/12
| ethernet-1/13
| ethernet-1/14
| ethernet-1/15
```

### Example: Show differences in interface statistics

In the following example, the watch command is used to show differences in interface statistics (with in-octets and out-octets in table format). In addition, the no-color argument is used to show the differences between previous and current execution with markers verses color indicators.

```
# watch differences no-colors info from state interface * statistics | as table |filter
  fields in-octets out-octets

Every 10.0s: info from state interface * statistics | as table | filter fields in-octets
out-octets (Executions 4,
Thu 04:54:48PM)
+-----+-----+-----+
| Interface | In-octets | Out-octets |
+-----+-----+-----+
- | ethernet-1/1 | 817889 | 817760 |
? | | | -- | ^ ^ |
+ | ethernet-1/1 | 817975 | 817865 |
? | | | ++ | ^ ^ |
- | ethernet-1/2 | 816328 | 815088 |
? | | | ^^ | ^^ |
+ | ethernet-1/2 | 816585 | 815278 |
? | | | ^ + | ^^ |
| ethernet-1/3 | | | |
| ethernet-1/4 | | | |
| ethernet-1/5 | | | |
| ethernet-1/6 | | | |
| ethernet-1/7 | | | |
| ethernet-1/8 | | | |
| ethernet-1/9 | | | |
```

### 3.1.5.1.6 Using the diff command

#### Procedure

Use the **diff** command to get a comparison of configuration changes. Optional arguments can be used to indicate the source and destination datastore. The following use rules apply:

- If no arguments are specified, the diff is performed from the candidate to the baseline of the candidate.
- If a single argument is specified, the diff is performed from the current candidate to the specified candidate.
- If two arguments are specified, the first is treated as the source, and the second as the destination.

Global arguments include: baseline, candidate, checkpoint, factory, file, from, rescue, running, and startup.

The **diff** command can be used outside of candidate mode, but only if used with arguments.

### Example: Basic diff command with no arguments

The following shows a basic **diff** command without arguments. In this example, the description and admin state of an interface are changed and the differences shown:

```
--{ candidate shared default }--[ ]--
# interface ethernet-1/1 admin-state disable
--{ * candidate shared default }--[ ]--
# interface ethernet-1/2 description "updated"
--{ * candidate shared default }--[ ]--
# diff
+   interface ethernet-1/1 {
+       admin-state disable
+   }
+   interface ethernet-1/2 {
+       description updated
+   }
```

### Example: diff command with single argument

The following shows a diff with a single argument. In this example, the comparison occurs to and from a factory configuration.

```
--{ candidate shared default }--[ ]--
# diff factory
-   acl {
-   }
+   ipv4-filter allow_sip_dip {
+       subinterface-specific output-only
+       entry 10 {
+           action {
+               accept {
+               }
+           }
+           match {
+               destination-ip {
+                   prefix 100.1.2.2/32
+               }
+               source-ip {
+                   prefix 100.1.1.1/32
+               }
+           }
+       }
+   }
+   entry 100 {
+       action {
+           accept {
+           }
+       }
+   }
+ }
```

### Example: diff between two checkpoints

The following shows an example where the comparison occurs between two checkpoints.

```
--{ candidate shared default }--[ ]--
# save checkpoint name current
/system:
  Generated checkpoint '/etc/opt/srlinux/checkpoint/checkpoint-0.json' with name
  'current' and comment ''
--{ candidate shared default }--[ ]--
```

```

# interface ethernet-1/1 description "changed-in-next-checkpoint"
--{ candidate shared default }--[ ]--
# commit stay
All changes have been committed. Starting new transaction.
--{ candidate shared default }--[ ]--
# save checkpoint name newer
/system:
  Generated checkpoint '/etc/opt/srlinux/checkpoint/checkpoint-0.json' with name 'newer'
  and comment ''
--{ candidate shared default }--[ ]--
# diff checkpoint newer checkpoint current
  interface ethernet-1/1 {
-    description changed-in-next-checkpoint
+    description dut1-dut2-1
  }

```

### 3.1.5.1.7 Using the copy command

#### Procedure

Use the **copy** command to copy a specific context to another context. For example, you can use this command to copy a container or any configuration hierarchy and give it another name (such as an interface).

The **copy** command merges the existing context instead of replacing it. If a replace is required, you can delete the target node first. When using the **copy** command, matching fields populate to the destination node; fields that do not match are ignored. The use of ranges for both source and destination is permitted.

Use this command in candidate mode. Nokia also recommends that you use the **diff** command to verify changes when using complex copy operations such as multiple ranges in both the source and destination.

#### Example: Copy context of one interface to another

The following shows the context of two existing interfaces (ethernet-1/1 and ethernet-2/1):

```

--{ candidate shared default }--[ ]--
# info interface ethernet-1/1
  interface ethernet-1/1 {
    description dut1-dut2-1
    ethernet {
      aggregate-id lag1
    }
  }
--{ candidate shared default }--[ ]--
# info interface ethernet-2/1
  interface ethernet-2/1 {
    description dut2-dut4-1
    subinterface 1 {
      ipv4 {
        address 1.2.4.2/24 {
        }
      }
      ipv6 {
        address 3ffe:0:2:4::2/64 {
        }
      }
    }
  }
}

```

To copy the context of ethernet-1/1 to ethernet-2/1, enter the following:

```
--{ candidate shared default }--[ ]--
# copy interface ethernet-1/1 to interface ethernet-2/1
--{ * candidate shared default }--[ ]--
# diff
  interface ethernet-2/1 {
-   description dut2-dut4-1
+   description dut1-dut2-1
    ethernet {
+     aggregate-id lag1
    }
  }
```

### Example: Copy matching fields only

The following shows an example where only some fields match. Fields that do not match are ignored:

```
--{ * candidate shared default }--[ ]--
# info acl cpm-filter ipv4-filter entry 10
  acl {
    cpm-filter {
      ipv4-filter {
        entry 10 {
          description "cpm-filter description"
          action {
            accept {
            }
          }
          match {
            protocol icmp
            icmp {
              type dest-unreachable
              code [
                0
                1
                2
                3
                4
                13
              ]
            }
          }
        }
      }
    }
  }
--{ * candidate shared default }--[ ]--
# copy acl cpm-filter ipv4-filter entry 10 to interface ethernet-2/1
--{ * candidate shared default }--[ ]--
A:dev-dut2# diff
  interface ethernet-2/1 {
-   description dut2-dut4-1
+   description "cpm-filter description"
  }
```

### Example: Copy with ranges

The following shows an example that uses ranges. The system expands both the source and destination to determine which set has the largest number of keys, and copies 1-to-1 until the larger of the two ranges finishes.

```
--{ * candidate shared default }--[ ]--
# copy interface ethernet-1/{1,2} to interface ethernet-{2,3}/{1..10}
--{ * candidate shared default }--[ ]--
# diff
    interface ethernet-2/1 {
-       description dut2-dut4-1
+       description dut1-dut2-1
+       ethernet {
+         aggregate-id lag1
+       }
    }
    interface ethernet-2/2 {
-       description dut2-dut3-1
+       description "second description"
+       mtu 9000
+     }
    interface ethernet-2/3 {
+       description dut1-dut2-1
+       ethernet {
+         aggregate-id lag1
+       }
    }

+   interface ethernet-3/1 {
+     description dut1-dut2-1
+     ethernet {
+       aggregate-id lag1
+     }
+   }
+   interface ethernet-3/2 {
+     description "second description"
+     mtu 9000
+   }
+   interface ethernet-3/3 {
+     description dut1-dut2-1
+     ethernet {
+       aggregate-id lag1
+     }
+   }
+   interface ethernet-3/4 {
+     description "second description"
+     mtu 9000
+   }

+   interface ethernet-3/9 {
+     description dut1-dut2-1
+     ethernet {
+       aggregate-id lag1
+     }
+   }
+   interface ethernet-3/10 {
+     description "second description"
+     mtu 9000
+   }
```

### 3.1.5.1.8 Using the replace command

#### Procedure

Use the **replace** command to replace a source context with a destination context (including all of its children). Both the source and destination can be text. This command can also be used to create a destination that does not currently exist by creating a new key that uses the source configuration.

The **replace** command has the following usage: **replace** <original text> **with** <replacement text>

Use this command in candidate mode.

#### Example: replace network-instance

The following example replaces all instances of the "mgmt" network-instance with a "test" network-instance:

```
--{ candidate shared default }--[ ]--
# replace "network-instance mgmt" with "network-instance test"
--{ * candidate shared default }--[ ]--
# diff
system {
  gnmi-server {
-   network-instance mgmt {
+   network-instance test {
      admin-state enable
      port 50052
      tls-profile tls-profile-1
    }
  }
  json-rpc-server {
-   network-instance mgmt {
+   network-instance test {
      http {
        admin-state enable
        use-authentication false
        port 4000
      }
      https {
        admin-state enable
        port 4001
        tls-profile tls-profile-1
      }
    }
  }
  dns {
-   network-instance mgmt
+   network-instance test
  }
}
```

#### Example: replace interface

The following example shows a command line that can be used to replace all instances of "interface lag3" or "aggregate-id lag3" with "interface lag2" or "aggregate-id lag2":

```
--{ candidate shared default }--[ ]--
# replace "(interface |aggregate-id )lag3" with \1lag2
```

### Example: replace with environment alias

The **replace** command can also be used with the **environment alias** command so that multiple arguments can be used. In the following, an alias named 'ifrename' is created to replace the name of an interface:

```
--{ candidate shared default }--[ ]--
# environment alias ifrename "replace \"(interface |aggregate-id ){}\\b\" with \\1{} /"
```

When the alias is created, the alias with the arguments is entered.

```
--{ candidate shared default }--[ ]--
# ifrename lag2 lag9
```

#### Related topics

[Configuring CLI command aliases](#)

### 3.1.5.1.9 Displaying configuration details

#### Procedure

Use the **info** command to display the configuration. Entering the **info** command from the root context displays the entire configuration, or the configuration for a specified context. Entering the command from within a context limits the display to the configuration under that context. Use this command in candidate or running mode.

#### Example: info from root context

To display the entire configuration, enter **info** from the root context:

```
--{ candidate shared default }--[ ]--
# info
<all the configuration is displayed>
--{ candidate }--[ ]--
```

#### Example: info for specific context

To display the configuration for a specific context, enter **info** and specify the context:

```
--{ candidate shared default }--[ ]--
# info system lldp
  system {
    lldp {
      admin-state enable
      hello-timer 600
      management-address mgmt0.0 {
        type [
          IPv4
        ]
      }
      interface mgmt0 {
        admin-state disable
      }
    }
  }
--{ candidate }--[ ]--
```



### Example: info within specific context

From a context, use the **info** command to display the configuration under that context:

```
--{ candidate shared default}--[ ]--
# system lldp
--{ candidate }--[ system lldp ]--
# info
  admin-state enable
  hello-timer 600
  management-address mgmt0.0 {
    type [
      IPv4
    ]
  }
  interface mgmt0 {
    admin-state disable
  }
--{ candidate }--[ system lldp ]--
```

### Example: info within specific context with JSON-formatted output

Use the **as-json** option to display JSON-formatted output:

```
--{ candidate }--[ system lldp ]--
# info | as json
{
  "admin-state": "enable",
  "hello-timer": "600",
  "management-address": [
    {
      "subinterface": "mgmt0.0",
      "type": [
        "IPv4"
      ]
    }
  ],
  "interface": [
    {
      "name": "mgmt0",
      "admin-state": "disable"
    }
  ]
}
```

### Example: info detail

Use the **detail** option to display values for all parameters, including those not specifically configured:

```
--{ candidate shared default}--[ system lldp ]--
# info detail
  admin-state enable
  hello-timer 600
  hold-multiplier 4
  management-address mgmt0.0 {
    type [
      IPv4
    ]
  }
  interface mgmt0 {
    admin-state disable
```

```
}

```

### Example: info flat

Use the **flat** option to display the output as a series of **set** statements, omitting indentation for any sub-contexts:

```
--{ candidate shared default}--[ system lldp ]--
# info flat
set / system lldp admin-state enable
set / system lldp hello-timer 600
set / system lldp management-address mgmt0.0
set / system lldp management-address mgmt0.0 type [ IPv4 ]
set / system lldp interface mgmt0
set / system lldp interface mgmt0 admin-state disable

```

### Example: info depth

Use the **depth** option to display parameters with a specified number of sub-context levels:

```
--{ candidate shared default}--[ system lldp ]--
# info depth 0
  admin-state enable
  hello-timer 600

```

```
--{ candidate shared default}--[ system lldp ]--
# info depth 1
  admin-state enable
  hello-timer 600
  management-address mgmt0.0 {
    type [
      IPv4
    ]
  }
  interface mgmt0 {
    admin-state disable
  }

```

## 3.1.5.1.10 Displaying the command tree hierarchy

### Procedure

Use the **tree** command to display the tree hierarchy for all available nodes you can enter. Entering the **tree** command from the root context displays the entire tree hierarchy. Entering the command from a context limits the display to the nodes under that context. Use this command in candidate or running mode.

### Example: tree command

```
--{ candidate shared default}--[ ]--
# tree
<root>
+-- acl
|   +-- ipv4-filter
|   |   +-- description
|   |   +-- subinterface-specific
|   |   +-- statistics-per-entry
|   |   +-- entry
|   |       +-- description

```

```

+-- action
|   +-- accept
|   |   +-- log
|   +-- drop
|   +-- log
+-- match
    +-- destination-address
    +-- fragment
    +-- first-fragment
    +-- protocol
    +-- source-address
.
.
.
.

```

### 3.1.5.1.11 Displaying the state of the configuration

#### Procedure

To display the state of the configuration, enter the **info from state** command in candidate or running mode, or the **info** command in state mode.

#### Example: info from state command

To display state information for a specified context from modes that are not state mode:

```

--{ candidate shared default }--[ ]--
# info from state routing-policy policy bgp-export-policy
  routing-policy {
    policy bgp-export-policy {
      statement 999 {
        action {
          accept {
          }
        }
      }
    }
  }
--{ candidate }--[ ]--

```

#### Example: info command from state mode

To display state information for a specified context from state mode:

```

--{ candidate shared shared default }--[ ]--
# enter state
--{ state }--[ ]--
# info routing-policy policy bgp-export-policy
  routing-policy {
    policy bgp-export-policy {
      statement 999 {
        action {
          accept {
          }
        }
      }
    }
  }
--{ state }--[ ]--

```

### 3.1.5.1.12 Executing configuration statements from a file

#### Procedure

You can execute configuration statements from a source file consisting of **set** statements such as those generated by the **info flat** command (see [Displaying configuration details](#)). SR Linux reads the file and executes each configuration statement line-by-line. You can optionally commit the configuration automatically after the file is read.

#### Example: Execute configuration from a file

The following example executes a configuration from a specified file:

```
--{ running }--[ ]--
# source config.cfg
Sourcing commands from 'config.cfg'
Executed 20 lines in 1.6541 seconds from file config.cfg
```

Use the **auto-commit** option to commit the configuration after the commands in the source file are executed.

### 3.1.5.1.13 Collecting technical support data

#### Procedure

Collect technical support data using the **tech-support** command. Use this command in any configuration mode.

#### Example: Collect technical support data

```
--{ candidate shared default }--[ ]--
# tech-support
Waiting 5 seconds for apps to dump the reports in /tmp/admintech-report-2019_06_19_20_26_05.zip
Finished collecting in 5s
Admin tech report has been generated at /tmp/admintech-report-2019_06_19_20_26_05.zip
--{ candidate }--[ ]--
```

#### Example: Access technical support file from bash shell

You can access the saved file from the bash shell. For example:

```
--{ running }--[ ]--
# bash
[root@3-node_srlinux-A /]# cd /tmp
[root@3-node_srlinux-A tmp]# ls -l
total 6012
-rw-r--r-- 1 root root 6110160 Jun 19 20:26 admintech-report-2019_06_19_20_26_05.zip
[root@3-node_srlinux-A tmp]# exit
logout
--{ running }--[ ]--
```

## 3.2 Configuration modes

Configuration modes define how the system is running when transactions are performed. Supported modes are the following:

- **Candidate** – Use this mode to modify a configuration. Modifications are not applied to the running system until a **commit** command is issued. When committed, the changes are copied to the running configuration and become active.

There are different types of configuration candidates. See [Configuration candidates](#).

- **Running** – Use this mode to display the currently running or active configuration. Configurations cannot be edited in this mode.
- **State** – Use this mode to display the configuration and operational states. The state mode displays more information than show mode.
- **Show** – Use this mode to display configured features and operational states. The show mode displays less information than state mode.

### 3.2.1 Configuration candidates

You can modify the candidate configuration in different modes:

- Exclusive
- Shared
- Private
- Name

#### 3.2.1.1 Exclusive mode

When entering candidate mode, if you specify the **exclusive** keyword, it locks out other users from making changes to the candidate configuration.

You can enter candidate exclusive mode only under the following conditions:

- The current shared candidate configuration has not been modified.
- There are no other users in candidate shared mode.
- No other users have entered candidate exclusive mode.

#### 3.2.1.2 Shared mode

By default, the candidate configuration is in shared mode. This allows multiple users to modify the candidate configuration concurrently. When the configuration is committed, the changes from all of the users are applied.

A default candidate is defined per user (see [Name mode](#)).

Use caution when allowing multiple users access to the candidate configuration at the same time. If one user commits the configuration, that commits the changes made by any other users who have modified the current candidate configuration.

### 3.2.1.3 Private mode

A private candidate allows multiple users to modify a configuration; however when a user commits their changes, only the changes from that user are committed. When a private candidate is created, private datastores are created and a snapshot is taken from the running database to create a baseline.

When starting a private candidate, a default candidate is defined per user with the name 'private-`<username>`' unless a unique name is defined (see [Name mode](#)).

### 3.2.1.4 Name mode

Candidate types support an optional name. This allows multiple users to share environments.

When a candidate is created with a name specified, a new entry is created in the `/system/configuration/candidate[]` list. Other users can enter the same candidate (if the candidate type is shared) using this name.

If no name is specified, then the name **default** is used. This means the global shared candidate can be accessed by entering **enter candidate name default** or just **enter candidate**. For private candidates the name **default** is not used (because private candidates share a list with shared candidates). Instead, private candidates are created with the name **private-`<username>`**.

Named candidates are automatically deleted when there are no active sessions present and they are empty, or after 7 days of no session activity. This 7-day default is configurable in the `/system/configuration/idle-timeout` field.

## 3.2.2 Setting the configuration mode

### Procedure

After logging in to the CLI, you are initially placed in running mode. To change between modes, use one of the commands in the following table.

Table 2: Commands to change configuration mode

To enter this mode:	Type this command:
Candidate shared	<b>enter candidate</b>
Candidate mode for named shared candidate	<b>enter candidate name <code>&lt;name&gt;</code></b>
Candidate private	<b>enter candidate private</b>
Candidate mode for named private candidate	<b>enter candidate private name <code>&lt;name&gt;</code></b>
Candidate exclusive	<b>enter candidate exclusive</b>
Exclusive mode for named candidate	<b>enter candidate exclusive name <code>&lt;name&gt;</code></b>
Running	<b>enter running</b>

To enter this mode:	Type this command:
State	<b>enter state</b>
Show	<b>enter show</b>

### Example: Change from running to shared mode

To change from running to a shared candidate mode (using the default):

```
--{ running }--[ ]--
# enter candidate
--{ * candidate shared default}--[ ]--
```

The asterisk (\*) next to the mode name indicates that the candidate configuration has changes that have not yet been committed.

### Example: Switch between shared and candidate exclusive modes

To switch between candidate shared and candidate exclusive modes, you must first switch to a different configuration mode (for example, running mode) before entering candidate shared or exclusive mode. For example:

```
--{ running }--[ ]--
# enter candidate exclusive
--{ candidate exclusive }--[ ]--
Are you sure? (y/[n]):
# enter running
--{ running }--[ ]--
# enter candidate
--{ candidate shared default}--[ ]--
```

### Example: Enter candidate mode for named candidate

To enter candidate mode for a named configuration candidate, you specify the name of the configuration candidate. For example:

