SONiC Command Line Interface Guide

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Document History

Version	Modification Date	Details
v7	Sep-12-2023	Add STP,VRRP,OSPF commands; Fix some command format
v6	May-06-2021	Add SNMP show and config commands
v5	Nov-05-2020	Add document for console commands
v4	Oct-17-2019	Unify usage statements and other formatting; Replace tabs with spaces; Modify heading sizes; Fix spelling, grammar and other errors; Fix organization of new commands
v3	Jun-26-2019	Update based on 201904 (build#19) release, "config interface" command changes related to interfacename order, FRR/Quagga show command changes, platform specific changes, ACL show changes and few formatting changes
v2	Apr-22-2019	CLI Guide for SONiC 201811 version (build#32) with complete "config" command set
v1	Mar-23-2019	Initial version of CLI Guide with minimal command set

Introduction

SONiC is an open source network operating system based on Linux that runs on switches from multiple vendors and ASICs. SONiC offers a full-suite of network functionality, like BGP and RDMA, that has been production-hardened in the data centers of some of the largest cloud-service providers. It offers teams the flexibility to create the network solutions they need while leveraging the collective strength of a large ecosystem and community.

SONiC software shall be loaded in these supported devices and this CLI guide shall be used to configure the devices as well as to display the configuration, state and status.

Follow the Quick Start Guide to boot the device in ONIE mode, install the SONiC software using the steps specified in the document and login to the device using the default username and password.

After logging into the device, SONiC software can be configured in following three methods.

1. Command Line Interface (CLI)
2. config_db.json
3. minigraph.xml

This document explains the first method and gives the complete list of commands that are supported in SONiC 201904 version (build#19).
All the configuration commands need root privileges to execute them. Note that show commands can be executed by all users without the root privileges.
Root privileges can be obtained either by using "sudo" keyword in front of all config commands, or by going to root prompt using "sudo -i".
Note that all commands are case sensitive.

- Example:

```
admin@sonic:~$ sudo config aaa authentication login tacacs+

OR

admin@sonic:~$ sudo -i
root@sonic:~#  config aaa authentication login tacacs+
```

Note that the command list given in this document is just a subset of all possible configurations in SONiC.
Please follow config_db.json based configuration for the complete list of configuration options.

Scope of this Document

It is assumed that all configuration commands start with the keyword “config” as prefix.
Any other scripts/utilities/commands that need user configuration control are wrapped as sub-commands under the “config” command.
The direct scripts/utilities/commands (examples given below) that are not wrapped under the "config" command are not in the scope of this document.

1. acl_loader – This script is already wrapped inside “config acl” command; i.e. any ACL configuration that user is allowed to do is already part of “config acl” command; users are not expected to use the acl_loader script directly and hence this document need not explain the “acl_loader” script.
2. crm – this command is not explained in this document.
3. sonic-clear, sfputil, etc., This document does not explain these scripts also.

Basic Tasks

This section covers the basic configurations related to the following:

1. SSH login
2. Configuring the Management Interface

SSH Login

All SONiC devices support both the serial console based login and the SSH based login by default.
The default credential (if not modified at image build time) for login is `admin/YourPaSsWoRd` .
In case of SSH login, users can login to the management interface (eth0) IP address after configuring the same using serial console.
Refer the following section for configuring the IP address for management interface.

- Example:

```
At Console:
Debian GNU/Linux 9 sonic ttyS1

sonic login: admin
Password: YourPaSsWoRd

SSH from any remote server to sonic can be done by connecting to SONiC IP
user@debug:~$ ssh admin@sonic_ip_address(or SONIC DNS Name)
admin@sonic's password:
```

By default, login takes the user to the default prompt from which all the show commands can be executed.

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Configuring Management Interface

The management interface (eth0) in SONiC is configured (by default) to use DHCP client to get the IP address from the DHCP server. Connect the management interface to the same network in which your DHCP server is connected and get the IP address from DHCP server.
The IP address received from DHCP server can be verified using the `/sbin/ifconfig eth0` Linux command.

SONiC provides a CLI to configure the static IP for the management interface. There are few ways by which a static IP address can be configured for the management interface.

1. Use the `config interface ip add eth0` command.

- Example:

```
admin@sonic:~$ sudo config interface ip add eth0 20.11.12.13/24 20.11.12.254
```

2. Use config_db.json and configure the MGMT_INTERFACE key with the appropriate values. Refer here
3. Use minigraph.xml and configure "ManagementIPInterfaces" tag inside "DpgDesc" tag as given at the page

Once the IP address is configured, the same can be verified using either `show management_interface address` command or the `/sbin/ifconfig eth0` linux command.
Users can SSH login to this management interface IP address from their management network.

- Example:

```
admin@sonic:~$ /sbin/ifconfig eth0
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
      inet 10.11.11.13  netmask 255.255.255.0  broadcast 10.11.12.255
```

Configuring hostname and timezone

config hostname

- Usage:

```
sudo config hostname <hostname>
```

- Example:

```
admin@sonic:~$ sudo config hostname test
Running command: service hostname-config restart
Reloading Monit configuration ...
Reinitializing monit daemon
Please note loaded setting will be lost after system reboot. To preserve setting, run `config save`.
admin@sonic:~$
```

show timezone-list

This command is used to display timezones can be configured.

- Usage:

```
show timezone-list
```

- Example:

```
admin@sonic:~$ show timezone-list
Africa/Abidjan
Africa/Accra
Africa/Algiers
Africa/Bissau
Africa/Cairo
...
```

config set_timezone

This command is used to set the timezone.

- Usage:

```
sudo config set_timezone <timezone-name>
```

- Example:

```
admin@sonic:~$ sudo config set_timezone America/New_York
set sonic timezone to America/New_York success!
admin@sonic:~$ show clock
Mon 20 Mar 2023 10:45:18 AM EDT
admin@sonic:~$
```

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Getting Help

Subsections:

Help for Config Commands

All commands have in-built help that aids the user in understanding the command as well as the possible sub-commands and options.
"--help" can be used at any level of the command; i.e. it can be used at the command level, or sub-command level or at argument level. The in-built help will display the available possibilities corresponding to that particular command/sub-command.

config --help

This command lists all the possible configuration commands at the top level.

- Usage:

  ```
  config --help
  ```

- Example:

```
admin@sonic:~$ config --help
Usage: config [OPTIONS] COMMAND [ARGS]
SONiC command line - 'config' command

Options:
  --help  Show this message and exit.

Commands:
  aaa                     AAA command line
  acl                     ACL-related configuration tasks
  bgp                     BGP-related configuration tasks
  ecn                     ECN-related configuration tasks
  feature                 Modify configuration of features
  hostname                Change device hostname without impacting traffic
  interface               Interface-related configuration tasks
  interface_naming_mode   Modify interface naming mode for interacting...
  kubernetes              Kubernetes server related configuration
  load                    Import a previous saved config DB dump file.
  load_mgmt_config        Reconfigure hostname and mgmt interface based...
  load_minigraph          Reconfigure based on minigraph.
  loopback                Loopback-related configuration tasks.
  mirror_session
  nat                     NAT-related configuration tasks
  platform                Platform-related configuration tasks
  portchannel
  qos
  reload                  Clear current configuration and import a...
  route                   route-related configuration tasks
  save                    Export current config DB to a file on disk.
  tacacs                  TACACS+ server configuration
  vlan                    VLAN-related configuration tasks
  vrf                     VRF-related configuration tasks
  warm_restart            warm_restart-related configuration tasks
  watermark               Configure watermark
```

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Help For Show Commands

show help

This command displays the full list of show commands available in the software; the output of each of those show commands can be used to analyze, debug or troubleshoot the network node.