```
--{ running }--[ ]--
# enter candidate name cand1
--{ candidate shared cand1}--[ ]--
```

## 3.2.3 Managing configuration conflicts

### About this task

When a user enters candidate mode, the system creates two copies of the running datastore: one is modifiable by the user, and the other serves as a baseline. The modifiable datastore and the baseline datastore are collectively known as a configuration candidate.

### Procedure

You can use the **baseline** command to assist in managing conflicts. It uses the following arguments:

- **baseline update** - Performs an update of the complete baseline datastore, pulling in any changes that occurred in the running datastore since the baseline snapshot was taken.

- **baseline diff**- Shows baseline configuration changes with options to refine by area.
- **baseline check** - Performs a dry-run baseline check, and if conflicts are detected, an informational or warning message is generated.

### 3.2.4 Committing a configuration in candidate mode

#### About this task

Changes made during a configuration modification session do not take effect until a **commit** command is issued. Use the **commit** command in candidate mode only.

#### Procedure

**Step 1.** Enter candidate mode:

```
# enter candidate
```

**Step 2.** Enter configuration commands.

**Step 3.** Enter the **commit** command when with the required option.

Table 3: *commit command options*

Option	Action	Permitted additional arguments
<b>commit now</b>	Apply the changes, exit candidate mode, and enter running mode.	NA
<b>commit stay</b>	Apply the changes and then remain in candidate mode.	<b>commit stay [save] [comment] [confirmed]</b>
<b>commit save</b>	Apply the changes and automatically save the commit to the startup configuration. Can be used other arguments except <b>now</b> (for example, <b>commit stay save</b> ).	<b>commit [stay] [checkpoint] save [confirmed] [comment]</b>
<b>commit checkpoint</b>	Apply the changes and cause an automatic checkpoint after the commit succeeds.	<b>commit [stay] [now] checkpoint [save] [confirmed]</b>
<b>commit validate</b>	Verify that a propose configuration change passes a management server validation.	NA
<b>commit comment</b> <comment>	Use with other keywords (except <b>validate</b> ) to add a user comment (for example, <b>commit stay comment</b> <comment> where <comment> is a quoted string, 1-255 characters).	<b>commit [stay] [save] [checkpoint] [confirmed] comment</b>
<b>commit confirmed</b> <b>commit confirmed [timeout]</b> <b>commit confirmed [accept   reject]</b>	Apply the changes, but requires an explicit confirmation to become permanent. If the explicit confirmation is not issued within a specified time period, all changes are automatically reverted.  The timeout period default is 600 seconds (10 mins.), or can be provisioned with a value of 1-86400 sec.). The timeout parameter cannot be used with the accept or reject parameter.	<b>commit [checkpoint] [save] [stay] [comment] confirmed</b>



Option	Action	Permitted additional arguments
	Before the timer expires, the accept parameter explicitly confirms and applies the changes. With no timer running, the reject parameter explicitly rejects the changes.	

### Example: commit stay and commit confirmed

This example shows the **commit stay** option:

```
# enter candidate
--{ candidate shared default}--[ ]--
# interface ethernet-1/1 subinterface 1
--{ * candidate shared default}--[ interface ethernet-1/1 subinterface 1 ]--

# commit stay
All changes have been committed. Starting new transaction.

--{ candidate shared default}--[ interface ethernet-1/1 subinterface 1 ]--
```

This example shows the **commit confirmed** option with a custom timeout followed by an accept action.

```
--{ * candidate shared default}--[ ]--
# commit confirmed timeout 86400
Commit confirmed (automatic rollback in a day)
All changes have been committed. Leaving candidate mode.
--{ running }--[ ]--

# commit confirmed accept
Info: Commit confirmed, automatic rollback cancelled
--{ candidate shared default}--[ ]--
#
```

## 3.2.5 Deleting configurations

### Procedure

Use the **delete** command to delete configurations while in candidate mode.

### Example: Delete configuration

The following example displays the system banner configuration, deletes the configured banner, then displays the resulting system banner configuration:

```
--{ candidate shared default}--[ ]--
# info system banner
  system {
    banner {
      login-banner "Welcome to SRLinux!"
    }
  }
--{ candidate shared default}--[ ]--
# delete system banner
--{ candidate shared default}--[ ]--
# info system banner
```

```

system {
  banner {
  }
}

```

## 3.2.6 Annotating the configuration

### Procedure

To aid in reading a configuration, you can add comments or descriptive annotations. The annotations are indicated by **!!!** in displayed output.

You can enter a comment either directly from the command line or by navigating to a CLI context and entering the comment in annotate mode.

### Example: Add a comment

The following example adds a comment to an ACL configuration. If there is already a comment in the configuration, the new comment is appended to the existing comment.

```

--{ candidate shared default}--[ ]--
# acl ipv4-filter ip_tcp !! "Filter TCP traffic"

```

To replace the existing comment, use **!!!** instead of **!!** in the command.

### Example: Add a comment in annotate mode

The following example adds the same comment to the ACL by navigating to the context for the ACL and entering the comment in annotate mode:

```

--{ * candidate shared default}--[ ]--
# acl ipv4-filter ip_tcp
--{ * candidate shared default}--[ acl ipv4-filter ip_tcp ]--
# annotate
Press [Meta+enter] or [Esc] followed by [Enter] to finish
-> Filter TCP traffic

```

You can enter multiple lines in annotate mode. To exit annotate mode, press Esc, then the Enter key. In CLI output, the comment is displayed in the context it was entered. For example:

```

--{ running }--[ ]--
# info acl
acl {
  ipv4-filter ip_tcp {
    !!! Filter TCP traffic
    entry 100 {
      action {
        drop {
          log true
        }
      }
    }
    entry 110 {
      action {
        accept {
          log true
        }
      }
    }
  }
}

```

```

    }
  }
}

```

To remove a comment, enter annotate mode for the context and press Esc then Enter without entering any text.

### 3.2.7 Discarding a configuration in candidate mode

#### Procedure

You can discard previously applied configurations with the **discard** command. Use the **discard** command in candidate mode only.

- To discard the changes and remain in candidate mode with a new candidate session, enter **discard stay**.
- To discard the changes, exit candidate mode, and enter running mode, enter **discard now**.

#### Example: Discard changes and remain in candidate mode

```

All changes have been committed. Starting new transaction.
--{ candidate shared }--[ interface ethernet-1/1 subinterface 1 ]--
# discard stay
--{ candidate shared }--[ interface ethernet-1/1 subinterface 1 ]--

```

## 3.3 CLI output formatting and filtering

Several ways exist to format and filter CLI output. These include:

- Specifying the display output (text, JSON, or table format)
- Filtering the output using Linux tools such as **grep**
- Using an output filter
- Directing filtered output to a specified file in a specified format

### 3.3.1 Specifying output format

#### Procedure

You can display output from SR Linux CLI commands as lines of text, in JSON format, or in a table. By default, output is displayed as lines of text, but you can configure output to be displayed in JSON format by default. See [Configuring the CLI output format](#).

#### Example: show version | as text

The following example displays the output of the **show version** command as lines of text:

```

--{ running }--[ ]--
# show version | as text
-----
Hostname           : 3-node-srlinux-A

```

```

Chassis Type       : 7250 IXR-10
Part Number        : Sim Part No.
Serial Number      : Sim Serial No.
System MAC Address : 12:12:02:FF:00:00
Software Version   : v19.11.1
Build Number       : 291-g4664705
Architecture       : x86_64
Last Booted        : 2019-12-07T00:34:48.942Z
Total Memory       : 16396536 kB
Free Memory        : 5321932 kB
-----

```

### Example: show version | as json

The following example displays the output of the **show version** command in JSON format:

```

--{ running }--[ ]--
# show version | as json
{
  "basic system info": {
    "Hostname": "3-node-srlinux-A",
    "Chassis Type": "7250 IXR-10",
    "Part Number": "Sim Part No.",
    "Serial Number": "Sim Serial No.",
    "System MAC Address": "12:12:02:FF:00:00",
    "Software Version": "v19.11.1",
    "Build Number": "291-g4664705",
    "Architecture": "x86_64",
    "Last Booted": "2019-12-07T00:34:48.942Z",
    "Total Memory": "16396536 kB",
    "Free Memory": "5319448 kB"
  }
}

```

### Example: show version | as table

The following example displays the output of the **show version** command as a table:

```

--{ running }--[ ]--
# show version | as table
+-----+-----+-----+-----+-----+-----+-----+-----+
| Hostname | Chassis | Part | Serial | System | Software | Architec | Last |
|          | Type   | Number | Number | MAC   | Version  | ture     | Booted |
|          |        |        |        | Address |          |          |        |
+-----+-----+-----+-----+-----+-----+-----+-----+
| 3-node-s | 7250    | Sim Pa | Sim    | 12:12:05 | v19.11.1 | x86_64  | 2019-12- |
| rlinux-A | IXR-10  | rt No. | Serial | :FF:00:0 |          |          | 07T00:34 |
|          |         |        | No.    | 0       |          |          | :48.942Z |
+-----+-----+-----+-----+-----+-----+-----+-----+

```

## 3.3.2 Using Linux output modifiers

### Procedure

You can pipe output from SR Linux CLI commands to standard Linux tools using **grep**, **more**, **head**, and **tail**.

**Example: show interface | grep**

The following example pipes the output of the **show interface** command to **grep** so that only lines with `mgmt0` appear in the output:

```
--{ running }--[ ]--
# show interface | grep mgmt0
mgmt0 is up, speed None, type None
  mgmt0.0 is up
```

**Example: show interface | more**

The following example pipes the output of the **show interface** command to **more** to display one page of output at a time:

```
--{ running }--[ ]--
# show interface | more
=====
ethernet-1/10 is up, speed 100G, type 100GBASE-CR4 CA-L
  ethernet-1/10.1 is up
    Encapsulation: null
    IPv4 addr      : 192.35.1.0/31 (static)
    IPv6 addr      : 2001:192:35:1::/127 (static, preferred)
    IPv6 addr      : fe80::22e0:9cff:fe78:e2ea/64 (link-layer, preferred)
-----
ethernet-1/21 is up, speed 100G, type 100GBASE-CR4 CA-L
  ethernet-1/21.1 is up
    Encapsulation: null
    IPv4 addr      : 192.45.1.254/31 (static)
    IPv6 addr      : 2001:192:45:1::fe/127 (static, preferred)
    IPv6 addr      : fe80::22e0:9cff:fe78:e2f5/64 (link-layer, preferred)
-----
ethernet-1/22 is up, speed 100G, type 100GBASE-CR4 CA-L
  ethernet-1/22.1 is up
    Encapsulation: null
    IPv4 addr      : 192.45.3.254/31 (static)
    IPv6 addr      : 2001:192:45:3::fe/127 (static, preferred)
    IPv6 addr      : fe80::22e0:9cff:fe78:e2f6/64 (link-layer, preferred)
-----
ethernet-1/3 is up, speed 100G, type 100GBASE-CR4 CA-L
  ethernet-1/3.1 is up
    Encapsulation: null
    IPv4 addr      : 192.57.1.1/31 (static)
    IPv6 addr      : 2001:192:57:1::1/127 (static, preferred)
    IPv6 addr      : fe80::22e0:9cff:fe78:e2e3/64 (link-layer, preferred)
-----
--More--
```

**Example: show interface | head**

The following example pipes the output of the **show interface** command to **head** to display only the first 8 lines:

```
--{ running }--[ ]--
# show interface | head --lines 8
=====
ethernet-1/10 is up, speed 100G, type 100GBASE-CR4 CA-L
  ethernet-1/10.1 is up
    Encapsulation: null
    IPv4 addr      : 192.35.1.0/31 (static)
    IPv6 addr      : 2001:192:35:1::/127 (static, preferred)
```

```
IPv6 addr      : fe80::22e0:9cff:fe78:e2ea/64 (link-layer, preferred)
-----
```

### 3.3.3 Using output filters

#### Procedure

You can use the **filter** option to limit the output of **show** and **info from state** commands. Filter options include:

- **node** - Defines a specific node to filter on
- **depth** - Filters out sub-nodes that are deeper than the specified depth
- **fields** - Specifies a specific field or fields to filter on
- **keys-only** - Hides all fields
- **non-zero** - Filters integer fields set to 0 and empty strings

The **show** or **info from state** command is piped to the **filter** command with the following usage: **filter** [**<node>**] [**depth <value>**] [**fields <value>**] [**keys-only**] [**non-zero**]

#### Example: Filter info from state command

The following example directs the output of the **info from state** command to filter on the Ethernet node.

```
--{ running }--[ ]--
# info from state interface ethernet-1/1 | filter ethernet
  interface ethernet-1/1 {
    description dut1-dut2-1
    admin-state enable
    mtu 9232
    loopback-mode false
    ifindex 54
    oper-state up
    last-change "an hour ago"
    linecard 1
    forwarding-complex 0
    vlan-tagging false
    ethernet {
      port-speed 10G
      hw-mac-address 00:01:02:FF:00:00
      flow-control {
        receive false
      }
      statistics {
        in-mac-pause-frames 0
        in-oversize-frames 0
        in-jabber-frames 0
        in-fragment-frames 0
        in-crc-error-frames 0
        out-mac-pause-frames 0
        in-64b-frames 0
        in-65b-to-127b-frames 0
        in-128b-to-255b-frames 0
        in-256b-to-511b-frames 0
        in-512b-to-1023b-frames 0
        in-1024b-to-1518b-frames 0
        in-1519b-or-longer-frames 0
        out-64b-frames 0
      }
    }
  }
```

```

        out-65b-to-127b-frames 0
        out-128b-to-255b-frames 0
        out-256b-to-511b-frames 0
        out-512b-to-1023b-frames 0
        out-1024b-to-1518b-frames 0
        out-1519b-or-longer-frames 0
    }
}

```

### Example: Apply filter to a specific field

Specify the field option to further filter the output to a specific field. For example:

```

--{ running }--[ ]--
# info from state interface ethernet-1/1 | filter fields ethernet/port-speed
  interface ethernet-1/1 {
    ethernet {
      port-speed 10G
    }
  }
}

```

### Example: Apply non-zero filter

The following example shows how you can use the **non-zero** option to display only non-zero values to eliminate non-useful information. The use of the non-zero option only filters integer fields that are currently set to 0 and empty strings.

```

--{ running }--[ ]--
# info from state interface ethernet-1/* statistics | filter non-zero
  interface ethernet-1/1 {
    statistics {
      in-octets 1106761
      in-unicast-packets 1592
      in-broadcast-packets 32
      in-multicast-packets 10736
      in-error-packets 5
      out-octets 2859625
      out-unicast-packets 31576
      out-broadcast-packets 18
      out-multicast-packets 243
      carrier-transitions 3
    }
  }
  interface ethernet-1/2 {
    statistics {
      in-octets 1399961
      in-unicast-packets 129
      in-broadcast-packets 11
      in-multicast-packets 14772
      in-error-packets 1
      out-octets 2474023
      out-unicast-packets 26126
      out-broadcast-packets 19
      out-multicast-packets 173
      carrier-transitions 3
    }
  }
  interface ethernet-1/20 {
    statistics {
      in-octets 1443012
      in-unicast-packets 350
    }
  }
}

```

```
    in-broadcast-packets 12
    in-multicast-packets 15639
    in-error-packets 3
    out-octets 2319629
    out-unicast-packets 25558
    out-broadcast-packets 17
    out-multicast-packets 199
    carrier-transitions 3
  }
}
```

### 3.3.4 Directing output to a file

#### Procedure

You can direct the output of SR Linux CLI commands to a specified file. The output can be saved as text, in table format, or in JSON format.

#### Example: Direct show interface output to file

The following example directs the output of the **show interface** command to a file. The output is saved in JSON format.

```
--{ running }--[ ]--
# show interface | as json > show_interface.json
```

Use **>** to create a new file with the specified filename; if the file already exists, it is replaced. Use **>** to append the output to the specified file if it exists.

#### Example: Access output file in bash mode

You can access the file using bash mode. For example:

```
--{ * running }--[ ]--
# bash
[bob@3-node-srlinux-A /]# more show_interface.json
{
  "interfaces": [
    {
      "Interface": "ethernet-1/1",
      "subinterfaces": [
        {
          "Subinterface": "ethernet-1/1.1",
          "Oper": "up",
          "IPv4 Addresses": "192.168.11.1/30",
          "IPv6 Addresses": "2001:1::192:168:11:1/126, fe80::1012:5ff:feff:0/64"
        }
      ]
    }
  ],
  {
    {
      --More-- (42%)
```

## 3.4 CLI environment customization

You can optionally configure the SR Linux CLI environment to change settings such as the command prompt, contents of the bottom toolbar, and the default format for displayed output. You can create aliases



for CLI commands. The CLI environment settings can be saved to the default SR Linux configuration or to a specified file and subsequently loaded and applied to the current CLI session.

### 3.4.1 Configuring the CLI prompt

#### About this task

By default, the SR Linux CLI prompt consists of two lines of text, indicating with an asterisk whether the configuration has been modified, the current mode and session type, the current CLI context, and the host name of the SR Linux device, in the following format:

```
--{ modified? mode_and_session_type }--[ context ]--
hostname#
```

For example:

```
--{ * candidate shared }--[ acl ]--
3-node-srlinux-A#
```

#### Procedure

You can configure the SR Linux prompt to include information such as the username or session ID of the CLI session, the number of changes made to the configuration, and the current local time.

#### Example: Add local time and session username to CLI prompt

The following example adds the local time and session username to the SR Linux CLI prompt.

```
--{ candidate shared default }--[ ]--
# environment prompt "--{{ {modified}{mode_and_session_type} }}--[ {pwc} ]--{time}--\
n{user}@{host}# "
```

In the example, the local time is configured with the **{time}** keyword, and the session username is configured with the **{user}** keyword. The line break is configured with **\n**. Use the **environment prompt ?** command to display the keywords that you can configure in the SR Linux CLI prompt.

After you enter this command, the CLI prompt looks like the following:

```
--{ * candidate shared default }--[ acl ]--Wed 03:07PM--
bob@3-node-srlinux-A#
```

### 3.4.2 Configuring the bottom toolbar text

#### About this task

By default, the text that appears at the bottom of the terminal window in SR Linux CLI sessions displays the current mode and session type, whether the configuration has been modified, the username and session ID of the current AAA session, and the local time, in the following format:

```
Current mode: modified? mode_and_session_type aaa_user (aaa_session_id) time
```

For example:

```
Current mode: * candidate shared          root (36) Wed 09:52PM
```

### Procedure

You can configure the bottom toolbar using the **environment bottom-toolbar** command to include information such as the number of changes made to the configuration and the host name.

#### Example: Add number of changes and host name to toolbar

The following example adds the number of changes made to the configuration and the host name to the bottom toolbar.

```
--{ candidate shared default}--[ ]--
# environment bottom-toolbar "Current mode: {modified_with_change_count}{mode_and_session_
type} | {aaa_user}@{host} ({aaa_session_id}) {time}"
```

In the example, the number of configuration changes is configured with the **{modified\_with\_change\_count}** keyword, and the host name is configured with the **{host}** keyword. Use the **environment bottom-toolbar ?** command to display the keywords that you can configure in the bottom toolbar.

After you enter this command, the bottom toolbar looks like the following:

```
Current mode: *10 candidate shared          root@3-node-srlinux-A (36) Wed 10:18PM
```

## 3.4.3 Configuring the SR Linux CLI engine type

### About this task

SR Linux features two versions of the CLI engine: advanced and basic. The advanced CLI engine is enabled by default; it includes the following features:

- Displays a toolbar at the bottom of the terminal window.
- Includes the command auto-complete feature.
- Allows you to select command options by pressing the **Tab** key to display the options in a popup, then using the arrow keys to select an option.
- Displays descriptions of command options when you press the **?** key.

The basic CLI engine includes a limited set of features compared to the advanced version:

- Omits the bottom toolbar.
- Does not present a selectable list of options when you press the **Tab** key.
- Displays descriptions of command options when you press the **?** key (and press **Enter**), but only at the **#** prompt for the current context.

### Procedure

If necessary, you can use the **environment cli-engine type basic** command to configure SR Linux to use the basic CLI engine instead of the advanced CLI engine for CLI sessions.

### Example: Set CLI engine type to basic

The following example configures the SR Linux to use the basic CLI engine for CLI sessions:

```
--{ candidate shared default}--[ ]--  
# environment cli-engine type basic
```

#### Related topics

[Configuring the bottom toolbar text](#)

[Using the CLI auto-complete function](#)

## 3.4.4 Configuring the CLI output format

### Procedure

You can configure the output of CLI commands using the **output-format** command to be displayed as either text or in JSON format.

### Example: Set output to JSON format

The following example configures CLI command output to be displayed in JSON format.

```
--{ candidate shared default}--[ ]--  
# environment output-format json
```

Subsequent command output is displayed in JSON format by default. For example:

```
--{ running }--[ ]--  
# show version  
{  
  "basic system info": {  
    "Hostname": "3-node-srlinux-A",  
    "Chassis Type": "7250 IXR-10",  
    "Part Number": "Sim Part No.",  
    "Serial Number": "Sim Serial No.",  
    "System MAC Address": "12:12:02:FF:00:00",  
    "Software Version": "v19.11.1",  
    "Build Number": "291-g4664705",  
    "Architecture": "x86_64",  
    "Last Booted": "2019-12-07T00:34:48.942Z",  
    "Total Memory": "16396536 kB",  
    "Free Memory": "5319448 kB"  
  }  
}
```

## 3.4.5 Configuring CLI command aliases

### Procedure

As a shortcut for entering commands in the CLI, you can configure CLI command aliases using the **environment alias** command. The alias can include one or more CLI command keywords and arguments.

### Example: Set alias for info interface command

The following example configures the alias **display interface** for the SR Linux command **info interface <name>subinterface <index> | as table**:

```
--{ candidate shared default}--[ ]--
# environment alias "display interface" "info / interface {} subinterface {subinterface} |
as table"
```

In the example, the **display interface** alias consists of the keywords **info interface**, arguments to specify an interface name and subinterface number, and keywords to display the output as a table. The alias name and aliased command are each enclosed in quotes. The arguments are enclosed in braces (**{ }**). The argument **{ }** creates an optional unnamed variable for the interface name, and the argument **{subinterface}** creates an optional parameter named **subinterface**.

When you enter the alias at the CLI prompt, the output of the aliased command is displayed. For example:

```
# display interface ethernet-1/1 subinterface 1
+-----+-----+-----+
| Interface | Index | Admin-state |
+=====+=====+=====+
| ethernet-1/1 | 1 | enable |
+-----+-----+-----+
```

If you omit the optional parameters for the interface and subinterface names, they are treated as wildcards. For example:

```
# display interface
+-----+-----+-----+
| Interface | Index | Admin-state |
+=====+=====+=====+
| ethernet-1/1 | 1 | enable |
| ethernet-1/2 | 1 | enable |
| lo0 | 1 | enable |
| mgmt0 | 0 | enable |
+-----+-----+-----+
```

## 3.4.6 Configuring command auto-completion

### About this task

By default, if you enter a tab at any mode or level to auto-complete the next command level, a popup appears that displays the available options for that command.

You can optionally configure the space bar to provide the same function as the **Tab** key, so that pressing the space bar auto-completes the command.

### Procedure

To configure command auto-completion using the space bar, set the **environment complete-on-space** command to **true**.

### Example: Set space bar to auto-complete commands

```
--{ candidate shared default}--[ ]--
```

```
# environment complete-on-space true
```

### Related topics

[Using the CLI auto-complete function](#)

## 3.4.7 Displaying the CLI environment configuration

### Procedure

To display the CLI environment configuration, including any CLI command aliases, use the **environment show** command.

### Example: environment show

```
--{ candidate shared default}--[ ]--
# environment show
[alias]
"show system configuration session" = "info from state / system configuration session {} |
as table | filter fields username type started"
"show system configuration checkpoint" = "info from state / system configuration
checkpoint {} | as table | filter fields name comment username created"
"display interface" = "info / interface {} subinterface {subinterface} | as table

[bottom-toolbar]
value = "Current mode: {modified}{mode_and_session_type} | {aaa_user} ({aaa_session_id})
{time}"

[cli-engine]
type = "advanced"

[output-display-format]
value = "text"

[prompt]
value = "--{{ {modified}{mode_and_session_type} }}--[ {pwc} ]--\n{host}# "

[space-completion]
enabled = false
```

## 3.4.8 Managing CLI environment settings

### Procedure

You can save the current CLI environment settings to the default SR Linux configuration using the **environment save home** command, and you can load those settings using the **environment load home** command.

Alternatively, you can save the CLI environment settings to a file using the **environment save file** command and you can load those settings from the file using the **environment load file** command.

### Example: Save CLI environment settings to default configuration

The following example saves the current CLI environment settings to the default SR Linux configuration:

```
--{ candidate shared default}--[ ]--
# environment save home
```

```
Saved configuration to /root/.srlinuxrc
```

### Example: Load CLI environment settings from default

The following example loads CLI environment settings from the default SR Linux configuration:

```
--{ candidate shared default}--[ ]--  
# environment load home  
Loaded configuration from /root/.srlinuxrc
```

### Example: Save CLI environment settings to file

The following example saves the current CLI environment settings to a file:

```
--{ candidate shared default}--[ ]--  
# environment save file env.cfg  
Saved configuration to env.cfg
```

### Example: Load CLI environment settings from file

The following example loads CLI environment settings from a file:

```
--{ candidate shared default}--[ ]--  
# environment load file env.cfg  
Loaded configuration from env.cfg
```

## 4 YANG data models

SR Linux supports YANG data models for configuring the network element. YANG is a standards-based, data-modelling language that supports Remote Procedure Calls (RPCs). The SR Linux model-driven management interfaces are based on a common infrastructure that uses YANG models as the core definition for network element configuration, state, and operational actions. The model-driven interfaces (SR Linux CLI, gNMI server) take the underlying YANG modules and render them for the particular management interface.

SR Linux supports the following YANG data models:

- Nokia vendor-specific data models
- OpenConfig vendor-neutral data models

This chapter describes how SR Linux implements OpenConfig YANG data models and manages interactions with the Nokia YANG data models.

### 4.1 SR Linux data models

SR Linux makes extensive use of structured YANG data models to provide network operators with a single set of data models to configure and manage commonly-used network protocols, services, and devices. Each application that SR Linux supports has a Nokia vendor-specific YANG model that defines the application's configuration and state.

SR Linux exposes the YANG models to supported management APIs; for example, the CLI command tree is derived from the SR Linux YANG models loaded into the system. A gNMI client can use Set RPCs to configure an application based on the YANG model.

When you commit a configuration, the SR Linux management server validates the YANG models and translates them into protocol buffers for the impart database (IDB).

### 4.2 OpenConfig data models

OpenConfig is an informal working group that provides structured, vendor-neutral YANG data models to address the use requirements of networking applications and technologies by the community. OpenConfig data models support configuration and management of multivendor networks. They use standards-based, YANG data-modeling language, support Remote Procedure Calls (RPCs), and allow network operators to use a single set of data models to configure and manage commonly-used network protocols, services, and devices that support the OpenConfig initiative.

#### 4.2.1 Implementation in SR Linux

SR Linux supports OpenConfig YANG data models for configuring and managing network elements. You can use the OpenConfig data models together with the SR Linux data models to configure

network elements, using a CLI console or SSH connection or management-interface RPCs (gNMI) for communications between the clients and routers.

The SR Linux and OpenConfig data models are implemented through the management server binary. The SR Linux installation process installs the data models by default during the management server installation. The OpenConfig instance of the management server passes through authorization toward the native management server.

**Note:**

The system does not support multiple candidates within the OpenConfig instance of the management server.

See the *SR Linux Software Release Notes* for the supported OpenConfig modules in SR Linux releases.

## 4.2.2 Interaction with SR Linux data models

You can use the SR Linux vendor-specific and OpenConfig vendor-neutral YANG data models together to configure and manage network elements. The SR Linux data models offer a more complete representation of the capabilities of the SR Linux network elements, because they include vendor-specific features and functions that the OpenConfig data models do not describe.

The SR Linux configuration and operational statements map to path statements in the supported OpenConfig modules. The mappings are exposed in JSON files delivered with the software package. You can view the mapping files after installation, for vendor-specific deviations and augmentations.



**Note:** See the *SR Linux Software Release Notes* for information about the supported OpenConfig modules in SR Linux releases.

When using the gNMI service, the capabilities RPC can discover the capabilities of a specific gNMI server. The client sends a CapabilityRequest message to request capability information from the target. The target replies with a CapabilityResponse message that includes the gNMI service version, the supported data model versions, and the supported data encodings. Subsequent RPC messages from the client use this information to indicate the set of models used by the client and the encoding used for data.

The CapabilityResponse messages indicates each data model the target supports, based on the configuration in CLI (**system management openconfig admin-state**). The advertised names include information about the model, organization, and version, for the respective YANG models, and Nokia deviations for the OpenConfig models. See [gNMI Capabilities RPC](#) for more information.

### 4.2.2.1 Viewing OpenConfig to SR Linux mapping files

#### Procedure

SR Linux exposes the OpenConfig to SR Linux data model module mappings in `oc-srl.json` files provided with the installation. You can locate and view the module mapping files after SR Linux installation in the `/opt/srlinux/mappings/openconfig` directory.

See the *SR Linux Software Release Notes* for information about the supported OpenConfig modules in SR Linux releases.



**Example:**

The following example shows partial content from the `oc-srl-ldp.json` mapping file.

```

"mapping": [
  {
    "oc": "/lldp",
    "srlinux": "/system/srl_nokia-ldp:lldp"
  },
  {
    "oc": "/lldp/{config,state}",
    "srlinux": ""
  },
  {
    "oc": "/lldp/{config,state}/enabled",
    "srlinux": "/system/srl_nokia-ldp:lldp/srl_nokia-ldp:admin-state",
    "transform": "bool-to-admin-state"
  },
  {
    "oc": "/lldp/{config,state}/hello-timer",
    "srlinux": "/system/srl_nokia-ldp:lldp/srl_nokia-ldp:hello-timer"
  },
  {
    "oc": "/lldp/{config,state}/suppress-tlv-advertisement",
    "supported": false
  },
  {
    "oc": "/lldp/config/system-name",
    "supported": false
  },
  {
    "oc": "/lldp/state/system-name",
    "srlinux": "/system/srl_nokia-ldp:lldp/srl_nokia-ldp:system-name"
  },
  {
    "oc": "/lldp/config/system-description",
    "supported": false
  },
  {
    "oc": "/lldp/state/system-description",
    "srlinux": "/system/srl_nokia-ldp:lldp/srl_nokia-ldp:system-description"
  },
  {
    "oc": "/lldp/config/chassis-id",
    "supported": false
  },
  {
    "oc": "/lldp/state/chassis-id",
    "srlinux": "/system/srl_nokia-ldp:lldp/srl_nokia-ldp:chassis-id"
  },
  {
    "oc": "/lldp/config/chassis-id-type",
    "supported": false
  },
  {
    "oc": "/lldp/state/chassis-id-type",
    "srlinux": "/system/srl_nokia-ldp:lldp/srl_nokia-ldp:chassis-id-type"
  },
  {
    "oc": "/lldp/state/counters",
    "srlinux": "/system/srl_nokia-ldp:lldp/srl_nokia-ldp:statistics"
  },
  {
    "oc": "/lldp/state/counters/frame-in",

```

```
"srlinux": "/system/srl_nokia-lldp:lldp/srl_nokia-lldp:statistics/srl_nokia-
lldp:frame-in"
  },
  {
#
```

## 4.2.3 Enabling access to OpenConfig data models

### Procedure

You can enable access to the OpenConfig data model using the **admin-state** in the **system management openconfig admin-state** context. When you validate and commit a configuration, the system verifies if **openconfig** is set to **true** and determines if there is access to OpenConfig data models. If the candidate contains OpenConfig configuration statements and **openconfig** is not enabled (**false**), the action fails with an error.



**Note:** The system does not support multiple candidates within the OpenConfig instance of the management server.

The following example shows the basic configuration required to enable the OpenConfig configuration modules and obtain state information.

### Example:

```
A:dut2# system management openconfig admin-state enable
--{ [FACTORY] +* candidate shared default }--[ ]--
A:dut2# commit stay
All changes have been committed. Starting new transaction.
--{ [FACTORY] + candidate shared default }--[ ]--
A:dut2#
```

## 4.2.4 Specifying the data model mode

The SR Linux YANG data model is the default mode. The system supports different methods for switching between the default SR Linux data model and the OpenConfig data model.

### 4.2.4.1 Specifying the data model in SSH mode

#### Procedure

To specify the data model when accessing the system using SSH, use the **enter oc** or **enter srl** command. A special OpenConfig banner appears in OpenConfig mode.

#### Example: Specifying the data model in SSH mode

```
A:dut2# enter oc
--{ oc candidate shared default }--[ ]--
A:dut2# enter srl
--{ [FACTORY] + candidate shared default }--[ ]--
A:dut2#
```

#### 4.2.4.2 Specifying the data model in Linux bash mode

##### Procedure

To specify the data model when logging in to the Linux bash, start the CLI using **sr cli --oc** or **sr cli --srl**. This enters directly into OpenConfig or SRL mode respectively.

##### Example: Specifying the data model in Linux bash mode

```
[linuxadmin@dut2 srl]$ sr_cli --oc
Using configuration file(s): ['/etc/opt/srlinux/srlinux.rc']
Welcome to the srlinux CLI.
Type 'help' (and press <ENTER>) if you need any help using this.
--{ oc running }--[ ]--
A:dut2# quit
[linuxadmin@dut2 srl]$ sr_cli --srl
Using configuration file(s): ['/etc/opt/srlinux/srlinux.rc']
Welcome to the srlinux CLI.
Type 'help' (and press <ENTER>) if you need any help using this.
--{ [FACTORY] + running }--[ ]--
A:dut2# quit
[linuxadmin@dut2 srl]$
```

#### 4.2.4.3 Specifying the data model in CLI mode

##### Procedure

To specify the data model while working in the CLI environment, use the **environment yang-models** command.

##### Example: Specifying the data model in the CLI environment

```
A:dut2# environment yang-models oc
--{ [FACTORY] + running }--[ ]--
A:dut2# environment show
...
...
[yang-models]
value = "oc"

--{ [FACTORY] + running }--[ ]--
A:dut2#
```

#### 4.2.5 Verifying the OpenConfig operational state

##### Procedure

You can verify the OpenConfig operational state using the command **system management openconfig oper-state**. The following example shows the operational state of the OpenConfig data model.

##### Example:

```
A:dut2# info from state system management openconfig
system {
  management {
    openconfig {
      admin-state enable
    }
  }
}
```

```

        oper-state up
    }
}
--{ [FACTORY] + running }--[ ]--
A:dut2#

```

## 4.2.6 Specifying the data model mode for the gNMI server

### Procedure

When using the gNMI server to send and accept edits, requests, and responses for the SR Linux or OpenConfig data models, you can specify the corresponding data model schema (**openconfig** or **native**) for the target in the **system gnmi-server network-instance name yang-models** context. The following example shows this configuration.

### Example: Yang data model selection for gNMI server

```

A:dut2# enter candidate
--{ [FACTORY] + candidate shared default }--[ ]--
A:dut2# system gnmi-server network-instance mgmt yang-models openconfig
--{ [FACTORY] +* candidate shared default }--[ ]--
A:dut2# commit stay
All changes have been committed. Starting new transaction.
--{ [FACTORY] + candidate shared default }--[ ]--
A:dut2#

```

Alternatively, you can send a gNMI SetRequest with the origin prefix **openconfig** embedded in the request. This informs the system to use the OpenConfig data model, regardless of the value specified for **yang-models** under the gNMI server network instance configuration.

### Example: Prefix origin openconfig in gNMI SetRequest

```

SetRequest:
prefix: <
  origin: "openconfig"
>

```

## 5 RPC overview and supporting interfaces

SR Linux supports the gNMI and JSON interfaces that use the Remote Procedure Call (RPC) protocol for the modification and retrieval of a configuration from a target device as if it were a local object. This chapter provides a general RPC overview and defines how SR Linux implements the gNMI and JSON serving RPCs.

### 5.1 RPC overview

An RPC executes a procedure or method on a remote device in a way similar to one executed locally. Using an RPC should look and feel like a local procedure call and achieve similar results.

When RPCs operate in a server/client model, the client executes an application and requests some method be executed on a server. The server receives the RPC, executes the method, and sends the outcome back to the server. For this to occur, the following are needed:

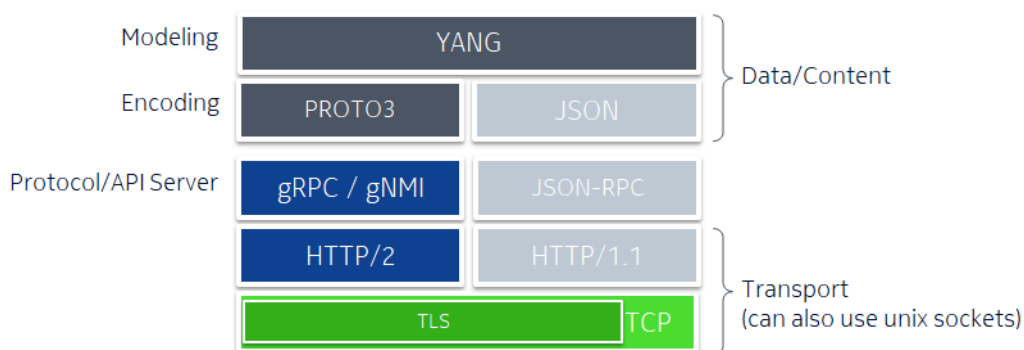
- A server application that contains a set of methods (or service) which a client can call. For example, a gNMI server or JSON-RPC server. Each needs to receive an RPC from a client for a specific method or service, execute the requested methods/service, and return data.
- A common way of describing which method to execute and associated data.

This is referred to as encoding/decoding or serialization/deserialization. For example, proto buffers or JSON.

- A transport mechanism between the two devices. In the case of gNMI and JSON-RPC this is done using HTTP/2 and HTTP1.1 over TCP secured by TLS.

For RPCs to relate to network applications and a network operating system, there needs to be a way to define the data model of the network constructs which an RPC must perform. In the SR Linux, all applications are modeled in YANG, as shown in the following figure.

Figure 1: RPC-based interfaces in SR Linux



### 5.1.1 gNMI path convention

Because SR Linux is modeled in YANG, for RPCs to retrieve or configure an SR Linux device (set) the data location or path to the data within the YANG model must be specified to the RPC. For example, to configure a description under a BGP peer, the RPC server must be able to reference this specific data and its location in the SR Linux data model.

Both the JSON-RPC and gNMI use the gNMI path convention to describe the location or path in SR Linux. The gNMI path convention is commonly referred to as the "path" and defines the data structure of a path to reference a config or state leaf within SR Linux.

A path is an ordered list of path elements with each element containing an element name and one or more key value pairs associated with the element. For example:

```
path: <
  elem: <
    name: "interface"
    key: <
      key: "name"
      value: "ethernet-1/20"
    >
  >
  elem: <
    name: "subinterface"
    key: <
      key: "index"
      value: "1"
    >
  >
```

A path can also be displayed as a string which is more human readable. The rules for building this string type are:

- Each path element is separated by a "/" character and listed in sequence.
- A path element which contains one or more key/value pairs is represented by the path element name followed the key/value wrapped in brackets ( [ ] ).
- The root of the data tree is represented by a single "/".

The following is a human readable path for the previous example:

```
/interface=ethernet-1/20/subinterface[index=1]
```

## 5.2 Configuring a gNMI or JSON server

The SR Linux can enable a gNMI server that allows external gNMI clients to connect to the device and modify the configuration and collect state information. You can also enable a JSON-RPC server on the SR Linux device, which allows you issue JSON-formatted requests to the device to retrieve and set configuration and state.

See the Management Servers chapter in the *SR Linux Configuration Basics Guide* for details on how to configure these servers.

## 6 gNMI

gRPC Network Management Interface (gNMI) is a gRPC based protocol that defines a service or set of services or RPC methods used to configure and retrieve data from network devices.

SR Linux provides a gNMI-based RPC for the modification and retrieval of a configuration. Supported RPCs are:

- Get
- Set
- Subscribe
- Capabilities

### 6.1 Common notification messages

When the SR Linux gNMI process communicates data to a client, it uses common notification messages. Notification messages use the fields shown in the following table.

*Table 4: Common notification fields*

Field	Definition
timestamp	Time data was collected
prefix	Prefix applied to all path fields included in the notification message. The paths expressed within the message are formed by the concatenation of prefix + path.
update	List of update messages that indicate changes in the underlying data. Subfields are: <ul style="list-style-type: none"> <li>• path</li> <li>• val (value)</li> </ul>
delete	List of paths indicating the deletion of data nodes

#### 6.1.1 Timestamps

Timestamp values are represented in nanoseconds. The value is encoded as a signed 64-bit integer (int64).

## 6.1.2 Path prefix

A prefix can be specified to reduce the lengths of path fields within a message. The absolute path is a concatenation of the path elements representing the prefix and the list of path elements in the path field. For example:

### Example: Path Prefix

```
notification: <
timestamp: (timestamp) // timestamp as int64
prefix: <
  elem: <
    name: "a"
  >
  elem: <
    name: "b"
    key: <
      key: "name"
      value: "b1"
    >
  >
  elem: <
    name: "c"
  >
>
update: <
  path: <
    elem: <
      name: "d"
    >
  >
  value: <
    val: <
      json_val: "AStringValue"
    >
  >
>
update: <
  path: <
    elem: <
      name: "e"
    >
  >
  val: <
    json_val: 10042 // converted to int representation
  >
>
>
```

## 6.1.3 Paths

Paths are represented according to gNMI path conventions. Each path is represented by an ordered list of PathElem messages, starting at the root node, and ending at the most specific path element (versus a single string with a "/" character separating each element). Each PathElem message contains the name of the node within the data tree, along with any associated keys and attributes that may be required. For example:



## Example

```

path: <
  elem: <
    name: "a"
  >
  elem: <
    name: "e"
    key: <
      key: "key"
      value: "k1"
    >
  >
  elem: <
    name: "f"
  >
  elem: <
    name: "g"
  >
>

```

Multiple paths are supported. Multiple notification messages are triggered in response to each path. For example:

## Example

```

path <
  elem <
    name: "interface"
    key <
      key: "name"
      value: "mgmt0"
    >
  >
>
path <
  elem <
    name: "system"
  >
>
type: 1
encoding: JSON_IETF

```

### 6.1.4 Data node values

The value of a data node can be the following:

- scalar types, such as a string in the `string_val` field, `int64` in the `int_val` field, `uint64` in the `uint_val` field, `bool` in the `bool_val` field, `bytes`, and `float` in the `float_val` field
- additional types used in some schema languages, such as `decimal64` in the `decimal_val` field and `ScalarArray` in the `leaflist_val` field
- structured data types

### 6.1.4.1 Structured data types

When structured data is sent in an update message, it is serialized according to supported encoding, as shown in the following table.

Table 5: Encoding for structured data

Data type	Description	Field
ASCII	An ASCII encoded string	ascii_val
PROTO	A Protobuf encoded message using protobuf.any	any_val
JSON_IETF	A JSON encoded string using JSON encoding compatible with RFC 7951	json_ietf_val

## 6.2 Data model selection using gNMI origin

Within a gNMI request, the origin extension allows clients to specify which data model to interact with: OpenConfig (**openconfig**), native (**native** or **srlinux\_native**), or CLI (**cli** or **srlinux\_cli**).

Clients can specify a value for the origin in the path prefix or in one or more paths, but not both at once. When a request specifies the origin in the path prefix, SR Linux uses the specified data model to process all operations within the transaction.



**Note:** If a request includes a path prefix, the prefix must specify any required origin.

If no origin is specified in a request, SR Linux handles the request based on the data model specified under **system gnm-server network-instance yang-models** (set to **native** by default).

SR Linux deviates from the gNMI specification in that it intrinsically links all origins such that a change in one data model produces the matching change in the other.

The following table describes the usage of the origin field in the message types where it is typically used.

Table 6: Purpose of origin field by message type

Message type	Purpose of origin field
SetRequest	Specifies the schema to use to modify the target configuration
GetRequest	Retrieves the contents of the specified schema
GetResponse	Indicates that the payload contains data from the specified <origin, path> schema
SubscribeRequest	Subscribes to paths within the specified schema
SubscribeResponse	Indicates the update corresponds to the specified <origin, path> tuple

## Multiple path origins

If a SetRequest specifies more than one origin (for example, it contains two operations each with different path origins), the updates are processed as a single transaction. In this case, all operations must succeed for the SetResponse to return a success message. If any of the operations fail, the contents of all origins roll back, and the SetResponse returns an error.

You can specify mixed origins combining OpenConfig with native YANG or with CLI. In either case, SR Linux applies the OpenConfig origin first, followed by the native or CLI origin.

The following example shows the OpenConfig origin defined in the path prefix:

### Example: Origin defined in path prefix

```
prefix {
  origin: "openconfig"
}
path {
  elem {
    name: "interfaces"
  }
  elem {
    name: "interface"
    key {
      key: "name"
      value: "ethernet-1/1"
    }
  }
  elem {
    name: "state"
  }
  elem {
    name: "description"
  }
}
type: ALL
encoding: JSON_IETF
```

## 6.2.1 CLI configuration with gNMI origin

SR Linux supports setting the gNMI origin to CLI (**cli** or **srlinux\_cli**), which allows gNMI clients to apply CLI configurations. In this case, SR Linux ignores any defined path and enters and commits the configuration included in the update or replace operation as CLI input.

The value defined in the CLI origin is encoded as ASCII and supports both the tree-based CLI commands as displayed using the SR Linux **info** command or the full-context **set /** commands as shown using the **info flat** command.

Delete operations are not supported with origin CLI.

If a SetRequest replace operation contains only the CLI origin, SR Linux treats the operation as a full device configuration replacement. The whole running configuration is replaced with the CLI commands applied over a blank configuration.

SR Linux supports only one CLI replace operation per SetRequest. However, one or more update operations can follow the replace operation, in which case the updates are appended to the contents of the replace operation.

The following example shows a SetRequest that uses CLI origin within the update operation:

**Example: SetRequest with CLI origin**

```

update: <
  path: <
    origin: "cli"
  >
  val: <
    ascii_val: "/interface ethernet-1/1 admin-state disable"
  >
>

```

## 6.3 gNMI Get RPC

The Get RPC allows you to obtain a view of the existing state. A GetRequest message is sent to the target (SR Linux gNMI process gnm\_mgr) that specifies the data to retrieve. A GetResponse message is returned that reflects the values of specified leafs at the collection time.

The Get RPC is recommended for retrieving small data sets. For larger data sets, the gNMI subscribe RPC is recommended, using the ONCE mode.

**Related topics**

[gNMI Subscribe RPC](#)

### 6.3.1 GetRequest message

A GetRequest message retrieves a view of data from the server. A Get RPC requests the server retrieve a subset of the data tree as specified by the paths included in the message and serializes this using the specified encoding. The GetRequest message uses the fields shown in the following table.

*Table 7: GetRequest fields*

Field	Definition
path	Path (or set of paths) for the requested data view. Wildcards are permitted.
type	Type of data requested. Supported options are: <ul style="list-style-type: none"> <li>• CONFIG (configurable read/write data)</li> <li>• STATE (non-configurable read-only data)</li> </ul>
encoding	Encoding that the target should use (ASCII or JSON_IETF). If not specified, JSON is the default.
extension	Repeated field to carry gNMI extensions

### 6.3.2 GetResponse message

The GetResponse message uses the fields shown in the following table.

Table 8: GetResponse fields

Field	Definition
notification	Set of notification messages for each path specified in the Get Request.
extension	Repeated field to carry gNMI extensions

**Related topics**

[Common notification messages](#)

## 6.4 gNMI Set RPC

The Set RPC allows you to modify an existing state. A SetRequest message is sent to the target (SR Linux gNMI process gnmi\_mgr) that specifies the required modifications. The server deletes, replaces, and updates paths based on the order they are listed. For each operation designated in the SetRequest message, an UpdateResult message is included in the SetResponse message.

### 6.4.1 SetRequest message

The SetRequest message uses the fields shown in the following table.

Table 9: SetRequest fields

Field	Definition
prefix	A specified prefix is applied to all defined paths within each field
delete	A set of paths to be removed from the data tree
replace	A set of update messages that defines content to replace
union_replace	A set of update messages of mixed origin that defines content to replace
update	A set of update messages that defines content to update
extension	Repeated field to carry gNMI extensions

An update message indicates changes to paths where a new value is required. Update messages contain the following:

- path - the path of the element to be modified
- value - a value to apply to the specified node

All changes to the state included in a SetRequest message are considered part of a transaction. Either all modifications are applied or changes are rolled back to reflect the original state. For changes to be applied together, they must be in a single SetRequest message.

For replace operations, the behavior of omitted data elements depends on whether they are non-default values (set by a previous SetRequest message) or unmodified defaults. When the replace operation omits values that have been previously set, they are deleted from the data tree. Otherwise, omitted data elements are created with their default values.

For update operations, only the value of the data elements explicitly specified are changed.

## 6.4.2 SetResponse message

The SetResponse message uses the fields shown in the following table.

Table 10: SetResponse fields

Field	Definition
prefix	The prefix specified for all paths
response	A list of responses (one per operation). Each response consists of an UpdateResult message with the following: <ul style="list-style-type: none"> <li>timestamp - time when the SetRequest message was accepted</li> <li>path - path defined in SetRequest message. A prefix may be present to reduce repetition of path elements.</li> <li>op - the operation performed on the path (delete, replace, or update)</li> <li>message - a status message</li> </ul>
extension	Repeated field to carry gNMI extensions

## 6.5 gNMI Subscribe RPC

The Subscribe RPC allows you to receive updates relating to the state of data instances. The user creates a subscription using the Subscribe RPC with the desired subscription mode. The defined mode triggers how and when the data is sent to the client.

A SubscribeRequest message is sent to the target (SR Linux gNMI process gnmi\_mgr) to request updates for one or more paths. A SubscribeResponse message is sent to the client over an established RPC.

### 6.5.1 SubscribeRequest message

The SubscribeRequest message uses the fields shown in the following table.

Table 11: *SubscribeRequest* fields

Field	Definition
subscribe	A SubscriptionList message specifying a new set of paths to subscribe to
extension	Repeated field to carry gNMI extensions

Subscriptions are set once and cannot be modified. A new Subscribe RPC call must be created for new paths. To end an existing subscription, the client must cancel the Subscribe RPC that relates to the subscription.

### 6.5.1.1 SubscriptionList message

A SubscriptionList message indicates a set of paths where common subscription behavior is required. The SubscriptionList message uses the fields shown in the following table.

Table 12: *SubscriptionList* fields

Field	Definition
subscription	A set of subscription messages indicating the paths associated with the subscription
mode	Type of subscription to create: <ul style="list-style-type: none"> <li>• ONCE</li> <li>• STREAM (default) <ul style="list-style-type: none"> <li>– ON_CHANGE</li> <li>– SAMPLE <ul style="list-style-type: none"> <li>• sample_interval</li> </ul> </li> <li>– TARGET_DEFINED</li> </ul> </li> </ul>
extension	Repeated field to carry gNMI extensions

ONCE subscriptions are one-time requests. A ONCE subscription is created by sending a SubscribeRequest message with the subscribe field containing a SubscriptionList, with the mode type set to ONCE. The relevant update messages are sent and the RPC channel is closed.

STREAM subscriptions are long-lived and transmit updates indefinitely. A STREAM subscription is created by sending a SubscribeRequest message with the subscribe field containing a SubscriptionList, with the mode type set to STREAM. The STREAM mode subscription message also specifies a mode.

- ON\_CHANGE - Data updates are only sent when the value of the data item changes.
- SAMPLE - Data is sent at specified intervals as specified in the sample\_interval field. The maximum sample rate is a 64-bit integer in nanoseconds and minimum is 0.

- TARGET\_DEFINED - The target determines the best subscription type to create on a per-leaf basis. For example, if the path specified refers to leaves that are event-driven, then an ON\_CHANGE subscription may be created. If the data represents counters values, a SAMPLE subscription may be created.

## 6.5.2 SubscribeResponse message

The SubscribeResponse message uses the fields shown in the following table.

Table 13: SubscribeResponse fields

Field	Definition
update OR sync_response	A response field. Only one type can be specified per message: <ul style="list-style-type: none"> <li>• update - message providing an update value for a subscribed data entity</li> <li>• sync_response - a Boolean field indicating that all data values corresponding to the paths have been transmitted at least once (not used with ONCE mode subscriptions)</li> </ul>
extension	Repeated field to carry gNMI extensions

## 6.6 gNMI Capabilities RPC

The Capabilities RPC allows you to discover the capabilities of a specific gNMI server.

A CapabilityRequest message is sent by the client to request capability information from the target. The target replies with a CapabilityResponse message that includes its gNMI service version, the versioned data models it supports, and the supported data encodings.

This information is used in subsequent RPC messages from the client to indicate the set of models that the client uses, and the encoding used for data.

### 6.6.1 CapabilityRequest message

The CapabilityRequest message is sent by the client to request capability information from the target. The CapabilityRequest message carries a single repeated extension field which can be used to carry gNMI extensions.

#### Example: CapabilityRequest message

```
message CapabilityRequest {
  repeated gnmi_ext.Extension extension = 1;
}
```

### 6.6.2 CapabilityResponse message

A CapabilityResponse message is sent from the target and includes the following fields:



- supported\_models - a set of ModelData messages describing each model supported by the target
- supported\_encodings - an enumerated field describing the data encodings supported by the target (ASCII and JSON\_IETF are supported)
- gNMI\_version - the version of the gNMI service supported by the target
- encoding - a repeated field for gNMI extensions

### Example: CapabilityResponse message

```
message CapabilityResponse {
  repeated ModelData supported_models = 1;
  repeated Encoding supported_encodings = 2;
  string gNMIversion = 3;
  repeated gnmi_ext.Extension extension = 4;
}
```

## 6.7 Candidate mode

The gNMI uses its own private candidate that allows multiple users or services to make simultaneous changes to a configuration.

## 6.8 gNMI examples

Open source clients can be used to run GetRequests, SetRequests, subscriptions, and capabilities. The examples that follow show requests and responses using the following clients although any client that conforms to gNMI specifications can be used:

- gnmi\_get — used for simple GetRequests
- gnmi\_set — used for simple SetRequests
- gnmi\_cli — used for SubscribeRequests, and advanced GetRequests and SetRequests
- gnmi\_capabilities — used for CapabilityRequests

### 6.8.1 gnmi\_get examples

The get gNMI-RPC allows you to retrieve state and configuration from a datastore. The following examples are shown:

- get all request
- get interface with wildcard key request

#### Example: get all request

```
# gnmi_get -target_addr 172.18.0.6:50052 -insecure -xpath '/'
== getRequest:
path: <
>
encoding: JSON_IETF
```

## Response (get all)

```
notification: <
  timestamp: 1565672122888042050
  update: <
    path: <
      >
      val: <
        json_ietf_val: "{\n \"srl_nokia-acl:acl\": {\n \"ipv4-
        filter\" ---- snip ---- }\n }\n}\n"
      >
    >
  >
>
```

**Example: get interface with wildcard key request**

```
# gnmi_get -target_addr 172.18.0.6:50052 -insecure -xpath
'/interface[name=mgmt0]/subinterface[index=*]'
== getRequest:
path: <
  elem: <
    name: "interface"
    key: <
      key: "name"
      value: "mgmt0"
    >
  >
  elem: <
    name: "subinterface"
    key: <
      key: "index"
      value: "*"
    >
  >
  >
  >
encoding: JSON_IETF
```

## Response (get interface with wildcard key)

```
notification: <
  timestamp: 1565671919030747121
  update: <
    path: <
      elem: <
        name: "srl_nokia-interfaces:interface"
        key: <
          key: "name"
          value: "mgmt0"
        >
      >
    >
  >
  val: <
    json_ietf_val: "{\n \"name\": \"mgmt0\", \n \"subinterface\":
    [\n {\n \"index\": 0, \n \"admin-state\": \"enable\", \n
    \"ip-mtu\": 1500, \n \"ifindex\": 524288000, \n \"operstate\":
    \"up\", \n \"last-change\": \"2019-08-
    11T17:21:48.366Z\", \n \"ipv4\": {\n \"allow-directedbroadcast\":
    false, \n \"dhcp-client\": true, \n
    \"address\": [\n {\n \"ip-prefix\": in
    \"172.18.0.6/24\", \n \"origin\": \"dhcp\" \n } \n
    ], \n \"srl_nokia-interfaces-nbr:arp\": {\n
    \"timeout\": 14400, \n \"neighbor\": [\n {\n
```

```

\ "ipv4-address\": \|172.18.0.1\,\n \|link-layeraddress\":
\ "02:42:45:9D:DB:FC\",\n \|origin\":
\ "dynamic\",\n \|expiration-time\": \|2019-08-
13T07:14:34.707Z\|\n }\,\n {\n
\ "ipv4-address\": \|172.18.0.2\,\n \|link-layeraddress\":
\ "02:42:AC:12:00:02\",\n \|origin\":
\ "dynamic\",\n \|expiration-time\": \|2019-08-
13T05:17:51.893Z\|\n }\n }\n }\n },\n
\ "ipv6\": {\n \|dhcp-client\": true,\n \|address\": [\n
{\n \|ip-prefix\": \|2001:172:18::6/80\,\n
\ "origin\": \|dhcp\,\n \|status\": \|preferred\|\n
},\n {\n \|ip-prefix\":
\ "fe80::42:acff:fe12:6/64\",\n \|origin\": \|linklayer\,\n
\ "status\": \|preferred\|\n }\n
],\n \|srl_nokia-interfaces-nbr:neighbor-discovery\": {\n
\ "dup-addr-detect\": true,\n \|reachable-time\": 30,\n
\ "stale-time\": 14400\ }\n },\n \|statistics\": {\n
\ "in-pkts\": \|5136\,\n \|in-octets\": \|438953\,\n
\ "in-error-pkts\": \|0\,\n \|in-discarded-pkts\": \|0\,\n
\ "in-terminated-pkts\": \|5136\,\n \|in-terminated-octets\":
\ "438953\,\n \|in-forwarded-pkts\": \|0\,\n \|inforwarded-
octets\": \|0\,\n \|out-forwarded-pkts\":
\ "6062\",\n \|out-forwarded-octets\": \|2746613\,\n
\ "out-error-pkts\": \|0\,\n \|out-discarded-pkts\": \|0\,\n
\ "out-pkts\": \|6062\,\n \|out-octets\": \|2746520\|\n
},\n \|srl_nokia-qos:qos\": {\n \|input\": {\n
\ "classifiers\": {\n \|ipv4-dscp\": \|default\,\n
\ "ipv6-dscp\": \|default\,\n \|mpls-tc\": \|default\|\n
}\n }\n }\n }\n }\n }\n }\n }
>
>
>
>

```

## 6.8.2 gnmi\_set examples

The set gNMI-RPC allows you to modify the state. The following examples are shown:

- set delete request
- set update all request

### Example: set delete request

```

# gnmi_set -target_addr 172.18.0.3:50052 -username admin -password
admin -insecure -delete /system/name/host-name
== setRequest:
delete: <
  elem: <
    name: "system"
  >
  elem: <
    name: "name"
  >
  elem: <
    name: "host-name"
  >
>
>

```

Response (set delete)