- Usage:

```
show (-?|-h|--help)
```

- Example:

```
admin@sonic:~$ show -?
Usage: show [OPTIONS] COMMAND [ARGS]...
  SONiC command line - 'show' command

Options:
  -?, -h, --help  Show this message and exit.

Commands:
  aaa                   Show AAA configuration
  acl                   Show ACL related information
  arp                   Show IP ARP table
  buffer_pool           Show details of the Buffer-pools
  clock                 Show date and time
  ecn                   Show ECN configuration
  environment           Show environmentals (voltages, fans, temps)
  feature               Show feature status
  interfaces            Show details of the network interfaces
  ip                    Show IP (IPv4) commands
  ipv6                  Show IPv6 commands
  kubernetes            Show kubernetes commands
  line                  Show all /dev/ttyUSB lines and their info
  lldp                  LLDP (Link Layer Discovery Protocol)...
  logging               Show system log
  mac                   Show MAC (FDB) entries
  mirror_session        Show existing everflow sessions
  mmu                   Show mmu configuration
  muxcable              Show muxcable information
  nat                   Show details of the nat
  ndp                   Show IPv6 Neighbour table
  ntp                   Show NTP information
  pfc                   Show details of the priority-flow-control...
  platform              Show platform-specific hardware info
  priority-group        Show details of the PGs
  processes             Display process information
  queue                 Show details of the queues
  reboot-cause          Show cause of most recent reboot
  route-map             show route-map
  runningconfiguration  Show current running configuration...
  services              Show all daemon services
  startupconfiguration  Show startup configuration information
  subinterfaces         Show details of the sub port interfaces
  system-memory         Show memory information
  tacacs                Show TACACS+ configuration
  techsupport           Gather information for troubleshooting
  uptime                Show system uptime
  users                 Show users
  version               Show version information
  vlan                  Show VLAN information
  vrf                   Show vrf config
```

```
  warm_restart          Show warm restart configuration and state
  watermark             Show details of watermark
```

The same syntax applies to all subgroups of `show` which themselves contain subcommands, and subcommands which accept options/arguments.

- Example:

```
admin@sonic:~$ show interfaces -?

  Show details of the network interfaces

Options:
  -?, -h, --help  Show this message and exit.

Commands:
  counters     Show interface counters
  description  Show interface status, protocol and...
  naming_mode  Show interface naming_mode status
  neighbor     Show neighbor related information
  portchannel  Show PortChannel information
  status       Show Interface status information
  tpid         Show Interface tpid information
  transceiver  Show SFP Transceiver information
```

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Basic Show Commands

Subsections:

Show Versions

show version

This command displays software component versions of the currently running SONiC image. This includes the SONiC image version as well as Docker image versions.
This command displays relevant information as the SONiC and Linux kernel version being utilized, as well as the ID of the commit used to build the SONiC image. The second section of the output displays the various docker images and their associated IDs.

- Usage:

```
show version
```

- Example:

```
admin@sonic:~$ show version

SONiC Software Version: SONiC_1.3.4_20231201033518
Distribution: Debian 11.8
Kernel: 5.10.0-8-2-amd64
Build commit: eb6f0fcaa
Build date: Thu Nov 30 19:47:18 UTC 2023
Built by: ngcf@sonic-114

Platform: x86_64-micas_m2-w6930-64qc-r0
HwSKU: M2-W6930-64QC
ASIC: broadcom
ASIC Count: 1
Serial Number: 0000000000000
Model Number: 01019AQ0
Hardware Revision: 105
Uptime: 01:56:39 up 2 days, 23:48,  1 user,  load average: 1.97, 1.98, 2.11

Docker images:
REPOSITORY                  TAG                           IMAGE ID       SIZE
docker-syncd-brcm           SONiC_1.3.4_20231201033518    dca4b32dfe24   741MB
docker-syncd-brcm           latest                        dca4b32dfe24   741MB
docker-gbsyncd-credo        SONiC_1.3.4_20231201033518    8ca879183bf0   471MB
docker-gbsyncd-credo        latest                        8ca879183bf0   471MB
docker-macsec               SONiC_1.3.4_20231201033518    88b65a5e9418   437MB
docker-macsec               latest                        88b65a5e9418   437MB
docker-l2mcd                SONiC_1.3.4_20231201033518    b0dba9e6fb88   452MB
docker-l2mcd                latest                        b0dba9e6fb88   452MB
docker-fpm-frr              SONiC_1.3.4_20231201033518    94415c4a208f   452MB
docker-fpm-frr              latest                        94415c4a208f   452MB
docker-iccpd                SONiC_1.3.4_20231201033518    a5cf29dedab2   434MB
docker-iccpd                latest                        a5cf29dedab2   434MB
docker-dhcp-relay           latest                        f0a300bf2656   431MB
docker-teamd                SONiC_1.3.4_20231201033518    c66765cb3bda   433MB
docker-teamd                latest                        c66765cb3bda   433MB
docker-stp                  SONiC_1.3.4_20231201033518    d8102ab1219c   456MB
docker-stp                  latest                        d8102ab1219c   456MB
docker-snmp                 SONiC_1.3.4_20231201033518    f9f9613320f5   510MB
docker-snmp                 latest                        f9f9613320f5   510MB
docker-sonic-telemetry      SONiC_1.3.4_20231201033518    3dea78a5d131   563MB
docker-sonic-telemetry      latest                        3dea78a5d131   563MB
docker-sonic-mgmt-framework SONiC_1.3.4_20231201033518    0ee611058c6e   657MB
docker-sonic-mgmt-framework latest                        0ee611058c6e   657MB
docker-sflow                SONiC_1.3.4_20231201033518    9eac54af4cfb   434MB
docker-sflow                latest                        9eac54af4cfb   434MB
docker-router-advertiser    SONiC_1.3.4_20231201033518    b92c95b83283   417MB
docker-router-advertiser    latest                        b92c95b83283   417MB
docker-platform-monitor     SONiC_1.3.4_20231201033518    40edccee910b   678MB
docker-platform-monitor     latest                        40edccee910b   678MB
docker-reup                 SONiC_1.3.4_20231201033518    d0f5018dc39e   482MB
docker-reup                 latest                        d0f5018dc39e   482MB
```

```
docker-orchagent            SONiC_1.3.4_20231201033518   b0ad64277121   449MB
docker-orchagent            latest                       b0ad64277121   449MB
docker-nat                  SONiC_1.3.4_20231201033518   1662cf2b43a4   434MB
docker-nat                  latest                       1662cf2b43a4   434MB
docker-lldp                 SONiC_1.3.4_20231201033518   28bf2b377b1e   455MB
docker-lldp                 latest                       28bf2b377b1e   455MB
docker-database             SONiC_1.3.4_20231201033518   269329a8cac1   415MB
docker-database             latest                       269329a8cac1   415MB
docker-mux                  SONiC_1.3.4_20231201033518   4323b930ddad   467MB
docker-mux                  latest                       4323b930ddad   467MB
```

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Show System Status

This sub-section explains some set of sub-commands that are used to display the status of various parameters pertaining to the physical state of the network node.

show clock

This command displays the current date and time configured on the system

- Usage:

```
show clock
```

- Example:

```
admin@sonic:~$ show clock
Mon Mar 25 20:25:16 UTC 2019
```

show boot

This command displays the current OS image, the image to be loaded on next reboot, and lists all the available images installed on the device

- Usage:

```
show boot
```

- Example:

```
admin@sonic:~$ show boot
Current: SONiC-OS-20181130.31
Next: SONiC-OS-20181130.31
Available:
SONiC-OS-20181130.31
```

show environment

This command displays the platform environmentals, such as voltages, temperatures and fan speeds

- Usage:

```
show environment
```

- Example:

```
admin@sonic:~$ show environment
coretemp-isa-0000
Adapter: ISA adapter
Core 0:       +28.0 C  (high = +98.0 C, crit = +98.0 C)
Core 1:       +28.0 C  (high = +98.0 C, crit = +98.0 C)
Core 2:       +28.0 C  (high = +98.0 C, crit = +98.0 C)
Core 3:       +28.0 C  (high = +98.0 C, crit = +98.0 C)
SMF_Z9100_ON-isa-0000
Adapter: ISA adapter
CPU XP3R3V_EARLY:              +3.22 V
<... few more things ...>

Onboard Temperature Sensors:
CPU:                             30 C
BCM56960 (PSU side):             35 C
<... few more things ...>

Onboard Voltage Sensors:
  CPU XP3R3V_EARLY                3.22 V
<... few more things ...>

Fan Trays:
Fan Tray 1:
  Fan1 Speed:     6192 RPM
  Fan2 Speed:     6362 RPM
  Fan1 State:        Normal
  Fan2 State:        Normal
  Air Flow:            F2B
<... few more things ...>

PSUs:
  PSU 1:
    Input:           AC
<... few more things ...>
```

NOTE: The show output has got lot of information; only the sample output is given in the above example.
Though the displayed output slightly differs from one platform to another platform, the overall content will be similar to the example mentioned above.

show reboot-cause

This command displays the cause of the previous reboot

- Usage:

```
show reboot-cause
```

- Example:

```
admin@sonic:~$ show reboot-cause
User issued reboot command [User: admin, Time: Mon Mar 25 01:02:03 UTC 2019]
```

show reboot-cause history

This command displays the history of the previous reboots up to 10 entry

- Usage:

```
show reboot-cause history
```

- Example:

```
admin@sonic:~$ show reboot-cause history
Name                 Cause        Time                          User    Comment
-------------------  -----------  ----------------------------  ------  ---------
2020_10_09_02_33_06  reboot       Fri Oct  9 02:29:44 UTC 2020  admin
2020_10_09_01_56_59  reboot       Fri Oct  9 01:53:49 UTC 2020  admin
2020_10_09_02_00_53  fast-reboot  Fri Oct  9 01:58:04 UTC 2020  admin
2020_10_09_04_53_58  warm-reboot  Fri Oct  9 04:51:47 UTC 2020  admin
```

show uptime

This command displays the current system uptime

- Usage:

```
show uptime
```

- Example:

```
admin@sonic:~$ show uptime
up 2 days, 21 hours, 30 minutes
```

show logging

This command displays all the currently stored log messages.
All the latest processes and corresponding transactions are stored in the "syslog" file.
This file is saved in the path `/var/log` and can be viewed by giving the command `sudo cat syslog` as this requires root login.

- Usage:

```
show logging [(<process_name> [-l|--lines <number_of_lines>]) | (-f|--follow)]
```

- Example:

```
admin@sonic:~$ show logging
```

It can be useful to pipe the output from `show logging` to the command `more` in order to examine one screenful of log messages at a time

- Example:

```
admin@sonic:~$ show logging | more
```

Optionally, you can specify a process name in order to display only log messages mentioning that process

- Example:

```
admin@sonic:~$ show logging sensord
```

Optionally, you can specify a number of lines to display using the `-l` or `--lines` option. Only the most recent N lines will be displayed. Also note that this option can be combined with a process name.

- Examples:

```
admin@sonic:~$ show logging --lines 50
```

```
admin@sonic:~$ show logging sensord --lines 50
```

Optionally, you can follow the log live as entries are written to it by specifying the `-f` or `--follow` flag

- Example:

```
admin@sonic:~$ show logging --follow
```

show users

This command displays a list of users currently logged in to the device

- Usage:

```
show users
```

- Examples:

```
admin@sonic:~$ show users
admin    pts/9        Mar 25 20:31 (100.127.20.23)

admin@sonic:~$ show users
admin    ttyS1        2019-03-25 20:31
```

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Show Hardware Platform

The information displayed in this set of commands partially overlaps with the one generated by “show envinronment” instruction. In this case though, the information is presented in a more succinct fashion. In the future these two CLI stanzas may end up getting combined.

show platform summary

This command displays a summary of the device's hardware platform

- Usage:

```
show platform summary
```

- Example:

```
admin@sonic:~$ show platform summary
Platform: x86_64-micas_m2-w6520-24dc8qc-r0
HwSKU: M2-W6520-24DC8QC
ASIC: broadcom
ASIC Count: 1
Serial Number: 0000000000000
Model Number: 01019APZ
Hardware Revision: 105
```

show platform syseeprom

This command displays information stored on the system EEPROM.
Note that the output of this command is not the same for all vendor's platforms.
Couple of example outputs are given below.

- Usage:

```
show platform syseeprom
```

- Example:

```
 TlvInfo Header:
Id String:    TlvInfo
Version:      1
Total Length: 193
TLV Name             Code      Len  Value
-------------------  ------  -----  --------------------------------
Product Name         0x21       16  M2-W6520-24DC8QC
Part Number          0x22        8  01019APZ
Serial Number        0x23       13  0000000000000
Base MAC Address     0x24        6  EC:B9:70:B4:4C:2B
Manufacture Date     0x25       19  07/26/2023 16:05:42
Device Version       0x26        1  105
Label Revision       0x27        3  R01
Platform Name        0x28       32  x86_64-micas_m2-w6520-24dc8qc-r0
ONIE Version         0x29        7  2023.02
MAC Addresses        0x2A        2  3
Manufacturer         0x2B        5  Micas
Manufacture Country  0x2C        3  USA
Vendor Name          0x2D        5  Micas
Diag Version         0x2E        8  0.1.0.15
Service Tag          0x2F       21  www.micasnetworks.com
Vendor Extension     0xFD        6
CRC-32               0xFE        4  0x9FCB07E3

(checksum valid)
```

show platform ssdhealth

This command displays health parameters of the device's SSD

- Usage:

```
show platform ssdhealth [--vendor]
```

- Example:

```
admin@sonic:~$ show platform ssdhealth
Device Model : M.2 (S42) 3IE3
Health       : 99.665%
Temperature  : 30C
```

show platform psustatus

This command displays the status of the device's power supply units

- Usage:

```
show platform psustatus
```

- Example:

```
admin@sonic:~$ show platform psustatus
PSU    Model          Serial        HW Rev      Voltage (V)    Current (A)    Power (W)  Status    LED
-----  -------------  ------------  --------  -------------  -------------  -----------  --------  -----
PSU 1  MTEF-PSF-AC-A  MT1621X15246  A3                11.97           4.56        54.56  OK        green
```

show platform fan

This command displays the status of the device's fans

- Usage:

```
show platform fan
```

- Example:

```
admin@sonic:~$ show platform fan
        FAN     Speed    Direction    Presence    Status          Timestamp
-----------  --------  -----------  ----------  --------  -----------------
       fan1       34%       intake     Present        OK  20200302 06:58:56
       fan2       43%       intake     Present        OK  20200302 06:58:56
       fan3       38%       intake     Present        OK  20200302 06:58:56
       fan4       49%       intake     Present        OK  20200302 06:58:57
       fan5       38%      exhaust     Present        OK  20200302 06:58:57
       fan6       48%      exhaust     Present        OK  20200302 06:58:57
       fan7       39%      exhaust     Present        OK  20200302 06:58:57
       fan8       48%      exhaust     Present        OK  20200302 06:58:57
```

show platform temperature

This command displays the status of the device's thermal sensors

- Usage:

```
show platform temperature
```

- Example:

```
admin@sonic:~$ show platform temperature
                  NAME    Temperature    High Th    Low Th    Crit High Th    Crit Low Th    Warning
----------------------  -------------  ---------  --------  --------------  -------------  ---------  ------
     Ambient ASIC Temp           37.0      100.0       N/A           120.0            N/A      False  20200
 Ambient Fan Side Temp           28.5      100.0       N/A           120.0            N/A      False  20200
Ambient Port Side Temp           31.0      100.0       N/A           120.0            N/A      False  20200
       CPU Core 0 Temp           36.0       87.0       N/A           105.0            N/A      False  20200
       CPU Core 1 Temp           38.0       87.0       N/A           105.0            N/A      False  20200
         CPU Pack Temp           38.0       87.0       N/A           105.0            N/A      False  20200
            PSU-1 Temp           28.0      100.0       N/A           120.0            N/A      False  20200
            PSU-2 Temp           28.0      100.0       N/A           120.0            N/A      False  20200
    xSFP module 1 Temp           31.5       70.0       N/A            90.0            N/A      False  20200
    xSFP module 2 Temp           35.0       70.0       N/A            90.0            N/A      False  20200
    xSFP module 3 Temp           32.0       70.0       N/A            90.0            N/A      False  20200
    xSFP module 4 Temp           33.5       70.0       N/A            90.0            N/A      False  20200
    xSFP module 5 Temp           34.0       70.0       N/A            90.0            N/A      False  20200
    xSFP module 6 Temp           36.0       70.0       N/A            90.0            N/A      False  20200
    xSFP module 7 Temp           33.5       70.0       N/A            90.0            N/A      False  20200
    xSFP module 8 Temp           33.0       70.0       N/A            90.0            N/A      False  20200
    xSFP module 9 Temp           32.0       70.0       N/A            90.0            N/A      False  20200
   xSFP module 10 Temp           38.5       70.0       N/A            90.0            N/A      False  20200
   xSFP module 11 Temp           38.0       70.0       N/A            90.0            N/A      False  20200
   xSFP module 12 Temp           39.0       70.0       N/A            90.0            N/A      False  20200
   xSFP module 13 Temp           35.5       70.0       N/A            90.0            N/A      False  20200
   xSFP module 14 Temp           37.0       70.0       N/A            90.0            N/A      False  20200
   xSFP module 15 Temp           36.0       70.0       N/A            90.0            N/A      False  20200
   xSFP module 16 Temp           36.5       70.0       N/A            90.0            N/A      False  20200
   xSFP module 17 Temp           32.0       70.0       N/A            90.0            N/A      False  20200
   xSFP module 18 Temp           34.5       70.0       N/A            90.0            N/A      False  20200
   xSFP module 19 Temp           30.0       70.0       N/A            90.0            N/A      False  20200
   xSFP module 20 Temp           31.5       70.0       N/A            90.0            N/A      False  20200
   xSFP module 21 Temp           34.0       70.0       N/A            90.0            N/A      False  20200
   xSFP module 22 Temp           34.4       70.0       N/A            90.0            N/A      False  20200
   xSFP module 23 Temp           34.0       70.0       N/A            90.0            N/A      False  20200
   xSFP module 24 Temp           35.6       70.0       N/A            90.0            N/A      False  20200
   xSFP module 25 Temp           38.0       70.0       N/A            90.0            N/A      False  20200
   xSFP module 26 Temp           32.2       70.0       N/A            90.0            N/A      False  20200
   xSFP module 27 Temp           39.0       70.0       N/A            90.0            N/A      False  20200
   xSFP module 28 Temp           30.1       70.0       N/A            90.0            N/A      False  20200
   xSFP module 29 Temp           32.0       70.0       N/A            90.0            N/A      False  20200
   xSFP module 30 Temp           35.3       70.0       N/A            90.0            N/A      False  20200
   xSFP module 31 Temp           31.0       70.0       N/A            90.0            N/A      False  20200
   xSFP module 32 Temp           39.5       70.0       N/A            90.0            N/A      False  20200
```