```
response: <
```

```

path: <
  elem: <
    name: "system"
  >
  elem: <
    name: "name"
  >
  elem: <
    name: "host-name"
  >
  >
op: DELETE
>
timestamp: 1567203341816078044

```

### Example: set an update all request

```

# gnmi_set -target_addr 172.18.0.3:50052 -username admin -password
admin -insecure -update /system/name/host-name:replaced-host -replace
/system/name/domain-name:replaced-domain
== setRequest:
replace: <
  path: <
    elem: <
      name: "system"
    >
    elem: <
      name: "name"
    >
    elem: <
      name: "domain-name"
    >
  >
  val: <
    string_val: "replaced-domain"
  >
>
update: <
  path: <
    elem: <
      name: "system"
    >
    elem: <
      name: "name"
    >
    elem: <
      name: "host-name"
    >
  >
  val: <
    string_val: "replaced-host"
  >
>

```

### Response (set update all)

```

response: <
  path: <
    elem: <
      name: "system"
    >
  >
  elem: <

```

```

    name: "name"
  >
  elem: <
    name: "domain-name"
  >
  >
  op: REPLACE
response: <
  path: <
    elem: <
      name: "system"
    >
    elem: <
      name: "name"
    >
    elem: <
      name: "host-name"
    >
  >
  >
  op: UPDATE
  >
timestamp: 1567204165851469784

```

### 6.8.3 gnmi\_cli examples

The cli gNMI-RPC allows you to subscribe and receive updates on the state of a data instance. The following examples are shown:

- Subscribe - ONCE for all (one-time subscription) request
- Subscribe - STREAM ON\_CHANGE interface (long term subscription) request

In these examples, -qt specifies the subscription type. ONCE mode is the default and therefore is not shown in the first example.

#### Example: Subscribe ONCE for all request

```
# gnmi_cli -a 172.18.0.6:50052 -insecure -q '/'
```

Response (subscribe ONCE for all)

```

{
  "acl": {
    "ipv4-filter": {
      "allow_sip_dip": {
        "entry": {
          "10": {
            "action": {
              "accept": {
                "log": "false"
              }
            }
          }
        }
      }
    }
  }
}
-- Snip --

```

#### Example: Subscribe STREAM ON\_CHANGE interface request

```
# gnmi_cli -a 172.18.0.6:50052 -insecure --qt streaming -q
'/interface[name=mgmt0]'
```

## Response (Subscribe STREAM ON\_CHANGE interface)

```

{
  "interface": {
    "mgmt0": {
      "admin-state": "enable",
      "ethernet": {
        "flow-control": {
          "receive": "false"
        },
        "hw-mac-address": "02:42:AC:12:00:06",
        "statistics": {
          "in-crc-errors": "0",
          "in-fragment-frames": "0",
          "in-jabber-frames": "0",
          "in-mac-pause-frames": "0",
          "in-oversize-frames": "0",
          "out-mac-pause-frames": "0"
        }
      },
      "ifindex": "524304383",
      "last-change": "2019-08-30T18:44:45.490Z",
      "mtu": "1514",
      "oper-state": "up",
      "statistics": {
        "carrier-transitions": "1",
        "in-broadcast-pkts": "5",
        "in-errors": "0",
        "in-fcs-errors": "0",
        "in-multicast-pkts": "1356",
        "in-octets": "612022",
        "in-unicast-pkts": "4662",
        "out-broadcast-pkts": "1",
        "out-errors": "0",
        "out-multicast-pkts": "456",
        "out-octets": "2724476",
        "out-unicast-pkts": "5505"
      },
      "subinterface": {
        "0": {
          "admin-state": "enable",
          "ifindex": "524288000",
          "ip-mtu": "1500",
          "ipv4": {
            "address": {
              "172.18.0.6/24": {
                "origin": "dhcp"
              }
            },
            "allow-directed-broadcast": "false",
            "arp": {
              "neighbor": {
                "172.18.0.1": {
                  "expiration-time": "2019-08-31T01:13:22.987Z",
                  "link-layer-address": "02:42:45:9D:DB:FC",
                  "origin": "dynamic"
                },
                "172.18.0.2": {
                  "expiration-time": "2019-08-30T22:44:54.422Z",
                  "link-layer-address": "02:42:AC:12:00:02",
                  "origin": "dynamic"
                }
              }
            },
            "timeout": "14400"
          }
        }
      }
    }
  }
}

```

```

    },
    "dhcp-client": "true"
  },
  "ipv6": {
    "address": {
      "2001:172:18::6/80": {
        "origin": "dhcp",
        "status": "preferred"
      },
      "fe80::42:acff:fe12:6/64": {
        "origin": "link-layer",
        "status": "preferred"
      }
    },
    "dhcp-client": "true",
    "neighbor-discovery": {
      "dup-addr-detect": "true",
      "reachable-time": "30",
      "stale-time": "14400"
    }
  },
  "last-change": "2019-08-30T18:44:45.490Z",
  "oper-state": "up",
  "qos": {
    "input": {
      "classifiers": {
        "ipv4-dscp": "default",
        "ipv6-dscp": "default",
        "mpls-tc": "default"
      }
    }
  },
  "statistics": {
    "in-discarded-pkts": "0",
    "in-error-pkts": "0",
    "in-forwarded-octets": "0",
    "in-forwarded-pkts": "0",
    "in-octets": "404380",
    "in-pkts": "4679",
    "in-terminated-octets": "404380",
    "in-terminated-pkts": "4679",
    "out-discarded-pkts": "0",
    "out-error-pkts": "0",
    "out-forwarded-octets": "2409995",
    "out-forwarded-pkts": "5511",
    "out-octets": "2409995",
    "out-pkts": "5511"
  }
},
"vlan-tagging": "false"
}
{
  "interface": {
    "mgmt0": {
      "statistics": {
        "in-octets": "615366"
      }
    }
  }
}
{
  "interface": {

```

```

    "mgmt0": {
      "statistics": {
        "in-unicast-pkts": "4693"
      }
    }
  }
}
{
  "interface": {
    "mgmt0": {
      "statistics": {
        "out-octets": "2736287"
      }
    }
  }
}
.
.
.

```

#### 6.8.4 gnmi\_capabilities example

The capabilities gNMI-RPC allows you to discover the capabilities of a specific gNMI server. The following example shows a request to obtain model, data encodings, and version for a specified server.

##### Example: Request server capabilities for specified server

```
gnmi_capabilities -username admin -password admin --target_addr [172.18.0.8]:50264
```

Response (request server capabilities)

```

supported_models: <
  name: "urn:srl_nokia/aaa:srl_nokia-aaa"
  organization: "Nokia"
  version: "2020-12-31"
>

supported_models: <
  name: "urn:srl_nokia/aaa-types:srl_nokia-aaa-types"
  organization: "Nokia"
  version: "2019-11-30"
>
.
.
.
supported_encodings: JSON_IETF
supported_encodings: ASCII
supported_encodings: PROTO
supported_encodings: 45
supported_encodings: 44
supported_encodings: 46
supported_encodings: 47
gNMI_version: "0.7.0"

```



## 7 gNOI

gRPC Network Operations Interface (gNOI) defines a set of gRPC-based services for executing operational commands on network devices. The individual RPCs and messages that perform the gNOI operations required on the node are defined at the following location: <https://github.com/openconfig/gnoi>. This repository also stores the various per-service protos in subdirectories.

SR Linux supports the following gNOI services:

- [gNOI OS service](#)
- [gNOI File service](#)
- [gNOI System service](#)

### 7.1 gNOI OS service

The gNOI OS service provides an interface to install an OS package on a target node. SR Linux supports the gNOI OS service on both the active and standby CPMs (referred to as supervisors in gNOI).

To perform the OS installation, the client progresses through the following three gNOI OS RPCs:

- Install RPC
- Activate RPC
- Verify RPC

The protos used to define the OS service were pulled from the following hash: <https://github.com/openconfig/gnoi/commit/93cdd9ae9f35d8b4bc1599d0a727b294faeca352>.

#### 7.1.1 Install RPC

The Install RPC transfers the OS package to the target node. The target node first attempts to copy the specified OS package between the CPMs before it accepts the transfer from the client.

To refer to the OS version, SR Linux uses the same string in gNOI as the one used with ZTP (*version string-build number*), for example: `v22.11.1-010`. The download folder for the OS is located at: `/var/run/srlinux/gnoi`. To validate that the transferred OS package is valid and bootable before installation, the platform performs a hash check against the md5sum that is embedded in the `.bin` file.

On a dual CPM node, only the active CPM runs the gNOI service. The Install RPC transfers the OS to the active CPM.



**Note:** SR Linux does not support the **standby\_supervisor** option. On a dual CPM node, the transferred image is synced automatically to the standby CPM using ZTP.

One Install RPC is required for each CPM. Concurrent Install RPCs are not allowed on the same target node.

## Install RPC structure

```
rpc Install(stream InstallRequest) returns (stream InstallResponse);
```

### 7.1.2 Activate RPC

The Activate RPC sets the requested OS version for the target node to use at the next reboot. It also reboots the target node if the `no_reboot` flag is not set.



**Note:** If the requested image fails to boot, SR Linux cannot attempt to boot a secondary image. In this case, the system can revert to the rescue image.

On a dual CPM node, if you perform this RPC on the active CPM, it triggers a switchover to the standby CPM before rebooting the previously active CPM.

## Activate RPC structure

```
rpc Activate(ActivateRequest) returns (ActivateResponse);
```

### 7.1.3 Verify RPC

The Verify RPC checks the OS version running on the target node. The client can call this RPC multiple times while the target node boots until the activation is successful.



**Note:** The `activation_fail_message` is not supported because if the target node does not boot, it remains in a failure state and does not revert to a previous version of OS.

## Verify RPC structure

```
rpc Verify(VerifyRequest) returns (VerifyResponse);
```

## 7.2 gNOI File service

The gNOI File service allows the client to transfer files to and from the target node. The main use for this service is extracting debugging information through the transfer of system logs and core files.

SR Linux supports the following gNOI File RPCs:

- [Get RPC](#)
- [Put RPC](#)
- [Stat RPC](#)
- [Remove RPC](#)



**Note:** The `TransferToRemote` RPC is not supported.

The protos used to define the gNOI File service were pulled from the following hash: <https://github.com/openconfig/gnoi/commit/93cdd9ae9f35d8b4bc1599d0a727b294faeca352>.

### 7.2.1 Get RPC

The Get RPC reads and streams the contents of a file from a target node to the client using sequential messages, and sends a final message containing the hash of the streamed data before closing the stream.

The target node returns an error if:

- An error occurs while reading the file.
- The file does not exist.

#### Get RPC structure

```
rpc Get(GetRequest) returns (stream GetResponse) {}
```

### 7.2.2 Put RPC

The Put RPC streams data to the target node and writes the data to a file. The client streams the file using sequential messages. The initial message contains information about the filename and permissions. The final message includes the hash of the streamed data.

The target node returns an error if:

- An error occurs while writing the data.
- The location does not exist.

#### Put RPC structure

```
rpc Put(stream PutRequest) returns (PutResponse) {}
```

### 7.2.3 Stat RPC

The Stat RPC returns metadata about files on the target node.

If the path specified in the StatRequest references a directory, the StatResponse returns the metadata for all files and folders, including the parent directory. If the path references a direct path to a file, the StatResponse returns metadata for the specified file only.

The target node returns an error if:

- The file does not exist.
- An error occurs while accessing the metadata.

#### Stat RPC structure

```
rpc Stat(StatRequest) returns (StatResponse) {}
```

## 7.2.4 Remove RPC

The Remove RPC removes the specified file from the target node.

The target node returns an error if:

- An error occurs during the remove operation (for example, permission denied).
- The file does not exist.
- The path references a directory instead of a file.

### Remove RPC structure

```
rpc Remove(RemoveRequest) returns (RemoveResponse) {}
```

## 7.3 gNOI System service

The gNOI System service defines an interface that allows a client to perform operational tasks on target network nodes. SR Linux supports the following gNOI System RPCs:

- [Ping RPC](#)
- [Traceroute RPC](#)
- [Time RPC](#)
- [SwitchControlProcessor RPC](#)
- [Reboot RPC](#)
- [CancelReboot RPC](#)
- [RebootStatus RPC](#)
- [KillProcess RPC](#)

The protos used to define the gNOI System service were pulled from the following hash: <https://github.com/openconfig/gnoi/commit/93cdd9ae9f35d8b4bc1599d0a727b294faeca352>.

### 7.3.1 Ping RPC

The Ping RPC allows the client to execute the ping command on the target node. The target node streams the results back to the client. Some targets do not stream any results until they receive all results. If the RPC does not specify a packet count, the ping operation uses a default of five packets.



**Note:**

- The Ping RPC does not currently support specification of a network-instance. The ping is executed in the network-instance where the gNMI server is running.
- SR Linux does not support setting the interval field in the PingRequest to -1 (flood ping).

## Ping RPC structure

```
rpc Ping(PingRequest) returns (stream PingResponse) {}
```

### 7.3.2 Traceroute RPC

The Traceroute RPC allows the client to execute the traceroute command on the target node. The target node streams the results back to the client. Some targets do not stream any results until they receive all results. If the RPC does not specify a hop count, the traceroute operation uses a default of 30.

**Note:**

- The Traceroute RPC does not currently support specification of a network-instance. The traceroute is executed in the network-instance where the gNMI server is running.
- In the TracerouteRequest, SR Linux does not support the TCP and UDP enum values for the I4protocol field. Only ICMP is supported.
- In the TracerouteResponse, SR Linux does not support the mpls and as\_path fields.

## Traceroute RPC structure

```
rpc Traceroute(TracerouteRequest) returns (stream TracerouteResponse) {}
```

### 7.3.3 Time RPC

The Time RPC returns the current time on the target node. It is typically used to test whether the target is currently responding.

## Time RPC structure

```
rpc Time(TimeRequest) returns (TimeResponse) {}
```

### 7.3.4 SwitchControlProcessor RPC

The SwitchControlProcessor RPC switches the active control processing module (CPM) on the target node to the control slot (A or B) that is specified in the request message.

## SwitchControlProcessor RPC structure

```
rpc SwitchControlProcessor(SwitchControlProcessorRequest)
  returns (SwitchControlProcessorResponse) {}
```

### 7.3.5 Reboot RPC

The Reboot RPC allows the client to reboot a target node, either immediately or at some time in the future. It triggers the reboot of the entire chassis. It also supports specification of a reboot method (for example,

cold or warm reboot), however, if the target node does not support the specified reboot method, the Reboot RPC fails.



**Note:** SR Linux supports only the cold reboot method, and does not support rebooting of subcomponents.

If a reboot is pending on the active control processor, the service rejects all other reboot requests.

### Reboot RPC structure

```
rpc Reboot(RebootRequest) returns (RebootResponse) {}
```

### 7.3.6 CancelReboot RPC

The CancelReboot RPC allows the client to cancel any pending reboot requests on the target node.



**Note:** SR Linux does not support canceling a reboot for a subcomponent.

### CancelReboot RPC structure

```
message CancelRebootResponse { }
```

### 7.3.7 RebootStatus RPC

The RebootStatus RPC allows the client to query the status of a reboot on the target node.



**Note:** SR Linux does not support querying on a single component at a time.

### RebootStatus RPC structure

```
rpc RebootStatus(RebootStatusRequest) returns (RebootStatusResponse) {}
```

### 7.3.8 KillProcess RPC

The KillProcess RPC allows a client to kill an OS process and optionally restart it on the target node.

To specify the process to kill, the RPC must match the application name referenced in the **tools system app-management application** *<name>* command.

### Mapping of termination signals to SR Linux commands

The KillProcess RPC termination signals map to SR Linux commands as follows:

Table 14: Mapping of termination signals to SR Linux commands

Termination signal	SR Linux command	Command if restart field is true
SIGNAL_TERM	<b>stop</b>	<b>restart</b> (this option runs a warm or cold restart based on what is supported)
SIGNAL_KILL	<b>kill</b>	<b>restart cold</b>
SIGNAL_HUP	<b>reload</b>	—

### KillProcess RPC structure

```
rpc KillProcess(KillProcessRequest) returns (KillProcessResponse) {}
```

## 7.4 gNOI configuration

SR Linux supports gNOI services using the existing gNMI server configuration. To enable gNOI support, enable the gNMI server.

Like gNMI, the session between the gNOI client and SR Linux must be encrypted using TLS.

See the "Management servers" chapter in the *SR Linux Configuration Basics Guide* for information about how to configure the gNMI server.

## 8 JSON interface

The SR Linux provides a JSON-based Remote Procedure Call (RPC) for both CLI commands and configuration. The JSON API allows the operator to retrieve and set the configuration and state, and provide a response in JSON format. This JSON-RPC API models the CLI implemented on the system.

If output from a command cannot be displayed in JSON, the text output is wrapped in JSON to allow the application calling the API to retrieve the output. During configuration, if a TCP port is in use when the JSON-RPC server attempts to bind to it, the commit fails. The JSON-RPC supports both normal paths, as well as XPATHs.

### 8.1 JSON message structure

The JSON RPC requires a specific message structure. The jsonrpc version, ID, method, and params are required in all requests. For example:

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "get",
  "params": {
  }
}
```

Within these required elements can be additional mandatory and conditional elements, as described in the following table.

Table 15: Required JSON request structure

Required request elements	Description
jsonrpc	Version, which must be "2.0". No other JSON RPC versions are currently supported.
id	Client-provided integer. The JSON RPC responds with the same ID, which allows the client to match requests to responses when there are concurrent requests.
method	Defines the method accessed with the JSON RPC. Supported options are get, set, and cli.
params	Defines a container for any parameters related to the request. The type of parameter is dependent on the method used.

#### Related topics

[method options](#)



*params options***8.1.1 method options**

The following table defines supported JSON RPC method options.

Table 16: JSON RPC method options

Method option	Description
get	Used to retrieve configuration and state details from the system. The get method can be used with candidate, running, and state datastores, but cannot be used with the tools datastore.
set	Used to set a configuration or run operational transaction. The set method can be used with the candidate and tools datastores.
validate	Used to verify that the system accepts a configuration transaction before applying it to the system.
cli	Used to run CLI commands. The get and set methods are restricted to accessing data structures via the YANG models, but the cli method can access any commands added to the system via python plug-ins or aliases.

**8.1.2 params options**

The following table defines valid JSON RPC params options.

Table 17: JSON RPC params options

params option	Descriptions
<p><b>commands</b> - Mandatory. List of commands used to execute against the called method. Multiple commands can be executed with a single request. Supported commands are:</p> <ul style="list-style-type: none"> <li>• <b>action</b></li> <li>• <b>path</b></li> <li>• <b>path-keywords</b></li> <li>• <b>datastore</b></li> <li>• <b>recursive</b></li> </ul>	<p><b>action</b> command - Conditional mandatory; used with the set and validate methods. Supported options are:</p> <ul style="list-style-type: none"> <li>• <b>replace</b> — Replaces the entire configuration within a specific context with the supplied configuration; equivalent to a delete/update.</li> <li>• <b>update</b> — Updates a leaf or container with the specified value.</li> <li>• <b>delete</b> — Deletes a leaf or container. All children beneath the parent are removed from the system.</li> </ul> <p>Note: When the action command is used with the tools datastore, update is the only supported option.</p>

params option	Descriptions
<ul style="list-style-type: none"> <li><b>include-field-defaults</b></li> </ul>	<p><b>path</b> command - Mandatory with the get, set and validate methods. This value is a string that follows the gNMI path specification<sup>1</sup> in human-readable format:</p> <ul style="list-style-type: none"> <li>"/" separates nodes</li> <li>keys are specified using [&lt;key-name&gt;=&lt;key-value&gt;]</li> <li>if key-value contains "]" , it must be escaped ("\]" before the "]"</li> <li>fields end with "." or ",value&gt;"</li> </ul> <p>Example: /interface[name=mgmt0]</p>
	<p><b>path-keywords</b> command - Optional; used to substitute named parameters with the path field. More than one keyword can be used with each path.</p>
	<p><b>datastore</b> command - Optional; selects the datastore to perform the method against. Supported options are:</p> <ul style="list-style-type: none"> <li><b>candidate</b> — Used to change the configuration of the system with the get, set, and validate methods; default datastore is used if the datastore parameter is not provided.</li> <li><b>running</b> — Used to retrieve the active configuration with the get method.</li> <li><b>state</b> — Used to retrieve the running (active) configuration along with the operational state.</li> <li><b>tools</b> — Used to perform operational tasks on the system; only supported with the update action command and the set method.</li> </ul>
	<p><b>recursive</b> command - Optional; a Boolean used to retrieve children underneath the specific path. The default = true.</p>
	<p><b>include-field-defaults</b> command - Optional; a Boolean used to show all fields, regardless if they have a directory configured or are operating at their default setting. The default = false.</p>
<p><b>output-format</b> - Optional. Defines the output format as:</p> <ul style="list-style-type: none"> <li>json</li> <li>text</li> <li>table</li> </ul>	<p>Output defaults to JSON if not specified.</p>

## 8.2 JSON responses

The JSON RPC returns one entry for each command that was executed. For methods that contain non-response (other than acknowledging the command), a response is returned, but with an empty list.