show platform pcieinfo

This command displays the status of pcie

- Usage:

```
show platform pcieinfo
```

- Example:

```
admin@sonic:~$ show platform pcieinfo
==============================Display PCIe Device==================================
bus:dev.fn 00:00.0 - dev_id=0x6f00, Host bridge: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xeon D I
bus:dev.fn 00:01.0 - dev_id=0x6f02, PCI bridge: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xeon D PC
bus:dev.fn 00:01.1 - dev_id=0x6f03, PCI bridge: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xeon D PC
bus:dev.fn 00:02.0 - dev_id=0x6f04, PCI bridge: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xeon D PC
bus:dev.fn 00:02.2 - dev_id=0x6f06, PCI bridge: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xeon D PC
bus:dev.fn 00:02.3 - dev_id=0x6f07, PCI bridge: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xeon D PC
bus:dev.fn 00:03.0 - dev_id=0x6f08, PCI bridge: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xeon D PC
bus:dev.fn 00:03.1 - dev_id=0x6f09, PCI bridge: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xeon D PC
bus:dev.fn 00:03.2 - dev_id=0x6f0a, PCI bridge: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xeon D PC
bus:dev.fn 00:03.3 - dev_id=0x6f0b, PCI bridge: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xeon D PC
bus:dev.fn 00:04.0 - dev_id=0x6f20, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn 00:04.1 - dev_id=0x6f21, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn 00:04.2 - dev_id=0x6f22, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn 00:04.3 - dev_id=0x6f23, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn 00:04.4 - dev_id=0x6f24, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn 00:04.5 - dev_id=0x6f25, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn 00:04.6 - dev_id=0x6f26, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn 00:04.7 - dev_id=0x6f27, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn 00:05.0 - dev_id=0x6f28, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn 00:05.1 - dev_id=0x6f29, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn 00:05.2 - dev_id=0x6f2a, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn 00:05.4 - dev_id=0x6f2c, PIC: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xeon D I/O APIC
bus:dev.fn 00:05.6 - dev_id=0x6f39, Performance counters: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4
bus:dev.fn 00:06.0 - dev_id=0x6f10, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn 00:06.1 - dev_id=0x6f11, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn 00:06.2 - dev_id=0x6f12, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn 00:06.3 - dev_id=0x6f13, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn 00:06.4 - dev_id=0x6f14, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn 00:06.5 - dev_id=0x6f15, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn 00:06.6 - dev_id=0x6f16, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn 00:06.7 - dev_id=0x6f17, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn 00:07.0 - dev_id=0x6f18, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn 00:07.1 - dev_id=0x6f19, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn 00:07.2 - dev_id=0x6f1a, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn 00:07.3 - dev_id=0x6f1b, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn 00:07.4 - dev_id=0x6f1c, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn 00:14.0 - dev_id=0x8c31, USB controller: Intel Corporation 8 Series/C220 Series Chipset Family US
bus:dev.fn 00:16.0 - dev_id=0x8c3a, Communication controller: Intel Corporation 8 Series/C220 Series Chipset
bus:dev.fn 00:16.1 - dev_id=0x8c3b, Communication controller: Intel Corporation 8 Series/C220 Series Chipset
bus:dev.fn 00:1d.0 - dev_id=0x8c26, USB controller: Intel Corporation 8 Series/C220 Series Chipset Family US
bus:dev.fn 00:1f.0 - dev_id=0x8c54, ISA bridge: Intel Corporation C224 Series Chipset Family Server Standard
bus:dev.fn 00:1f.2 - dev_id=0x8c02, SATA controller: Intel Corporation 8 Series/C220 Series Chipset Family 6
bus:dev.fn 00:1f.3 - dev_id=0x8c22, SMBus: Intel Corporation 8 Series/C220 Series Chipset Family SMBus Contr
bus:dev.fn 04:00.0 - dev_id=0x15ab, Ethernet controller: Intel Corporation Ethernet Connection X552 10 GbE B
bus:dev.fn 04:00.1 - dev_id=0x15ab, Ethernet controller: Intel Corporation Ethernet Connection X552 10 GbE B
bus:dev.fn 05:00.0 - dev_id=0x15ab, Ethernet controller: Intel Corporation Ethernet Connection X552 10 GbE B
bus:dev.fn 05:00.1 - dev_id=0x15ab, Ethernet controller: Intel Corporation Ethernet Connection X552 10 GbE B
bus:dev.fn 06:00.0 - dev_id=0xb780, Ethernet controller: Broadcom Inc. and subsidiaries Device b780 (rev 01)
bus:dev.fn 07:00.0 - dev_id=0x1537, Ethernet controller: Intel Corporation I210 Gigabit Backplane Connection
```

```
bus:dev.fn 08:00.0 - dev_id=0x7011, Memory controller: Xilinx Corporation Device 7011
bus:dev.fn ff:0b.0 - dev_id=0x6f81, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:0b.1 - dev_id=0x6f36, Performance counters: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4
bus:dev.fn ff:0b.2 - dev_id=0x6f37, Performance counters: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4
bus:dev.fn ff:0b.3 - dev_id=0x6f76, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:0c.0 - dev_id=0x6fe0, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:0c.1 - dev_id=0x6fe1, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:0c.2 - dev_id=0x6fe2, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:0c.3 - dev_id=0x6fe3, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:0f.0 - dev_id=0x6ff8, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:0f.4 - dev_id=0x6ffc, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:0f.5 - dev_id=0x6ffd, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:0f.6 - dev_id=0x6ffe, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:10.0 - dev_id=0x6f1d, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:10.1 - dev_id=0x6f34, Performance counters: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4
bus:dev.fn ff:10.5 - dev_id=0x6f1e, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:10.6 - dev_id=0x6f7d, Performance counters: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4
bus:dev.fn ff:10.7 - dev_id=0x6f1f, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:12.0 - dev_id=0x6fa0, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:12.1 - dev_id=0x6f30, Performance counters: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4
bus:dev.fn ff:12.2 - dev_id=0x6f70, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:13.0 - dev_id=0x6fa8, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:13.1 - dev_id=0x6f71, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:13.2 - dev_id=0x6faa, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:13.3 - dev_id=0x6fab, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:13.4 - dev_id=0x6fac, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:13.5 - dev_id=0x6fad, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:13.6 - dev_id=0x6fae, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:13.7 - dev_id=0x6faf, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:14.0 - dev_id=0x6fb0, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:14.1 - dev_id=0x6fb1, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:14.2 - dev_id=0x6fb2, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:14.3 - dev_id=0x6fb3, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:14.4 - dev_id=0x6fbc, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:14.5 - dev_id=0x6fbd, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:14.6 - dev_id=0x6fbe, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:14.7 - dev_id=0x6fbf, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:15.0 - dev_id=0x6fb4, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:15.1 - dev_id=0x6fb5, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:15.2 - dev_id=0x6fb6, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:15.3 - dev_id=0x6fb7, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:1e.0 - dev_id=0x6f98, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:1e.1 - dev_id=0x6f99, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:1e.2 - dev_id=0x6f9a, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:1e.3 - dev_id=0x6fc0, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:1e.4 - dev_id=0x6f9c, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:1e.7 - dev_id=0x6f9f, System peripheral: Intel Corporation Device 6f9f (rev 05)
bus:dev.fn ff:1f.0 - dev_id=0x6f88, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
bus:dev.fn ff:1f.2 - dev_id=0x6f8a, System peripheral: Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xe
```

Transceivers

Displays diagnostic monitoring information of the transceivers

show interfaces transceiver

This command displays information for all the interfaces for the transceiver requested or a specific interface if the optional "interface_name" is specified.

- Usage:

```
show interfaces transceiver (eeprom [-d|--dom] | lpmode | presence | error-status [-hw|--fetch-from-hardware
```

- Example (Decode and display information stored on the EEPROM of SFP transceiver connected to Ethernet0):

```
admin@sonic:~$ show interfaces transceiver eeprom --dom Ethernet0
Ethernet0: SFP detected
        Connector : No separable connector
        Encoding : Unspecified
        Extended Identifier : Unknown
        Extended RateSelect Compliance : QSFP+ Rate Select Version 1
        Identifier : QSFP+
        Length Cable Assembly(m) : 1
        Specification compliance :
                10/40G Ethernet Compliance Code : 40GBASE-CR4
                Fibre Channel Speed : 1200 Mbytes/Sec
                Fibre Channel link length/Transmitter Technology : Electrical inter-enclosure (EL)
                Fibre Channel transmission media : Twin Axial Pair (TW)
        Vendor Date Code(YYYY-MM-DD Lot) : 2015-10-31
        Vendor Name : XXXXX
        Vendor OUI : XX-XX-XX
        Vendor PN : 1111111111
        Vendor Rev :
        Vendor SN : 111111111
        ChannelMonitorValues:
              RX1Power: -1.1936dBm
              RX2Power: -1.1793dBm
              RX3Power: -0.9388dBm
              RX4Power: -1.0729dBm
              TX1Bias: 4.0140mA
              TX2Bias: 4.0140mA
              TX3Bias: 4.0140mA
              TX4Bias: 4.0140mA
        ModuleMonitorValues :
                Temperature : 1.1111C
                Vcc : 0.0000Volts
```

- Example (Display status of low-power mode of SFP transceiver connected to Ethernet100):

```
admin@sonic:~$ show interfaces transceiver lpmode Ethernet100
Port         Low-power Mode
-----------  ----------------
Ethernet100  On
```

- Example (Display presence of SFP transceiver connected to Ethernet100):

```
admin@sonic:~$ show interfaces transceiver presence Ethernet100
Port         Presence
-----------  ----------
Ethernet100  Present
```

- Example (Display error status of SFP transceiver connected to Ethernet100):

```
admin@sonic:~$ show interfaces transceiver error-status Ethernet100
Port         Error Status
-----------  --------------
Ethernet100  OK
```

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AAA & TACACS+ & RADIUS & USERNAME

This section captures the various show commands & configuration commands that are applicable for the AAA (Authentication, Authorization, and Accounting) module.
Admins can configure the type of authentication (local or remote tacacs based) required for the users and also the authentication failthrough and fallback options.
Following show command displays the current running configuration related to the AAA.

AAA

AAA show commands

This command is used to view the Authentication, Authorization & Accounting settings that are configured in the network node.

show aaa

This command displays the AAA settings currently present in the network node

- Usage:

```
show aaa
```

- Example:

```
admin@sonic:~$ show aaa
AAA authentication login local (default)
AAA authentication failthrough True (default)
AAA authentication fallback True (default)
```

AAA config commands

This sub-section explains all the possible CLI based configuration options for the AAA module. The list of commands/sub-commands possible for aaa is given below.

Command: aaa authentication
sub-commands:
- aaa authentication failthrough
- aaa authentication fallback
- aaa authentication login

aaa authentication failthrough

This command is used to either enable or disable the failthrough option.
This command is useful when user has configured more than one tacacs+ server and when user has enabled tacacs+ authentication.
When authentication request to the first server fails, this configuration allows to continue the request to the next server.
When this configuration is enabled, authentication process continues through all servers configured.
When this is disabled and if the authentication request fails on first server, authentication process will stop and the login will be disallowed.

- Usage:

```
sudo config aaa authentication failthrough (enable | disable | default)
```

    - Parameters:
        - enable: This allows the AAA module to process with local authentication if remote authentication fails.
        - disable: This disallows the AAA module to proceed further if remote authentication fails.
        - default: This re-configures the default value, which is "enable".
- Example:

```
admin@sonic:~$ sudo config aaa authentication failthrough enable
```

aaa authentication fallback

The command is not used at the moment.
When the tacacs+ authentication fails, it falls back to local authentication by default.

- Usage:

```
sudo config aaa authentication fallback (enable | disable | default)
```

- Example:

```
admin@sonic:~$ sudo config aaa authentication fallback enable
```

aaa authentication login

This command is used to either configure whether AAA should use local database or remote tacacs+ database for user authentication.
By default, AAA uses local database for authentication. New users can be added/deleted using the linux commands (Note that the configuration done using linux commands are not preserved during reboot).
Admin can enable remote tacacs+ server based authentication by selecting the AUTH_PROTOCOL as tacacs+ in this command.
Admins need to configure the tacacs+ server accordingly and ensure that the connectivity to tacacas+ server is available via the management interface.
Once if the admins choose the remote authentication based on tacacs+ server, all user logins will be authenticated by the tacacs+ server.
If the authentication fails, AAA will check the "failthrough" configuration and authenticates the user based on local database if failthrough is enabled.

- Usage:

```
sudo config aaa authentication login (tacacs+ | local | default)
```

  - Parameters:
    - tacacs+: Enables remote authentication based on tacacs+
    - local: Disables remote authentication and uses local authentication
    - default: Reset back to default value, which is only "local" authentication
- Example:

```
admin@sonic:~$ sudo config aaa authentication login tacacs+
```

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TACACS+

TACACS+ show commands

show tacacs

This command displays the global configuration fields and the list of all tacacs servers and their correponding configurations.

- Usage:

```
show tacacs
```

- Example:

```
admin@sonic:~$ show tacacs
TACPLUS global auth_type pap (default)
TACPLUS global timeout 5 (default)
TACPLUS global passkey ******

TACPLUS_SERVER address 172.31.240.109
               priority 1
               tcp_port 49
```

TACACS+ config commands

This sub-section explains the command "config tacacs" and its sub-commands that are used to configure the following tacacs+ parameters.
Some of the parameters like authtype, passkey and timeout can be either configured at per server level or at global level (global value will be applied if there no server level configuration)

1. Add/Delete the tacacs+ server details.
2. authtype - global configuration that is applied to all servers if there is no server specific configuration.
3. default - reset the authtype or passkey or timeout to the default values.
4. passkey - global configuration that is applied to all servers if there is no server specific configuration.
5. timeout - global configuration that is applied to all servers if there is no server specific configuration.

config tacacs add

This command is used to add a TACACS+ server to the tacacs server list.
Note that more than one tacacs+ (maximum of seven) can be added in the device.

When user tries to login, tacacs client shall contact the servers one by one.
When any server times out, device will try the next server one by one based on the priority value configured for that server.
When this command is executed, the configured tacacs+ server addresses are updated in /etc/pam.d/common-auth-sonic configuration file which is being used by tacacs service.