<sup>1</sup> gNMI path specification reference: <https://github.com/openconfig/reference/blob/master/rpc/gnmi/gnmi-path-conventions.md>

When the cli method is used, each executed command returns an individual response.

## 8.3 Candidate mode

JSON uses its own private candidate that allows multiple users or services to make simultaneous changes to a configuration.

## 8.4 Logical expressions

For logical expressions, support is provided for the asterisk ("\*") which can be used to reference all keys within a list.

## 8.5 JSON examples

The following provides JSON examples (both requests and responses) for these method options:

- [JSON get examples](#)
- [JSON set examples](#)
- [JSON delete example](#)
- [JSON validate example](#)
- [JSON CLI example](#)

### 8.5.1 JSON get examples

The get method allows you to retrieve configuration and state details from the system. The following examples are shown:

- get method using the path, datastore, and recursive commands with the recursive option set to true (to retrieve children underneath the specific path)
- multiple get request where multiple commands are executed with a single request

#### Example: Single get with recursive request

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "get",
  "params": {
    "commands": [
      {
        "path": "/interface[name=mgmt0]",
        "datastore": "state",
        "recursive": true
      }
    ]
  }
}
```

## Response (single get with recursive)

```

{
  "result": [
    {
      "name": "mgmt0",
      "admin-state": "enable",
      "mtu": 1514,
      "ifindex": 524304383,
      "oper-state": "up",
      "last-change": "2019-07-12T16:53:39.291Z",
      "statistics": {
        "in-octets": "4545395",
        "in-unicast-pkts": "1178",
        "in-broadcast-pkts": "130",
        "in-multicast-pkts": "27560",
        "in-discards": "0",
        "in-errors": "0",
        "in-unknown-protos": "0",
        "in-fcs-errors": "0",
        "out-octets": "1735990",
        "out-unicast-pkts": "1125",
        "out-broadcast-pkts": "38",
        "out-multicast-pkts": "9187",
        "out-discards": "0",
        "out-errors": "0",
        "carrier-transitions": "1"
      },
      "ethernet": {
        "hw-mac-address": "02:42:AC:12:00:05",
        "statistics": {
          "in-mac-control-frames": "0",
          "in-mac-pause-frames": "0",
          "in-oversize-frames": "0",
          "in-jabber-frames": "0",
          "in-fragment-frames": "0",
          "in-crc-errors": "0",
          "out-mac-control-frames": "0",
          "out-mac-pause-frames": "0"
        }
      },
      "subinterface": [
        {
          "index": 0,
          "admin-state": "enable",
          "ip-mtu": 1500,
          "ifindex": 524288000,
          "oper-state": "up",
          "last-change": "2019-07-12T16:53:39.291Z",
          "ipv4": {
            "allow-directed-broadcast": false,
            "dhcp-client": true,
            "address": [
              {
                "ip-prefix": "172.18.0.5/24",
                "origin": "dhcp"
              }
            ]
          },
          "srl_nokia-interfaces-nbr:arp": {
            "timeout": 14400,
            "neighbor": [
              {
                "ipv4-address": "172.18.0.1",
                "link-layer-address": "02:42:90:06:D7:26",

```

```

        "origin": "dynamic",
        "expiration-time": "2019-07-15T21:37:28.987Z"
    },
    {
        "ipv4-address": "172.18.0.2",
        "link-layer-address": "02:42:AC:12:00:02",
        "origin": "dynamic",
        "expiration-time": "2019-07-16T00:44:17.673Z"
    },
    {
        "ipv4-address": "172.18.0.3",
        "link-layer-address": "02:42:AC:12:00:03",
        "origin": "dynamic",
        "expiration-time": "2019-07-16T01:20:48.600Z"
    },
    {
        "ipv4-address": "172.18.0.4",
        "link-layer-address": "02:42:AC:12:00:04",
        "origin": "dynamic",
        "expiration-time": "2019-07-16T01:20:48.597Z"
    },
    {
        "ipv4-address": "172.18.0.6",
        "link-layer-address": "02:42:AC:12:00:06",
        "origin": "dynamic",
        "expiration-time": "2019-07-16T01:20:48.599Z"
    }
    ]
}
},
"ipv6": {
    "dhcp-client": true,
    "address": [
        {
            "ip-prefix": "2001:172:18::5/80",
            "origin": "dhcp",
            "status": "preferred"
        },
        {
            "ip-prefix": "fe80::42:acff:fe12:5/64",
            "origin": "link-layer",
            "status": "preferred"
        }
    ],
    "srl_nokia-interfaces-nbr:neighbor-discovery": {
        "dup-addr-detect": true,
        "reachable-time": 30,
        "stale-time": 14400
    }
}
}
]
}
},
"jsonrpc": "2.0",
"id": 0,
}

```

### Example: Multiple get request

```

{
    "jsonrpc": "2.0",
    "id": 0,
}

```

```

"method": "get",
"params": {
  "commands": [
    {
      "path": "/interface[name=mgmt0]",
      "datastore": "state",
      "recursive": false
    },
    {
      "path": "/interface[name=ethernet-1/10]",
      "datastore": "state",
      "recursive": false
    }
  ]
}

```

Response (multiple get)

```

{
  "result": [
    {
      "name": "mgmt0",
      "admin-state": "enable",
      "mtu": 1514,
      "ifindex": 524304383,
      "oper-state": "up",
      "last-change": "2019-07-12T16:53:39.291Z"
    },
    {
      "name": "ethernet-1/10",
      "description": "dut2-dut4-2",
      "admin-state": "enable",
      "mtu": 9232,
      "ifindex": 180223,
      "oper-state": "up",
      "last-change": "2019-07-12T16:54:15.602Z"
    }
  ],
  "id": 0,
  "jsonrpc": "2.0"
}

```

## 8.5.2 JSON set examples

The set method allows you to set a configuration or run operational commands. The following examples are shown:

- multiple set method using update and replace
- set method using **path-keywords**
- set method using an alternative update

### Example: Multiple set with update and replace request

```

{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "set",
  "params": {

```

```

    "commands": [
      {
        "action": "update",
        "path": "/interface[name=mgmt0]/description:my-description"
      },
      {
        "action": "replace",
        "path": "/interface[name=mgmt0]/subinterface[index=0]/description:my-
subdescription"
      }
    ]
  }
}

```

Response (multiple set)

```

{
  "result": {},
  "id": 0,
  "jsonrpc": "2.0"
}

```

### Example: set using path keywords request

```

{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "set",
  "params": {
    "commands": [
      {
        "action": "update",
        "path": "/interface[name={name}]/description:my-description",
        "path-keywords": {
          "name": "mgmt0"
        }
      },
      {
        "action": "replace",
        "path": "/interface[name={name}]/subinterface[index={index}]/description:my-
subdescription",
        "path-keywords": {
          "name": "mgmt0",
          "index": "0"
        }
      }
    ]
  }
}

```

Response (set using path-keywords)

```

{
  "result": {},
  "id": 0,
  "jsonrpc": "2.0"
}

```

### Example: set using alternative update (specifying a value) request

```

{

```

```

"jsonrpc": "2.0",
"id": 0,
"method": "set",
"params": {
  "commands": [
    {
      "action": "update",
      "path": "/interface[name=mgmt0]",
      "value": {
        "description": "my-description",
        "subinterface": {
          "index": "0",
          "description": "my-subdescription"
        }
      }
    }
  ]
}
}

```

Response (set using alternative update)

```

{
  "result": {},
  "id": 0,
  "jsonrpc": "2.0"
}

```

### 8.5.3 JSON delete example

The set method allows you to use an action delete command to delete nodes or leafs within a configuration.

The following example shows a multiple set delete request to delete the specified paths.

#### Example: Multiple set method delete request

```

{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "set",
  "params": {
    "commands": [
      {
        "action": "delete",
        "path": "/interface[name=mgmt0]/description"
      },
      {
        "action": "delete",
        "path": "/interface[name=mgmt0]/subinterface[index=0]/description"
      }
    ]
  }
}

```

Response (multiple set delete)

```

{
  "result": {},

```



```

    "id": 0,
    "jsonrpc": "2.0"
  }

```

### 8.5.4 JSON validate example

The validate method allows you to verify that the system will accept a configuration transaction before applying it to the system. The 'delete', 'replace', and 'update' actions can be used with the validate method. The following examples are shown:

- validate request to delete a specified path.
- validate request to update and replace a specified path.

#### Example: validate a delete request

```

{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "validate",
  "params": {
    "commands": [
      {
        "action": "delete",
        "path": "/interface[name=mgmt0]/description"
      }
    ],
    "datastore": "candidate"
  }
}

```

Response (validate delete)

```

{
  "result": {},
  "id": 0,
  "jsonrpc": "2.0"
}

```

#### Example: validate an update and replace request

```

{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "validate",
  "params": {
    "commands": [
      {
        "action": "update",
        "path": "/interface[name=mgmt0]/description:my-description"
      },
      {
        "action": "replace",
        "path": "/interface[name=mgmt0]/subinterface[index=0]
/description:my-subdescription"
      }
    ]
  }
}

```

Response (validate update and delete)

```
{
  "result": {},
  "id": 0,
  "jsonrpc": "2.0"
}
```

### 8.5.5 JSON CLI example

The cli method allows you to run CLI commands. While get and set methods are restricted to accessing data structures in the YANG models, the cli method can access commands that have been added to the system using python plug-ins.

The following examples are shown:

- JSON cli command request.
- JSON cli command requesting the output format as text.

You can optionally define these output formats: json, text, or table. JSON is the default.

#### Example: CLI method input request

```
{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cli",
  "params": {
    "commands": [
      "enter candidate",
      "info interface mgmt0"
    ]
  }
}
```

Response (CLI input)

```
{
  "result": [
    {},
    {
      "interface": [
        {
          "name": "mgmt0",
          "description": "my-description",
          "admin-state": "enable",
          "subinterface": [
            {
              "index": 0,
              "description": "my-subdescription",
              "admin-state": "enable",
              "ipv4": {
                "dhcp-client": true
              },
              "ipv6": {
                "dhcp-client": true
              }
            }
          ]
        }
      ]
    }
  ]
}
```

```

    }
  ]
}
],
"id": 0,
"jsonrpc": "2.0"
}

```

### Example: CLI method input request with output formatting

```

{
  "jsonrpc": "2.0",
  "id": 0,
  "method": "cli",
  "params": {
    "commands": [
      "enter candidate",
      "info interface mgmt0"
    ],
    "output-format": "text"
  }
}

```

### Response (CLI with output formatting)

```

{
  "result": [
    "",
    "    interface mgmt0 {\n      description my-description\n      admin-state enable\n      subinterface 0 {\n      description my-subdescription\n      admin-state enable\n      ipv4 {\n      dhcp-client true\n      }\n      ipv6 {\n      dhcp-client true\n      }\n      }\n    }\n  ],
  "id": 0,
  "jsonrpc": "2.0"
}

```

## 9 Configuring SNMP

### About this task

SR Linux supports SNMPv2, which allows SNMP clients to read information about the system for device monitoring. The MIB file that covers the supported OIDs is packaged with each release.

### Procedure

To configure the SNMP server, use the **system snmp** command.

### Example: SNMP server configuration

In the following example, an SNMP server is running within the mgmt and default network-instances, and the configuration specifies the IP addresses where the device listens for SNMP client connections:

```
--{ candidate shared default }--[ ]--
# info system snmp
  system {
    snmp {
      community test1
      network-instance mgmt {
        admin-state enable
        source-address [
          1.1.1.1
        ]
      }
      network-instance default {
        admin-state enable
        source-address [
          3.3.3.3
        ]
      }
    }
  }
}
```

## 10 General and operational commands

The following table defines general and operational commands that can be entered at any point in the CLI.

Table 18: General and operational commands

Command	Description
<b>Tab</b>	Auto-completes a command
<b>/</b>	Moves to the root; can also be used to reset the context to the root for a specific command (for example: <b>info from state /</b> )
<b>?</b>	Displays context-based help
<b>back</b>	Returns to the context before executing the last command
<b>baseline</b> <argument>	Arguments: <ul style="list-style-type: none"> <li>• <b>check</b> - check baseline update for current candidates</li> <li>• <b>diff</b> - show baseline configuration changes</li> <li>• <b>update</b> - update baseline for current candidate</li> </ul>
<b>bash</b>	Opens a bash session
<b>bash</b> <command>	Executes a command without entering a bash session
<b>cls</b>	Clears the screen
<b>diff</b> [flat]	Compares the current candidate against the running configuration. Specifying <b>flat</b> provides a copy/paste format showing inserts and deletes. Global arguments include: <ul style="list-style-type: none"> <li>• <b>baseline</b> - configuration candidate baseline</li> <li>• <b>candidate</b> - configuration candidate</li> <li>• <b>checkpoint</b> - configuration checkpoint</li> <li>• <b>factory</b> - factory configuration</li> <li>• <b>file</b> - file with configuration stored in .json format</li> <li>• <b>from</b> - source datastore to compare with</li> <li>• <b>rescue</b> - rescue configuration</li> <li>• <b>running</b> - running datastore</li> <li>• <b>startup</b> - startup configuration</li> </ul> <p>If arguments are not used, this command must be used in candidate mode.</p>
<b>echo</b>	Echoes text back to a session

Command	Description
<b>enter</b>	Switches to a different mode
<b>enter candidate</b>	Enters the shared candidate mode. Shared candidate mode is the default.
<b>enter candidate exclusive</b>	Enters the exclusive candidate mode To switch between shared and exclusive, you must switch to a different datastore (for example. running).
<b>enter candidate exclusive name</b> <name>	Enters the exclusive mode for a named candidate
<b>enter candidate name</b> <name>	Enters the shared candidate mode for a named shared candidate
<b>enter candidate private</b>	Enters the candidate private mode
<b>enter candidate private name</b> <name>	Enters the candidate private mode for a named candidate
<b>enter running</b>	Enters the running mode (default)
<b>enter show</b>	Enters the show mode (used with show CLI plug-ins)
<b>enter state</b>	Enters the state mode (all configuration and operational states)
<b>environment</b>	Configures and displays environment variables
<b>environment alias</b>	Creates or overwrites an alias
<b>environment bottom-toolbar</b>	Changes the text displayed in the bottom toolbar
<b>environment cli-engine type</b>	Sets cli engine type for interactive logins: <ul style="list-style-type: none"> <li>• basic</li> <li>• advanced</li> </ul>
<b>environment complete-on-space</b>	Triggers auto-completion when a space is typed (default is to explicitly require a <TAB>)
<b>environment delete</b>	Resets and removes environment settings
<b>environment key-completer-limit</b> <limit>	Number of keys limited in auto-completion
<b>environment load</b>	Loads the environment settings from a file: <ul style="list-style-type: none"> <li>• file (path of the configuration file)</li> <li>• home (use ~/.srlinuxrc configuration file)</li> </ul>


Command	Description
<b>environment output-format</b>	Allows the default output format to change between text and JSON
<b>environment prompt</b>	Changes the prompt displayed before every input line
<b>environment save</b>	Saves the current environment
<b>environment save home</b>	Saves the current environment to the user home directory
<b>environment save file</b> <file>	Saves the current environment to a specific file
<b>environment show</b>	Shows the currently active environment settings
<b>exit</b>	Exits to a previous context
<b>exit to</b> <ancestor>	Exits to a specific ancestor of the current context
<b>exit all</b>	Exits to the root
<b>filter</b>	Filters output for show and info commands. Usage: <b>filter</b> [<node>] [depth <value>] [fields <value>] [keys-only] [non-zero] <ul style="list-style-type: none"> <li>• <b>node</b> - Positional node to filter on</li> <li>• <b>depth</b> - Filter out sub-nodes that are more than <i>n</i> levels deeper</li> <li>• <b>fields</b> - Fields to include</li> <li>• <b>keys-only</b> - Hide all fields</li> <li>• <b>non-zero</b> - Show only non-zero values (numeric values only)</li> </ul>
<b>help</b>	Displays mode-related help
<b>history</b>	Displays the command history list with line numbers
<b>history hot</b>	Displays the top 5 most frequently used commands
<b>history clear</b>	Clears the history
<b>info</b> [path]	Shows the value of all nodes and fields under the current context; optionally made more specific by a path
<b>info depth</b> <n>	Filters out sub-nodes that are deeper than the specified depth
<b>info detail</b>	Shows also default values for unset fields
<b>info flat</b>	Shows each node or field as a single line
<b>info use-proto-json</b>	Shows the output as the JSON used for the protobuf messages

Command	Description
<b>info from</b> <mode>	Executes the info command from within the specified mode (either candidate, running, or state). The current context can be retrieved without a from argument.
<b>list</b>	Show the keys of all nodes under the current context
<b>monitor</b> [path]	Monitors state changes within the current context; optionally made more specific by a path
<b>monitor recursive</b> [path]	Includes children when monitoring
<b>monitor sample</b>	Uses sampling instead of on-change monitoring (interval in seconds)
<b>ping</b>	<p>Sends IPv4 ICMPv4 echo requests to network hosts.</p> <p>Usage: <b>ping6</b> &lt;destination&gt; [-I &lt;value&gt;] [-M &lt;value&gt;] [-Q &lt;value&gt;] [-c &lt;value&gt;] [-i &lt;value&gt;] [-s &lt;value&gt;] [-t &lt;value&gt;] [network-instance &lt;value&gt;]</p> <ul style="list-style-type: none"> <li>• -I - Source interface/IP</li> <li>• -M - Path MTU discovery strategy</li> <li>• -M- pmtudisc_options - sets df-bit set</li> <li>• -Q - tos</li> <li>• -c - Number of ping requests</li> <li>• -i - Wait interval in seconds between each packet</li> <li>• -s - Packet size</li> <li>• -t - TTL (Time-To-Live)</li> </ul>
<b>ping6</b>	<p>Sends IPv6 ICMPv6 echo requests to network hosts.</p> <p>Usage: <b>ping6</b> &lt;destination&gt; [-I &lt;value&gt;] [-M &lt;value&gt;] [-Q &lt;value&gt;] [-c &lt;value&gt;] [-i &lt;value&gt;] [-s &lt;value&gt;] [-t &lt;value&gt;] [network-instance &lt;value&gt;]</p> <ul style="list-style-type: none"> <li>• -I - Source interface/IP</li> <li>• -M - Path MTU discovery strategy</li> <li>• -M- pmtudisc_options - sets df-bit set</li> <li>• -Q - tos</li> <li>• -c - Number of ping requests</li> <li>• -i - Wait interval seconds between each packet</li> <li>• -s - Packet size</li> <li>• -t - TTL (Time-To-Live)</li> </ul>
<b>pwc</b>	Prints the current working context
<b>quit</b>	Closes the CLI session



Command	Description
<b>save</b>	Saves the current datastore to the specified file in JSON format. Usage: <b>save</b> [ <b>detail</b> ] <b>file</b> <value> [ <b>from</b> <running state>] [ <b>text</b> ] <ul style="list-style-type: none"> <li>• <b>detail</b> - Additionally saves the default values for unset fields</li> <li>• <b>file</b> - Output filename</li> <li>• <b>from</b> - Datastore used to retrieve data from</li> <li>• <b>text</b> - Use CLI (text) format instead of JSON</li> </ul>
<b>show</b>	Displays plug-in style show commands; see <a href="#">Pre-defined show reports</a> .
<b>source</b> <file>	Executes a set of commands from a file
<b>tech-support</b>	Generates a technical support file. Usage: <b>tech-support</b> [ <b>ignore-host-keys</b> <value>] [ <b>max-time</b> <value>] [ <b>network-instance</b> <value>] [ <b>no-core</b> ] [ <b>scp-to</b> <value>] <ul style="list-style-type: none"> <li>• <b>ignore-host-keys</b> - Skip security verification of remote SSH server key</li> <li>• <b>max-time</b> - Maximum time</li> <li>• <b>network-instance</b> - Network-instance for scp command</li> <li>• <b>no-core</b> - Skip inclusion of core files</li> <li>• <b>scp-to</b> - scp location, for example, user@server-ip:/tmp/</li> </ul>
<b>tools</b>	Executes a tool command
<b>traceroute</b>	Prints the route packets trace to network host Usage: <b>traceroute</b> <destination>
<b>traceroute6</b>	Prints the route IPv6 packets trace to network host Usage: <b>traceroute6</b> <destination>
<b>tcptraceroute</b>	tcptraceroute compatible wrapper for traceroute Usage: <b>tcptraceroute</b> <destination>
<b>tree</b> [ <i>path</i> ]	Shows the tree structure in the current context; optionally made more specific with a path
<b>tree flat</b>	Shows each structure on a single line
<b>tree from</b> [ <i>mode</i> ]	Retrieves the tree from the current context in another mode
<b>watch</b>	Execute a program periodically

Command	Description
<b>Within candidate mode only, the following apply</b>	
<b>!!</b>	Appends a line to the annotation of the current node
<b>!!!</b>	Replaces the annotation of the current node
<b>commit now</b>	Applies the changes, exits candidate mode, and enters running mode
<b>commit stay</b>	Applies the changes and then remains in candidate mode. Permitted additional arguments: <b>commit stay</b> [save] [comment] [confirmed]
<b>commit save</b>	Applies the changes and then remains in candidate mode. Permitted additional arguments: <b>commit</b> [stay] [checkpoint] save [confirmed] [comment]
<b>commit checkpoint</b>	Causes an automatic checkpoint after the commit succeeds. Permitted additional arguments: <b>commit</b> [stay] [now] checkpoint [save] [confirmed]
<b>commit validate</b>	Verifies that a propose configuration change passes a management server validation
<b>commit comment</b> <comment>	Used with other arguments (except <b>validate</b> ) to add a user comment where comment is a quoted string, 1-255 characters. Permitted additional arguments: <b>commit</b> [stay] [save] [checkpoint] [confirmed] comment
<b>commit confirmed</b> <b>commit confirmed</b> [timeout <1-86400>] <b>commit confirmed</b> [accept reject]	Applies the changes, but requires an explicit confirmation to become permanent.  The timeout period default is 600 seconds (10 mins.), or can be provisioned with a value of 1-86400 sec.). The timeout argument cannot be used with the accept or reject parameter.  Before the timer expires, the accept argument explicitly confirms and applies the changes. With no timer running, the reject argument explicitly rejects the changes.
<b>annotate</b>	Sets the annotation of the current node
<b>discard</b> [now stay]	Discards all uncommitted changes; requires either a <b>now</b> or <b>stay</b> option (to stop unintended commit). When <b>stay</b> is used, the mode remains in candidate mode (opening a new transaction).
<b>insert</b>	Inserts the provided value into the specified user-ordered list. Usage: <b>insert</b> <path-to-list> <value> <first before after last>< value>

Command	Description
	<p>The provided value can be a single entry or a list. Use square brackets when specifying a list. In these examples, the provided values get added to an example community-set list named <i>sample</i>.</p> <pre data-bbox="589 432 1321 485">insert community-set sample member [ 1:1 1:2 ]</pre> <pre data-bbox="589 506 1321 558">insert community-set sample member 1:1</pre> <ul style="list-style-type: none"> <li>• <b>first</b> - Insert a value at the beginning of the user-ordered list</li> <li>• <b>before</b> - Insert a value in the user-ordered list before another specified value</li> <li>• <b>after</b> - Insert a value in the user-ordered list after another specified value</li> <li>• <b>last</b> - Insert a value at the end of the user-ordered list</li> </ul> <p>The optional <b>after</b> or <b>before</b> parameters, or the <b>first</b> and the <b>last</b> parameters, are mutually exclusive to place the value or values at an exact location in the list.</p> <p> <b>Note:</b> These parameters cannot be used for a system-ordered list.</p>

## 11 Pre-defined show reports

The SR Linux CLI is a python application that can load dynamic libraries from other applications. This flexibility allows users to create their own show commands, and also allows each application to own its own show command tree. In addition to custom show commands, Nokia provides pre-defined plug-ins.

The following sections provide the commands and syntax for pre-defined python plug-ins.

Users can also create their own customer reports using CLI Plug-ins. For more information, see the *SR Linux CLI Plug-In Guide*.

### 11.1 ACL show reports