- Usage:

```
sudo config tacacs add <ip_address> [-t|--timeout <seconds>] [-ek|--encrypted_key <secret>] [-a|--type <type
```

  - Parameters:
    - ip_address: TACACS+ server IP address.
    - timeout: Transmission timeout interval in seconds, range 1 to 60, default 5
    - encrypted_key: Configure the shared key for the server. If no shared key is configured, use global configuration. When this option is specified, the key is entered interactively.
    - type: Authentication type, "chap" or "pap" or "mschap" or "login", default is "pap".
    - port: TCP port range is 1 to 65535, default 49
    - pri: Priority, priority range 1 to 64, default 1.
    - use-mgmt-vrf: This means that the server is part of Management vrf, default is "no vrf"
- Example:

```
admin@sonic:~$ sudo config tacacs add 172.31.240.110 -t 10 -ek -a chap -o 50 -p 9
Please input your password:
Please confirm your password:
admin@sonic:~$
```

  - Example Server Configuration in /etc/pam.d/common-auth-sonic configuration file:

```
auth    [success=done new_authtok_reqd=done default=ignore]     pam_tacplus.so server=10.11.12.14:50 se
auth    [success=done new_authtok_reqd=done default=ignore]     pam_tacplus.so server=10.11.12.24:50 se
0987  try_first_pass
auth    [success=done new_authtok_reqd=done default=ignore]     pam_tacplus.so server=10.0.0.9:49 secre
auth    [success=done new_authtok_reqd=done default=ignore]     pam_tacplus.so server=10.0.0.8:49 secre
auth    [success=done new_authtok_reqd=done default=ignore]     pam_tacplus.so server=10.11.12.13:50 se
auth    [success=done new_authtok_reqd=done default=ignore auth_err=die]        pam_tacplus.so server=1
auth    [success=1 default=ignore]      pam_unix.so nullok try_first_pass
```

NOTE: In the above example, the servers are stored (sorted) based on the priority value configured for the server.

config tacacs delete

This command is used to delete the tacacs+ servers configured.

- Usage:

```
sudo config tacacs delete <ip_address>
```

- Example:

```
admin@sonic:~$ sudo config tacacs delete 10.11.12.13
```

config tacacs authtype

This command is used to modify the global value for the TACACS+ authtype.
When user has not configured server specific authtype, this global value shall be used for that server.

- Usage:

```
sudo config tacacs authtype (chap | pap | login)
```

- Example:

```
admin@sonic:~$ sudo config tacacs authtype chap
```

config tacacs default

This command is used to reset the global value for authtype or passkey or timeout to default value. Default for authtype is "pap", default for passkey is EMPTY_STRING and default for timeout is 5 seconds.

- Usage:

```
sudo config tacacs default (authtype | passkey | timeout)
```

- Example (This will reset the global authtype back to the default value "pap"):

```
admin@sonic:~$ sudo config tacacs default authtype
```

config tacacs passkey

This command is used to modify the global value for the TACACS+ passkey.
When user has not configured server specific passkey, this global value shall be used for that server.

- Usage:

```
sudo config tacacs encrypted-passkey -ek
```

- Example:

```
admin@sonic:~$ sudo config tacacs encrypted-passkey -ek
Please input your password:
Please confirm your password:
```

config tacacs timeout

This command is used to modify the global value for the TACACS+ timeout.
When user has not configured server specific timeout, this global value shall be used for that server.

- Usage:

```
sudo config tacacs [default] timeout [<timeout_value_in_seconds>]
```

  - Options:
    - Valid values for timeout is 1 to 60 seconds.
    - When the optional keyword "default" is specified, timeout_value_in_seconds parameter wont be used; default value of 5 is used.
    - Configuration using the keyword "default" is introduced in 201904 release.
- Example: To configure non-default timeout value

```
admin@sonic:~$ sudo config tacacs timeout 60
```

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RADIUS

This section explains the various show commands and configuration commands available for radius.

RADIUS show commands

show radius

This command displays the global configuration fields and the list of all radius servers and their correponding configurations.

- Usage:

```
show radius
```

- Example:

```
admin@sonic:~$ show radius
RADIUS global auth_type pap (default)
RADIUS global retransmit 3 (default)
RADIUS global timeout 5 (default)
RADIUS global passkey ******
RADIUS global statistics True

RADIUS_SERVER address 172.31.240.109
               auth_port 1812
               priority 1
```

RADIUS config commands

This sub-section explains the command "config radius" and its sub-commands that are used to configure the following radius parameters.
Some of the parameters like authtype, passkey and timeout can be either configured at per server level or at global level (global value will be applied if there no server level configuration)

1. Add/Delete the radius server details.
2. authtype - global configuration that is applied to all servers if there is no server specific configuration.
3. default - reset the authtype or passkey or timeout to the default values.
4. passkey - global configuration that is applied to all servers if there is no server specific configuration.
5. timeout - global configuration that is applied to all servers if there is no server specific configuration.
6. nasip - global configuration that is applied to all servers if there is no server specific configuration.
7. sourceip - global configuration that is applied to all servers if there is no server specific configuration.
8. retransmit - global configuration that is applied to all servers if there is no server specific configuration.
9. statistics - global configuration that is applied to all servers if there is no server specific configuration.

config radius add

- Usage:

```
sudo config radius add {ipv4-address | ipv6-address} [-r retransmit] [-p priority-integer] [-t timeout-integer] [
```

- Parameters:

    - ip_address | ipv6-address: RADIUS server IP address.
    - timeout: Transmission timeout interval in seconds, range 1 to 60, default 5.
    - shared-secret: Configure the shared key for the server. If no shared key is configured, use global configuration. When this option is specified, the key is entered interactively.
    - type: Authentication type, "chap" or "pap" or "mschapv2", default is "pap".
    - auth-port: UDP port range is 1 to 65535, default 1812
    - priority-integer: Priority, priority range 1 to 64, default 1.
    - use-mgmt-vrf: This means that the server is part of Management vrf, default is "no vrf".
    - retransmit: Number of retransmission times for communicating with the RADIUS server. The default value is 3.
    - source-interface: Source interface that communicates with the radius server.
- Example:

```
admin@sonic:~$ sudo config radius add 172.31.240.109 -t 10 -k -a chap -p 2
Please input your password:
Please confirm your password:
```

    - Example Server Configuration in /etc/pam.d/common-auth-sonic configuration file:

```
# root user can only be authenticated locally. Jump to local.
auth    [success=1 default=ignore]      pam_succeed_if.so user = root
# For the RADIUS servers, on success jump to the cache the MPL(Privilege)
auth    [success=2 new_authtok_reqd=done default=ignore]        pam_radius_auth.so conf=/etc/pam_radius
# Local
auth    [success=done new_authtok_reqd=done default=ignore]     pam_unix.so nullok try_first_pass
auth    requisite       pam_deny.so
# Cache MPL(Privilege)
auth    [success=1 default=ignore]      pam_exec.so /usr/sbin/cache_radius
```

config radius delete

This command is used to delete the radius servers configured.

- Usage:

```
sudo config radius delete <ipv4-address | ipv6-address>
```

- Example:

```
admin@sonic:~$ sudo config radius delete 172.31.240.109
```

config radius authtype

This command is used to modify the global value for the RADIUS authtype.
When user has not configured server specific authtype, this global value shall be used for that server.

- Usage:

```
sudo config radius authtype (chap | pap | mschapv2)
```

- Example:

```
admin@sonic:~$ sudo config radius authtype chap
```

config radius default

This command is used to reset the global value for authtype or passkey or timeout or nasip or sourceip or retransmit to default value.
Default for authtype is "pap", default for passkey is EMPTY_STRING and default for timeout is 5 seconds.

- Usage:

```
sudo config radius default (authtype | passkey | timeout | nasip | sourceip | retransmit)
```

- Example (This will reset the global authtype back to the default value "pap"):

```
admin@sonic:~$ sudo config radius default authtype
```

config radius passkey

This command is used to modify the global value for the RADIUS passkey.
When user has not configured server specific passkey, this global value shall be used for that server.

- Usage:

```
sudo config radius passkey -k
```

- Example:

```
admin@sonic:~$ sudo config radius passkey -k
Please input your password:
Please confirm your password:
```

config radius timeout

This command is used to modify the global value for the RADIUS timeout.
When user has not configured server specific timeout, this global value shall be used for that server.

- Usage:

```
sudo config radius [default] timeout [<timeout_value_in_seconds>]
```

    - Options:
        - Valid values for timeout is 1 to 60 seconds.
        - When the optional keyword "default" is specified, timeout_value_in_seconds parameter wont be used; default value of 5 is used.
        - Configuration using the keyword "default" is introduced in 201904 release.
- Example: To configure non-default timeout value

```
admin@sonic:~$ sudo config radius timeout 60
```

config radius nasip

This command is used to config the NAS-ip-address attribute used by the NAS to send RADIUS packets was configured.