```
show
  - acl
    - capture-filter <filter name>
      - ipv4-filter <filter name>
        - entry <value>
      - ipv6-filter <filter name>
        - entry <value>
    - cpm-filter <filter name>
      - ipv4-filter <filter name>
        - entry <value>
      - ipv6-filter <filter name>
        - entry <entry number>
    - ipv4-filter <filter name>
      - entry <value>
      - subinterface <subinterface value>
    - ipv6-filter <filter name>
      - entry <value>
      - subinterface <subinterface value>
    - mac-filter <filter name>
      - entry <value>
      - subinterface <subinterface value>
    - summary
```

#### 11.1.1 ACL descriptions

Context	Description
<b>show acl</b>	Container for ACL show reports.
<b>show acl capture-filter <i>filter type</i></b>	Show a list of ACL capture filters. Specify either ipv4-filter or ipv6-filter.
<b>show acl capture-filter ipv4-filter</b>	Show a list of ACL capture IPv4 filters.
<b>show acl capture-filter ipv4-filter entry <i>number</i></b>	Show a specific ACL capture IPv4 filter.
<b>show acl capture-filter ipv6-filter</b>	Show a list of ACL capture IPv6 filters.

Context	Description
<b>show acl capture-filter ipv6-filter entry</b> <i>number</i>	Show a specific ACL capture IPv6 filter.
<b>show acl cpm-filter</b> <i>filter type</i>	Show a list of ACL CPM filters. Specify either ipv4-filter or ipv6-filter.
<b>show acl cpm-filter ipv4-filter</b>	Show a list of ACL CPM IPv4 filters.
<b>show acl cpm-filter ipv4-filter entry</b> <i>number</i>	Show a specific ACL CPM IPv4 filter.
<b>show acl cpm-filter ipv6-filter</b>	Show a list of ACL CPM IPv6 filters.
<b>show acl cpm-filter ipv6-filter entry</b> <i>number</i>	Show a specific ACL CPM IPv6 filter.
<b>show acl ipv4-filter</b> <i>name</i>	Show ACL IPv4 filter policies.
<b>show acl ipv4-filter</b> <i>name entry number</i>	Show ACL IPv4 filter policies by entry ID.
<b>show acl ipv4-filter</b> <i>name subinterface</i> <i>string</i>	Show ACL IPv4 filter policies by subinterface.
<b>show acl ipv6-filter</b> <i>name</i>	Show ACL IPv6 filter policies.
<b>show acl ipv6-filter</b> <i>name entry number</i>	Show ACL IPv6 filter policies by entry ID.
<b>show acl ipv6-filter</b> <i>name subinterface</i> <i>string</i>	Show ACL IPv6 filter policies by subinterface.
<b>show acl mac-filter</b> <i>name</i>	Show ACL MAC filter policies.
<b>show acl mac-filter</b> <i>name entry number</i>	Show ACL MAC filter policies by entry ID.
<b>show acl mac-filter</b> <i>name subinterface</i> <i>string</i>	Show ACL MAC filter policies by subinterface.
<b>show acl summary</b>	Show a summarized list of all ACL filters.

## 11.2 ARPND show reports

```
show
- arpnd
  - neighbors
    - interface <interface name>
  - arp-entries
    - interface <interface name>
```

### 11.2.1 ARPND descriptions

Context	Description
<b>show arpnd</b>	Container for ARPND show reports.

Context	Description
<b>show arpd neighbors</b>	Show all ARPND neighbors including associated interfaces, subinterfaces, origin, and state.
<b>show arpd neighbors interface</b> <i>interface name</i>	Show ARPND neighbor for a specified interface name.
<b>show arpd arp-entries</b>	Show all ARPND entries including associated interfaces, subinterfaces, origin, and expiry.
<b>show arpd arp-entries interface</b> <i>interface name</i>	Show ARPND entries for a specified interface name.

## 11.3 Interface show reports

```
show
  - show interface <interface port name>
    - brief
    - all
    - detail
    - queue-detail
```

### 11.3.1 Interface descriptions

Context	Description
<b>show interface</b> <i>interface port name</i>	Container for Interface show reports. Can be used to show a report of all interfaces and subinterfaces with an operational state of up, or for a specified interface if an optional name is entered. Interfaces that are operationally down are not displayed; use the <b>all</b> option to display both up and down interfaces.
<b>show interface</b> <i>interface port name</i> <b>brief</b>	Show a report that provides a summarized view of all interfaces and subinterfaces, or for a specified interface if an optional name is entered. Displays the administrative state, operational state, speed, and type.
<b>show interface</b> <i>interface port name</i> <b>all</b>	Show a report that displays all up and down interfaces and subinterfaces, or for a specified interface if an optional name is entered. For interfaces with an operational state of up, IP addresses are displayed in addition to speed and type. For interfaces with an operational state of down, a reason for this state is provided.
<b>show interface</b> <i>interface port name</i> <b>detail</b>	Show a detail report for all up and down interfaces and subinterfaces, or for a specified interface if an optional name is entered. In addition to operational state, last changed, flow control and MAC address details, this report includes queue parameters, statistics, and transceiver/transceiver channel details.

Context	Description
<b>show interface</b> <i>interface port name</i> <b>queue-detail</b>	Show an egress queues and VOQs report for all interfaces and subinterfaces, or for a specified interface if an optional name is entered.

## 11.4 LAG show reports

```
show
- show lag <lag instance>
  - brief
  - detail
  - lacp-state
  - lacp-statistics
  - member-statistics
  - queue-detail
```

### 11.4.1 LAG descriptions

Context	Description
<b>show lag</b> <i>lag instance</i>	Container for lag show reports. Can be used to show a report of all LAGs, or for a specified LAG instance if an optional ID is entered. This includes a summary report of all operationally up and down LAGs.
<b>show lag</b> <i>lag instance</i> <b>brief</b>	Show a report that provides a summarized view of all LAGs, or for a specified LAG if an optional ID is entered. Displays the administrative state, operational state, aggregate speed, and min and active links.
<b>show lag</b> <i>lag instance</i> <b>detail</b>	Show a detail report for all LAGs, or for a specified LAG if an optional ID is entered. This report includes the operational status of the LAG, list of member links and their operational status, aggregated queue statistics, aggregated traffic/error statistics, and aggregated traffic rate.
<b>show lag</b> <i>lag instance</i> <b>lacp-state</b>	Show a LAG report that details all LAGs or a specific LAG it is enabled. Report also includes the LACP configuration mode and per member link statistics state details (operation state, activity, timeout, and so on.).
<b>show lag</b> <i>lag instance</i> <b>lacp-statistics</b>	Show a LAG report that details all LAGs or specific LAGs statistics. Report can include per member link statistics such as LACP in-pkts, out-pkts, rx-errors, tx-errors, unknown errors, and LACP errors.
<b>show lag</b> <i>lag instance</i> <b>member-statistics</b>	Show a LAG report that displays all member-statistics.
<b>show lag</b> <i>lag instance</i> <b>queue-detail</b>	Show a LAG report that displays aggregated queue statistics for all LAG link members.

## 11.5 MPLS show reports

```
show
  - mpls-aft
    - network-instance <instance name>
```

### 11.5.1 MPLS descriptions

Context	Description
<b>show mpls-aft</b>	Container for MPLS reports. Can be used to show all MPLS abstract forwarding tables.
<b>show mpls-aft network-instance</b> <i>network-instance name</i>	Show an MPLS abstract forwarding table for a specified network instance.

## 11.6 Network-instance show reports

```
show
  - network-instance <name>
    - bridge-table
      - mac-duplication duplication-entries
      - mac-table
        - all
        - mac <address>
        - summary
      - proxy-arp
        - all
        - ip-duplication duplicate-entries
        - neighbor <address>
        - summary
      - proxy-nd
        - all
        - ip-duplication duplicate-entries
        - neighbor <address>
        - summary
    - interfaces <interface name>
    - protocols
      - bgp
        - neighbor [<IP-address>]
          - advertised-routes
            - evpn
            - ipv4
            - ipv6
          - detail
          - maintenance
          - received-routes
            - evpn
            - ipv4
            - ipv6
        - routes [<IP family>]
          - evpn
            - route-type <route type>
            - detail
```



```

    - summary
  - ipv4
    - prefix <IP prefix>
    - summary
  - ipv6
    - prefix <IP prefix>
    - summary
  - summary
- bgp-evpn
  - bgp-instance
- bgp-vpn
  - bgp-instance

- isis
  - adjacency <interface_name>
    - neighbor-system-id <ID>
      - adjacency-level <value>
      - detail
  - database
    - lsp-id <ID>
    - detail
  - interface <name>
    - detail
  - hostnames
    - detail
  - summary
- ldp
  - interface
  - ipv4
    - address
      - advertised
      - all
      - received
    - fec
      - advertised
      - all
      - received
    - nexthop
  - neighbor
  - session
    - detail
    - statistics
  - statistics
  - summary

- ospf
  - area
    - detail
  - database
    - type
  - instance <name>
  - interface
    - detail
  - neighbor
    - detail
  - statistics
  - status