- Usage:

```
sudo config radius nasip {NAS-IP|IPV6-Address}
```

- Example:

```
sudo config radius nasip 172.31.32.50
```

config radius sourceip

This command is used to config the source IP address for the device to communicate with the RADIUS server.

- Usage:

```
sudo config radius sourceip {ipv4-address | ipv6-address}
```

- Example:

```
sudo config radius sourceip 172.31.32.50
```

config radius retransmit

This command is used to set the timeout retransmission times of RADIUS authentication request packets.

- Usage:

```
sudo config radius retransmit {retry_attempts}
```

- Example:

```
sudo config radius retransmit 5
```

config radius statistics

This command is used to enable or disable the RADIUS service statistics function.

- Usage:

```
sudo config radius statistics { enable | disable | default }
```

- Example:

```
sudo config radius statistics enable
```

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USERNAME

This section explains the various show commands and configuration commands available for users.

USERNAME show commands

show username

This command shows the configured users, including local users, configured tacacs users and radius users, and so on.

- Usage:

```
show username
```

- Example:

```
admin@sonic:~$ show username
Index   Username    Type
-------  ----------  ------------
  1     test001     cli-user
  2     admin       default-user
  3     tacacsuser  remote-user
```

USERNAME config commands

config username

This command is used to configure local users. Config the local user account command is an interactive command, an interactive page is displayed asking you to enter the password.
Can not set a password for the root account.
can not delete the default admin and root accounts.

- Usage:

```
sudo config username add <name> -ek
```

- Example:

```
admin@sonic:~$ sudo config username add test001 -ek
Please input your password:
Please confirm your password:
admin@sonic:~$
admin@sonic:~$ show username
Index   Username    Type
-------  ----------  ------------
  1     test001     cli-user
  2     admin       default-user
  3     tacacsuser  remote-user
```

remove username

This command is used to delete a local user

- Usage:

```
sudo config username delete <name>
```

- Example:

```
admin@sonic:~$ show username
Index   Username    Type
-------  ----------  ------------
  1     test001     cli-user
  2     admin       default-user
admin@sonic:~$ sudo config username delete test001
admin@sonic:~$ show username
Index   Username    Type
-------  ----------  ------------
  1     admin       default-user
```

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ACL

This section explains the various show commands and configuration commands available for users.

ACL show commands

show acl table

This command displays either all the ACL tables that are configured or only the specified "TABLE_NAME".
Output from the command displays the table name, type of the table, the cir and cbs, the dscp value, the status, the mode, the list of interface(s) to which the table is bound and the description about the table.

- Usage:

```
show acl table [<table_name>]
```

- Example:

```
admin@sonic:~$ show acl table
Name    Type       Binding    Description    Stage    Dscp    CIR    CBS    Status    Mode
------  ---------  ---------  -------------  -------  ------  -----  -----  --------  ---------
CTRL    CTRLPLANE  SSH        CTRL                                              N/A
CUSTOM  L2         Ethernet1  CUSTOM         ingress                            Active
TEST    L3         Ethernet1  TEST           ingress                            Active
                   Ethernet2
                   Ethernet3
TEST2   L3_QOS     Ethernet5  TEST2          ingress  10      100    200        Active
                   Ethernet6
TEST3   L3         Ethernet5  TEST3          egress                             Active    community


admin@sonic:~$ show acl table TEST
Name    Type    Binding    Description    Stage    Dscp    CIR    CBS    Status    Mode
------  ------  ---------  -------------  -------  ------  -----  -----  --------  ------
TEST    L3      Ethernet1  TEST           ingress                           Active
                Ethernet2
                Ethernet3
```

show acl rule

This command displays all the ACL rules present in all the ACL tables or only the rules present in specified table "TABLE_NAME" or only the rule matching the RULE_ID option.
Output from the command gives the following information about the rules

1. Table name - ACL table name to which the rule belongs to.
2. Rule name - ACL rule name
3. Priority - Priority for this rule.
4. Action - Action to be performed if the packet matches with this ACL rule.

It can be:

- "DROP"/"FORWARD"("ACCEPT" for control plane ACL)

Users can choose to have a default permit rule or default deny rule. In case of default "deny all" rule, add the permitted rules on top of the deny rule. In case of the default "permit all" rule, users can add the deny rules on top of it. If users have not confgured any rule, SONiC allows all traffic (which is "permit all").

5. Match - The fields from the packet header that need to be matched against the same present in the incoming traffic.

- Usage:

```
show acl rule [<table_name>] [<rule_id>]
```

- Example:

```
admin@sonic:~$ show acl rule
Table    Rule          Priority    Action    Match
-------  ------------  ----------  --------  -------------------------------------------
CUSTOM   RULE_1        9999        DROP      DST_MAC: 00:e0:f8:00:00:0d/ff:ff:ff:ff:ff:ff
                                             ETHER_TYPE: 2048
                                             LOG_ACTION: LOG_SYSLOG
                                             SRC_MAC: 00:00:00:00:00:00/00:00:00:00:00:00
CUSTOM   RULE_2        9998        FORWARD   DST_MAC: 00:00:00:00:00:00/00:00:00:00:00:00
                                             LOG_ACTION: LOG_SYSLOG
                                             SRC_MAC: 00:00:00:00:00:00/00:00:00:00:00:00
CUSTOM   DEFAULT_RULE  1           DROP      DST_MAC: 00:00:00:00:00:00/00:00:00:00:00:00
                                             SRC_MAC: 00:00:00:00:00:00/00:00:00:00:00:00
TEST     RULE_1        9999        DROP      DST_IP: 0.0.0.0/0
                                             LOG_ACTION: LOG_SYSLOG
                                             SRC_IP: 0.0.0.0/0
TEST     RULE_2        9998        DROP      DST_IP: 0.0.0.0/0
                                             LOG_ACTION: LOG_SYSLOG
                                             SRC_IP: 0.0.0.32/32
TEST     DEFAULT_RULE  1           DROP      ETHER_TYPE: 2048
```

```
admin@sonic:~$ show acl rule CUSTOM
Table    Rule          Priority    Action    Match
-------  ------------  ----------  --------  ----------------------------------------
CUSTOM   RULE_1        9999        DROP      DST_MAC: 00:e0:f8:00:00:0d/ff:ff:ff:ff:ff:ff
                                             ETHER_TYPE: 2048
                                             LOG_ACTION: LOG_SYSLOG
                                             SRC_MAC: 00:00:00:00:00:00/00:00:00:00:00:00
CUSTOM   RULE_2        9998        FORWARD   DST_MAC: 00:00:00:00:00:00/00:00:00:00:00:00
                                             LOG_ACTION: LOG_SYSLOG
                                             SRC_MAC: 00:00:00:00:00:00/00:00:00:00:00:00
CUSTOM   DEFAULT_RULE  1           DROP      DST_MAC: 00:00:00:00:00:00/00:00:00:00:00:00
                                             SRC_MAC: 00:00:00:00:00:00/00:00:00:00:00:00


admin@sonic:~$ show acl rule CUSTOM RULE_1
Table    Rule    Priority    Action    Match
-------  ------  ----------  --------  ----------------------------------------
CUSTOM   RULE_1  9999        DROP      DST_MAC: 00:e0:f8:00:00:0d/ff:ff:ff:ff:ff:ff
                                       ETHER_TYPE: 2048
                                       LOG_ACTION: LOG_SYSLOG
                                       SRC_MAC: 00:00:00:00:00:00/00:00:00:00:00:00
```

show acl log-update interval

This command is used to view the output interval of ACL matching logs.

- Usage:

```
show acl log-update interval
```

- Example:

```
admin@sonic:~$ show acl log-update interval
acl log-update interval 1
```

show acl counters

This command is used to view the ACL counters.