- route-table
  - all
  - summary
- ipv4-unicast
  - prefix
  - summary

```

```

- ipv6-unicast
  - prefix
  - summary
- mpls
  - next-hop <index>
- static-mpls
- summary
- tunnel-table
  - all
  - ipv4 ip address type
  - ipv6 ip address type
- vxlan-interface <name>

```

## 11.6.1 Network-instance descriptions

Context	Description
<b>show network-instance</b> <i>name</i>	Show network-instance for specified name or additional command (bridge-table, interfaces, protocols, route-table, or summary)
<b>show network-instance</b> <i>name</i> <b>bridge-table</b>	Show MAC bridge tables. Specify mac-duplication duplication-entries or mac-table.
<b>show network-instance</b> <i>name</i> <b>bridge-table mac-duplication duplication-entries</b>	Show all MAC learned entries.
<b>show network-instance</b> <i>name</i> <b>bridge-table mac-table</b>	Show a MAC table report. Specify option of all, mac, or summary.
<b>show network-instance</b> <i>name</i> <b>bridge-table mac-table all</b>	Show all MAC table entries
<b>show network-instance</b> <i>name</i> <b>bridge-table mac-table mac</b> <i>address</i>	Show MAC table entry for specific address.
<b>show network-instance</b> <i>name</i> <b>bridge-table mac-table summary</b>	Show a MAC table summary report.
<b>show network-instance</b> <i>name</i> <b>bridge-table proxy-arp</b>	Show proxy ARP entries report.
<b>show network-instance</b> <i>name</i> <b>bridge-table proxy-arp all</b>	Show all proxy ARP table entries.
<b>show network-instance</b> <i>name</i> <b>bridge-table proxy-arp ip-duplication duplicate-entries</b>	Show proxy ARP IP duplication report.
<b>show network-instance</b> <i>name</i> <b>bridge-table proxy-arp neighbor</b> < <i>address</i> >	Show proxy ARP IP table entry.
<b>show network-instance</b> <i>name</i> <b>bridge-table proxy-arp summary</b>	Show proxy ARP IP table summary.
<b>show network-instance</b> <i>name</i> <b>bridge-table proxy-nd</b>	Show proxy ND entries report.

Context	Description
<b>show network-instance <i>name</i> bridge-table proxy-nd all</b>	Show all proxy ND table entries.
<b>show network-instance <i>name</i> bridge-table proxy-nd ip-duplication duplicate-entries</b>	Show proxy ND IP duplication report.
<b>show network-instance <i>name</i> bridge-table proxy-nd neighbor <i>&lt;address&gt;</i></b>	Show proxy ND table entry.
<b>show network-instance <i>name</i> bridge-table proxy-nd summary</b>	Show proxy ND table summary.
<b>show network-instance <i>name</i> interfaces <i>interface name</i></b>	Show all network-instance interfaces.
<b>show network-instance <i>name</i> protocols</b>	Show network-instance protocol details. Specify bgp, isis, or ospf.
<b>show network-instance <i>name</i> protocols bgp</b>	Show bgp status report. Specify neighbor, routes, or summary.
<b>show network-instance <i>name</i> protocols bgp neighbor <i>IP address</i></b>	Show a bgp neighbor report. Specify a peer address to see a report for the specified address.
<b>show network-instance <i>name</i> protocols bgp neighbor <i>IP address</i> advertised-routes</b>	Show a bgp neighbor advertised routes report. The network-instance name and neighbor peer IP address must be specified.
<b>show network-instance <i>name</i> protocols bgp neighbor <i>IP address</i> advertised-routes evpn</b>	Show a bgp neighbor advertised routes report for EVPN. The network-instance name and neighbor peer IP address must be specified.
<b>show network-instance <i>name</i> protocols bgp neighbor <i>IP address</i> advertised-routes ipv4</b>	Show a bgp neighbor advertised routes report for IPv4. The network-instance name and neighbor peer IP address must be specified.
<b>show network-instance <i>name</i> protocols bgp neighbor <i>IP address</i> advertised-routes ipv6</b>	Show a bgp neighbor advertised routes report for IPv6. The network-instance name and neighbor peer IP address must be specified.
<b>show network-instance <i>name</i> protocols bgp neighbor <i>IP address</i> detail</b>	Show a bgp neighbor detailed report. network-instance name and neighbor peer IP address must be specified.
<b>show network-instance <i>name</i> protocols bgp neighbor <i>IP address</i> maintenance</b>	Show a bgp neighbor report that shows the maintenance mode and group.
<b>show network-instance <i>name</i> protocols bgp neighbor <i>IP address</i> received-routes</b>	Show a bgp neighbor received routes report. network-instance name and neighbor peer IP address must be specified.
<b>show network-instance <i>name</i> protocols bgp neighbor <i>IP address</i> received-routes evpn</b>	Show a bgp neighbor received routes report for EVPN. The network-instance name and neighbor peer IP address must be specified.
<b>show network-instance <i>name</i> protocols bgp neighbor <i>IP address</i> received-routes ipv4</b>	Show a bgp neighbor received routes report for IPv4. The network-instance name and neighbor peer IP address must be specified.

Context	Description
<b>show network-instance <i>name</i> protocols bgp neighbor <i>IP address</i> received-routes ipv6</b>	Show a bgp neighbor received routes report for IPv6. The network-instance name and neighbor peer IP address must be specified.
<b>show network-instance <i>name</i> protocols bgp routes <i>IP family</i></b>	Show bgp route report for an IP family (EVPN, IPv4 or IPv6).
<b>show network-instance <i>name</i> protocols bgp routes evpn</b>	Show a bgp EVPN route report. Additional parameters can define a report for a specific route type, and a detailed versus summary report.
<b>show network-instance <i>name</i> protocols bgp routes evpn route-type <i>route type</i></b>	Show a bgp EVPN route report for a specific route type. Route type can be numeric or of type esi, mac-address, and originating-router.
<b>show network-instance <i>name</i> protocols bgp routes evpn route-type <i>route type</i> detail</b>	Show a detailed bgp EVPN route report for a specific route type.
<b>show network-instance <i>name</i> protocols bgp routes evpn route-type <i>route type</i> summary</b>	Show a summarized bgp EVPN route report for a specific route type.
<b>show network-instance <i>name</i> protocols bgp routes ipv4</b>	Show a bgp IPv4 route report. Specify an IP prefix or summary.
<b>show network-instance <i>name</i> protocols bgp routes ipv4 prefix <i>IP prefix</i></b>	Show a bgp IPv4 route report for a specified IP prefix.
<b>show network-instance <i>name</i> protocols bgp routes ipv4 summary</b>	Show a bgp IPv4 route summary report.
<b>show network-instance <i>name</i> protocols bgp routes ipv6</b>	Show a bgp IPv6 route report. Specify an IP prefix or summary.
<b>show network-instance <i>name</i> protocols bgp routes ipv6 prefix <i>IP prefix</i></b>	Show a bgp IPv6 route report for a specified IP prefix.
<b>show network-instance <i>name</i> protocols bgp routes ipv6 summary</b>	Show a bgp IPv6 route summary report.
<b>show network-instance <i>name</i> protocols bgp summary</b>	Show a bgp summary report.
<b>show network-instance <i>name</i> protocols bgp-evpn</b>	Show a bgp-evpn status report.
<b>show network-instance <i>name</i> protocols bgp-evpn bgp-instance <i>instance</i></b>	Show a bgp-evpn status report for a specific bgp instance.
<b>show network-instance <i>name</i> protocols bgp-vpn</b>	Show a bgp-vpn status report.
<b>show network-instance <i>name</i> protocols bgp-vpn bgp-instance <i>instance</i></b>	Show a bgp-vpn status report for a specific bgp instance.
<b>show network-instance <i>name</i> protocols isis</b>	Show ISIS status report. Specify adjacency, database, hostnames, interface, or summary.

Context	Description
<b>show network-instance <i>name</i> protocols isis adjacency <i>interface_name</i></b>	Show a list of ISIS adjacencies formed through this interface.
<b>show network-instance <i>name</i> protocols isis adjacency <i>interface_name</i> neighbor-system-id <i>ID</i></b>	Show a list of ISIS adjacencies for a specified system ID of a neighbor router.
<b>show network-instance <i>name</i> protocols isis adjacency <i>interface_name</i> neighbor-system-id <i>ID</i> adjacency-level <i>value</i></b>	Show a list of ISIS adjacencies for a specified adjacency level.
<b>show network-instance <i>name</i> protocols isis adjacency <i>interface_name</i> neighbor-system-id <i>ID</i> adjacency-level <i>value</i> detail</b>	Show a detailed ISIS adjacency report.
<b>show network-instance <i>name</i> protocols isis database</b>	Show an ISIS database report.
<b>show network-instance <i>name</i> protocols isis database <i>lsp-id ID</i></b>	Show an ISIS database report for a specified <i>lsp-id</i> (ID format: 6 octets of adjacency system-id followed by 1 octet Lan-ID and 1 octet LSP Number).
<b>show network-instance <i>name</i> protocols isis database detail</b>	Show a detailed ISIS database report.
<b>show network-instance <i>name</i> protocols isis interface <i>name</i></b>	Show an ISIS interface report for all interfaces or optionally specify an interface name.
<b>show network-instance <i>name</i> protocols isis interface <i>name</i> detail</b>	Show a detailed ISIS interface report for all interfaces or optionally specify an interface name.
<b>show network-instance <i>name</i> protocols isis hostnames</b>	Show an ISIS hostname report.
<b>show network-instance <i>name</i> protocols isis hostnames detail</b>	Show a detailed ISIS hostname report.
<b>show network-instance <i>name</i> protocols isis summary</b>	Show a summarized ISIS report.
<b>show network-instance <i>name</i> protocols ldp</b>	Container for LDP show reports.
<b>show network-instance <i>name</i> protocols ldp interface <i>name</i> [detail]</b>	Show the LDP report for an interface.
<b>show network-instance <i>name</i> protocols ldp ipv4</b>	Container for IPv4 LDP reports.
<b>show network-instance <i>name</i> protocols ldp ipv4 address</b>	Show the LDP report for IPv4 addresses.
<b>show network-instance <i>name</i> protocols ldp ipv4 address advertised [table] summary] [lsp-id <i>value</i>] [label-space-id <i>value</i>]</b>	Show the LDP report for advertised IPv4 addresses.

Context	Description
<b>show network-instance <i>name</i> protocols ldp ipv4 address all [table summary] [lsr-id <i>value</i>] [label-space-id <i>value</i>]</b>	Show the LDP report for all IPv4 addresses.
<b>show network-instance <i>name</i> protocols ldp ipv4 address received [table summary] [lsr-id <i>value</i>] [label-space-id <i>value</i>]</b>	Show the LDP report for received IPv4 addresses.
<b>show network-instance <i>name</i> protocols ldp ipv4 fec</b>	Show the LDP report for IPv4 FECs.
<b>show network-instance <i>name</i> protocols ldp ipv4 fec advertised [table summary detail] [prefix <i>value</i> [lsr-id <i>value</i>] [label-space-id <i>value</i>]</b>	Show the LDP report for advertised IPv4 FECs.
<b>show network-instance <i>name</i> protocols ldp ipv4 fec all [table summary detail] [prefix <i>value</i> [lsr-id <i>value</i>] [label-space-id <i>value</i>]</b>	Show the LDP report for all IPv4 FECs.
<b>show network-instance <i>name</i> protocols ldp ipv4 fec received [table summary detail] [prefix <i>value</i> [lsr-id <i>value</i>] [label-space-id <i>value</i>]</b>	Show the LDP report for received IPv4 FECs.
<b>show network-instance <i>name</i> protocols ldp ipv4 nexthop [fec-prefix <i>value</i> [lsr-id <i>value</i>] [label-space-id <i>value</i>]</b>	Show the LDP report for IPv4 next-hops.
<b>show network-instance <i>name</i> protocols ldp neighbor</b>	Show the LDP neighbor report.
<b>show network-instance <i>name</i> protocols ldp session [lsr-id <i>value</i>] [label-space-id <i>value</i>]</b>	Show the LDP session report.
<b>show network-instance <i>name</i> protocols ldp session [lsr-id <i>value</i>] [label-space-id <i>value</i>] detail</b>	Show the detailed LDP session report.
<b>show network-instance <i>name</i> protocols ldp session [lsr-id <i>value</i>] [label-space-id <i>value</i>] statistics</b>	Show the LDP session statistics report.
<b>show network-instance <i>name</i> protocols ldp statistics</b>	Show the LDP statistics report.
<b>show network-instance <i>name</i> protocols ldp summary</b>	Show the LDP summary report.
<b>show network-instance <i>name</i> protocols ospf</b>	Show OSPF status report. Specify area, interface, neighbor, or status.

Context	Description
<b>show network-instance <i>name</i> protocols ospf area</b>	Show OSPF report for areas where the local system exists.
<b>show network-instance <i>name</i> protocols ospf area detail</b>	Show detailed OSPF report for areas where the local system exists.
<b>show network-instance <i>name</i> protocols ospf database</b>	Show OSPF database report.
<b>show network-instance <i>name</i> protocols ospf database type</b>	Show OSPF database report for a specific database type. For example: router-lsa
<b>show network-instance <i>name</i> protocols ospf instance <i>instance name</i></b>	Show OSPF report for a specific instance. After the instance name, a more detailed report can be generated by specifying area, database, interface, neighbor, statistics, or status after the instance name.
<b>show network-instance <i>name</i> protocols ospf interface</b>	Show OSPF report for OSPF interfaces that act as a connection between a router and one of its attached networks.
<b>show network-instance <i>name</i> protocols ospf interface detail</b>	Show detailed OSPF report for OSPF interfaces that act as a connection between a router and one of its attached networks.
<b>show network-instance <i>name</i> protocols ospf neighbor</b>	Show OSPF report for OSPF neighbors.
<b>show network-instance <i>name</i> protocols ospf neighbor detail</b>	Show detailed OSPF report for OSPF neighbors.
<b>show network-instance <i>name</i> protocols ospf statistics</b>	Show OSPF Rx, Tx, and packet statistics report.
<b>show network-instance <i>name</i> protocols ospf status</b>	Show an overall status report for OSPF (router IDs, version, admin state, backbone and area border router settings, and so on.).
<b>show network-instance <i>name</i> route-table</b>	Show a network-instance route table report. Specify all, ipv4-unicast, ipv6-unicast, next-hop, or, summary.
<b>show network-instance <i>name</i> route-table all</b>	Show a report of all routes that includes prefix, ID, active status and next-hop details.
<b>show network-instance <i>name</i> route-table summary</b>	Show a summary report of active routes by name and protocol.
<b>show network-instance <i>name</i> route-table ipv4-unicast</b>	Show a IPv4 route table report. Specify a summary report or by prefix ID.
<b>show network-instance <i>name</i> route-table ipv4-unicast prefix <i>&lt;ID&gt;</i> detail</b>	Show a IPv4 route table report for a specified prefix. Report includes destination, ID, owner, active status and details when it was last changed.
<b>show network-instance <i>name</i> route-table ipv4-unicast summary</b>	Show a IPv4 route table summary report that includes prefix, IDs, active status, and next-hop details.
<b>show network-instance <i>name</i> route-table ipv6-unicast</b>	Show a IPv6 route table report. Specify a summary report or by prefix ID.

Context	Description
<b>show network-instance <i>name</i> route-table ipv6-unicast prefix &lt;ID&gt; detail</b>	Show a IPv6 route table report for a specified prefix. Report includes destination, ID, owner, active status and details when it was last changed.
<b>show network-instance <i>name</i> route-table ipv6-unicast summary</b>	Show a IPv6 route table summary report that includes prefix, IDs, active status, and next-hop details.
<b>show network-instance <i>name</i> route-table mpls</b>	Show MPLS table report that includes labels, next-hop IP, next-hop subinterface, and next-hop labels.
<b>show network-instance <i>name</i> route-table next-hop <i>index</i></b>	Show a report of all next-hop route tables or optionally provide an index number to show a report for a specified route table.
<b>show network-instance <i>name</i> summary</b>	Show a summary report for all network-instances, or specify a network-name to refine the report.
<b>show network-instance <i>name</i> static-mpls</b>	Show static MPLS entries.
<b>show network-instance <i>name</i> tunnel-table</b>	Context for all tunnels in a tunnel table. Use with options all, IPv4, or IPv6.
<b>show network-instance <i>name</i> tunnel-table all</b>	Shows a network instance tunnel report that includes the prefix, type, ID, metric, preference, and last updated fields.
<b>show network-instance <i>name</i> tunnel-table ipv4 ip address type</b>	Show a network instance IPv4 tunnel report that includes the prefix, type, ID, metric, preference, and last updated fields. Report can be defined further by specifying the type (such as vxlan, ldp, and * (all types)).
<b>show network-instance <i>name</i> tunnel-table ipv6 ip address type</b>	Show a network instance IPv6 tunnel report that includes the prefix, type, ID, metric, preference, and last updated fields. Report can be defined further by specifying the type (such as vxlan, ldp, and * (all types)).
<b>show network-instance <i>name</i> vxlan-interface <i>name</i></b>	Show a network instance vxlan-interface report that defines the type, operation state and operation down reason for a specified interface or all interfaces (when the vxlan-interface name is "").

## 11.7 Platform show reports

```
show
  - platform
    - chassis
    - control <slot ID>
    - environment
    - fabric <slot number>
    - fan-tray <ID number>
    - linecard <slot number>
    - power-supply <ID number>
    - redundancy
    - resource-monitoring
    - trust
      - secure-boot
      - control
```



```

- detail
- tpm
  - certificate
  - pcr-bank

```

### 11.7.1 Platform descriptions

Context	Description
<b>show platform</b>	Show a state report for all components.
<b>show platform chassis</b>	Show a report for the chassis, including type, MAC address, number of slots, and operating status.
<b>show platform control <i>slot ID</i></b>	Show a report for the control module configuration and state. Shows all modules unless a specific slot is provided.
<b>show platform environment</b>	Show a report for the platform environment (state and temperature) for all components.
<b>show platform fabric <i>slot ID</i></b>	Show a report for the fabric module configuration and state. Shows all modules unless a specific slot is provided.
<b>show platform fan-tray <i>slot ID</i></b>	Show a report for the fan tray configuration and state. Shows all modules unless a specific slot is provided.
<b>show platform linecard <i>slot ID</i></b>	Show a report for the linecard configuration and state. Shows all modules unless a specific slot is provided.
<b>show platform power-supply <i>ID</i></b>	Show a report for the power-supply configuration and state. Shows all modules unless a specific ID is provided.
<b>show platform redundancy</b>	Show a platform redundancy report.
<b>show platform resource-monitoring</b>	Show a resource-monitoring report for areas such as ACL, TCAM, IP MPLS forwarding, etc.
<b>show platform trust</b>	Show platform trust information.
<b>show platform trust secure-boot</b>	Show platform secure boot information.
<b>show platform trust secure-boot control <i>id</i></b>	Show secure boot information for control modules.
<b>show platform trust secure-boot control <i>id detail</i></b>	Show detailed secure boot information for control modules.
<b>show platform trust tpm <i>tpm-id</i></b>	Show TPM information.
<b>show platform trust tpm <i>tpm-id</i> certificate <i>certificate</i></b>	Show certificates from TPM NV Memory.
<b>show platform trust tpm <i>tpm-id</i> pcr-bank <i>pcr-bank</i></b>	Show TPM PCR allocation.

## 11.8 System show reports

```
show
  - show system
    - aaa authentication session <session ID number>
    - application <application name>
    - lldp neighbor
      - interface <interface name>
    - logging
      - buffer
        - messages
        - system
      - file
        - messages
    - network-instance ethernet-segments <name>
    - sflow status
```

### 11.8.1 System descriptions

Context	Description
<b>show system</b>	Container for system management show reports.
<b>show system aaa authentication session</b> <i>session ID</i>	Show a list of all active sessions in the system or for a specific session ID user if an ID is specified.
<b>show system application</b> <i>application name</i>	Show a list of all applications and their status in the system or for a specific application if a name is specified.
<b>show system lldp neighbor</b>	Show a report of all LLDP neighbors that includes system name, chassis ID, first message, last update, port and related BGP details.
<b>show system lldp neighbor interface</b> <i>interface name</i>	Show a report of a specific LLDP neighbors by specifying an interface name.
<b>show system logging</b>	Shows a list of system logs, type, and directory path.
<b>show system logging buffer</b>	Shows a report of type buffer log files maintained in memory (non-persistent across system reboots).
<b>show system logging buffer messages</b>	Show a report of the messages associated with the system logging buffer (/var/log/srlinux/buffer/ messages)
<b>show system logging buffer system</b>	Show a report of the system related information in the system logging buffer (/var/log/srlinux/buffer/system)
<b>show system logging file</b>	Shows a report of log files that have been directed to a specific file (/var/log/srlinux/file).
<b>show system logging file messages</b>	Show a report of the messages associated with logs in a specific file (/var/log/srlinux/file/messages)
<b>show system network-instance ethernet-segments</b> <i>name</i>	Show a report that defines ethernet-segments details such as ESI, Alg, peers, and associated network instances.

Context	Description
<b>show system sflow status</b>	Show an sflow status report that includes the state, and sample size and rate.

## 11.9 Tunnel show reports

```
show
  - tunnel
    - vxlan-tunnel
      - all
      - vtep <ip address>
```

### 11.9.1 Tunnel descriptions

Context	Description
<b>show tunnel</b>	Enter the tunnel context.
<b>show tunnel vxlan-tunnel</b>	Show a tunnel report specific to VXLAN tunnels. Report includes the VXLAN tunnel endpoint address, index and when last updated. Specify a specific VTEP ip address or 'all' to display all vxlan tunnels.
<b>show tunnel vxlan-tunnel all</b>	Show a tunnel report specific to all VXLAN tunnels. Report includes the VXLAN tunnel endpoint address, index, and when last updated.
<b>show tunnel vxlan-tunnel vtep ip address</b>	Show a tunnel report for a specific VXLAN tunnel. Report includes the VXLAN tunnel endpoint address, index, and when last updated.

## 11.10 Tunnel-interface show reports

```
show
  - tunnel-interface <interface>
    - vxlan-interface <interface>
      - bridge-table
        - mac-table
        - multicast-destinations
          - destination | VNI
      - unicast-destinations
        - destination | VNI
    - brief
    - detail
```

### 11.10.1 Tunnel-interface descriptions

Context	Description
<b>show tunnel-interface</b> <i>interface</i>	Enter the context for tunnel interface (reports for EVPN Layer-2). Specify a tunnel-interface name or an asterisk (*) for all interfaces.
<b>show tunnel-interface</b> <i>interface vxlan-interface</i> <i>interface</i>	Show a vxlan interface report for EVPN-VXLAN for layer-2. Specify an vxlan-interface name or an asterisk (*) for all interfaces. Report options include brief, detail, or bridge-table.
<b>show tunnel-interface</b> <i>interface vxlan-interface</i> <i>interface bridge-table</i>	Show a bridge-table vxlan interface report for EVPN-VXLAN for layer-2. Options to use with bridge table include mac-table, multicast-destinations, and unicast-destination.
<b>show tunnel-interface</b> <i>interface vxlan-interface</i> <i>interface bridge-table mac-table</i>	Show a mac-table vxlan interface report for EVPN-VXLAN for layer-2. Report includes the address, destination, VNI, index, type, and last updated.
<b>show tunnel-interface</b> <i>interface vxlan-interface</i> <i>interface bridge-table multicast-destinations</i>	Show a multicast-destinations vxlan interface report for EVPN-VXLAN for layer-2. Use with the destination or VNI options.
<b>show tunnel-interface</b> <i>interface vxlan-interface</i> <i>interface bridge-table multicast-destinations destination</i>   <b>VNI</b>	Show a multicast-destinations vxlan interface report for EVPN-VXLAN for layer-2 for a specific destination or VNI or use the asterisk after either option to see all destinations/VNIs.
<b>show tunnel-interface</b> <i>interface vxlan-interface</i> <i>interface bridge-table unicast-destinations</i>	Show a unicast-destinations vxlan interface report for EVPN-VXLAN for layer-2. Use with the destination or VNI options.
<b>show tunnel-interface</b> <i>interface vxlan-interface</i> <i>interface bridge-table unicast-destinations destination</i>   <b>VNI</b>	Show a unicast-destinations vxlan interface report for EVPN-VXLAN for layer-2 for a specific destination or VNI or use the asterisk after either option to see all destinations/VNIs.
<b>show tunnel-interface</b> <i>interface vxlan-interface</i> <i>interface brief</i>	Show a brief vxlan interface report for EVPN-VXLAN for layer-2. The brief report includes the tunnel-interface, VXLAN-interface, type (bridged/routed), ingress VNI, and egress source-ip.
<b>show tunnel-interface</b> <i>interface vxlan-interface</i> <i>interface detail</i>	Show a detailed vxlan interface report for EVPN-VXLAN for layer-2. The detailed report includes the same details as the brief report (tunnel-interface, VXLAN-interface, type (bridged/routed), ingress VNI, and egress source-ip), plus bridge table and summary details.

### 11.11 Version show reports

```
show
  - version
```

### 11.11.1 Version descriptions

Context	Description
<b>show version</b>	Show a version report that contains the currently running software version, last booted, and memory details.

# Customer document and product support



## **Customer documentation**

[Customer documentation welcome page](#)



## **Technical support**

[Product support portal](#)



## **Documentation feedback**

[Customer documentation feedback](#)