- Usage:

```
show acl counters [<table_name>] [<rule_name>]
```

- Example:

```
admin@sonic:~$ show acl counters
RULE NAME     TABLE NAME      PRIO    PACKETS COUNT    BYTES COUNT  UPDATE TIME
------------  ------------  ------  ---------------  -------------  -------------------
RULE_1        CUSTOM          9999          7890943     1010075392  2023-03-21 06:48:47
DEFAULT_RULE  CUSTOM             1                0              0  1970-01-01 00:00:00
RULE_1        TEST            9999          7878959     1008541568  2023-03-21 06:48:47
DEFAULT_RULE  TEST               1                0              0  1970-01-01 00:00:00


admin@sonic:~$ show acl counters CUSTOM
RULE NAME     TABLE NAME      PRIO    PACKETS COUNT    BYTES COUNT  UPDATE TIME
------------  ------------  ------  ---------------  -------------  -------------------
RULE_1        CUSTOM          9999         50121379     6415571584  2023-03-21 06:48:57
DEFAULT_RULE  CUSTOM             1                0              0  1970-01-01 00:00:00


admin@sonic:~$ show acl counters TEST RULE_1
RULE NAME    TABLE NAME      PRIO    PACKETS COUNT    BYTES COUNT  UPDATE TIME
-----------  ------------  ------  ---------------  -------------  -------------------
RULE_1       TEST            9999         92335015    11818917376  2023-03-21 06:49:07
```

show acl resources

This command is used to view the ACL resources.

- Usage:

```
show acl resources table


show acl resources group
```

- Example:

```
admin@sonic:~$ show acl resources table

Table Name    Table OID        Resource Name      Used Count    Available Count
------------  ---------------  ---------------  ------------  -----------------
CUSTOM        0x70000000009fb  acl_entry                   2               1534
CUSTOM        0x70000000009fb  acl_counter                 2              57850
```

```
admin@sonic:~$ show acl resources group

Stage    Bind Point    Resource Name      Used Count    Available Count
-------  ------------  ---------------  ------------  -----------------
INGRESS  PORT          acl_group                   1                255
INGRESS  PORT          acl_table                   2                  1
INGRESS  LAG           acl_group                   0                255
INGRESS  LAG           acl_table                   0                  1
INGRESS  VLAN          acl_group                   0                255
INGRESS  VLAN          acl_table                   0                  4
INGRESS  RIF           acl_group                   0                255
INGRESS  RIF           acl_table                   0                  4
INGRESS  SWITCH        acl_group                   0                255
INGRESS  SWITCH        acl_table                   0                  4
EGRESS   PORT          acl_group                   0                255
EGRESS   PORT          acl_table                   0                  2
EGRESS   LAG           acl_group                   0                255
EGRESS   LAG           acl_table                   0                  2
EGRESS   VLAN          acl_group                   0                255
EGRESS   VLAN          acl_table                   0                  2
EGRESS   RIF           acl_group                   0                255
EGRESS   RIF           acl_table                   0                  2
EGRESS   SWITCH        acl_group                   0                255
EGRESS   SWITCH        acl_table                   0                  2
```

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ACL config commands

This sub-section explains the list of configuration options available for ACL module.
Note that there is no direct command to add or delete or modify the ACL table and ACL rule.
Existing ACL tables and ACL rules can be updated by specifying the ACL rules in json file formats and configure those files using this CLI command.

config acl update full

This command is to update the rules in all the tables or in one specific table in full. If a table_name is provided, the operation will be restricted in the specified table. All existing rules in the specified table or all tables will be removed. New rules loaded from file will be installed. If the table_name is specified, only rules within that table will be removed and new rules in that table will be installed. If the table_name is not specified, all rules from all tables will be removed and only the rules present in the input file will be added.

The command does not modify anything in the list of acl tables. It modifies only the rules present in those pre-existing tables.

In order to create acl tables, either follow the config_db.json method or minigraph method to populate the list of ACL tables.

After creating tables, either the config_db.json method or the minigraph method or the CLI method (explained here) can be used to populate the rules in those ACL tables.

This command updates only the ACL rules and it does not disturb the ACL tables; i.e. the output of "show acl table" is not alterted by using this command; only the output of "show acl rule" will be changed after this command.

When "--session_name" optional argument is specified, command sets the session_name for the ACL table with this mirror session name. It fails if the specified mirror session name does not exist.

When "--mirror_stage" optional argument is specified, command sets the mirror action to ingress/egress based on this parameter. By default command sets ingress mirror action in case argument is not specified.

When the optional argument "max_priority" is specified, each rule’s priority is calculated by subtracting its “sequence_id” value from the “max_priority”. If this value is not passed, the default “max_priority” 10000 is used.

- Usage:

```
config acl update full [--table_name <table_name>] [--session_name <session_name>] [--mirror_stage (ingress
```

  - Parameters:
    - table_name: Specifiy the name of the ACL table to load. Example: config acl update full "--table_name DT_ACL_T1 /etc/sonic/acl_table_1.json"
    - session_name: Specifiy the name of the ACL session to load. Example: config acl update full "--session_name mirror_ses1 /etc/sonic/acl_table_1.json"
    - priority_value: Specify the maximum priority to use when loading ACL rules. Example: config acl update full "--max-priority 100 /etc/sonic/acl_table_1.json"

  NOTE 1: All these optional parameters should be inside double quotes. If none of the options are provided, double quotes are not required for specifying filename alone.
  NOTE 2: Any number of optional parameters can be configured in the same command.

- Examples:

```
admin@sonic:~$ sudo config acl update full /etc/sonic/acl_full_snmp_1_2_ssh_4.json
admin@sonic:~$ sudo config acl update full "--table_name SNMP-ACL /etc/sonic/acl_full_snmp_1_2_ssh_4.json"
admin@sonic:~$ sudo config acl update full "--session_name everflow0 /etc/sonic/acl_full_snmp_1_2_ssh_4.jsor
```

This command will remove all rules from all the ACL tables and insert all the rules present in this input file.
Refer the example file acl_full_snmp_1_2_ssh_4.json that adds two rules for SNMP (Rule1 and Rule2) and one rule for SSH (Rule4)
Refer an example for input file format here
Refer another example here

config acl update incremental

- Examples:

```
admin@sonic:~$ sudo config acl update incremental acl_rule.json
```

- L3 ACL json example:

```
{
    "acl": {
        "acl-sets": {
            "acl-set": {
                "TEST2": {
                    "acl-entries": {
                        "acl-entry": {
                            "1": {
                                "actions": {
                                    "config": {
                                        "forwarding-action": "ACCEPT",
                                        "log-action": "LOG_SYSLOG"
                                    }
                                },
                                "config": {
                                    "sequence-id": 1
                                },
                                "icmp": {
                                    "config": {
                                        "type": "1",
                                        "code": "1"
                                    }
                                },
                                "ip": {
                                    "config": {
                                        "protocol":"IP_ICMP",
                                        "source-ip-address": "172.20.3.1/32",
                                        "destination-ip-address":"172.20.2.0/24"
                                    }
                                }
                            },
                            "2": {
                                "actions": {
                                    "config": {
                                        "forwarding-action": "ACCEPT"
                                    }
                                },
                                "config": {
                                    "sequence-id": 2
                                },
                                "ip": {
                                    "config": {
                                        "protocol": "IP_TCP",
                                        "source-ip-address": "1.1.1.1/32",
                                        "destination-ip-address": "2.2.2.2/32"
                                    }
                                },
                                "transport": {
                                    "config": {
                                        "source-port": "555",
                                        "destination-port": "2222",
```

```
                                    "tcp-flags": [
                                      "TCP_ACK",
                                      "TCP_SYN"
                                    ]
                                }
                            }
                        }
                    }
                },
                "config": {
                    "name": "TEST2"
                }
            }
        }
    }
}
```

- L3 ACL json example Parameters:
  - acl_rule-json: specifies the imported json file name.
  - sequence-id: indicates the sequence number of the rule entry. The value range is [1, 9000]. The sequence number determines the priority of the rule entry in the access list. The smaller the sequence number is, the larger the priority is. The higher the priority is, the packets are preferentially matched.
  - forwarding-action(ACCEPT) : If this option is set, it indicates that the rule belongs to the allowed class.
  - forwarding-action(REJECT) : If this option is configured, the keyword indicates that the rule is reject.
  - forwarding-action(TRAP) : If this option is configured, this rule matches packets and sends a copy to the CPU. At the same time, the forwarded packets are discarded.
  - forwarding-action(COPY) : If this option is configured, it indicates that the rule matches packets and sends a copy to the CPU. In addition, the packets forwarded are not affected.
  - redirect-action(REDIRECT:target) : If this option is configured, it indicates that the rule belongs to the redirection class.To use the ACL redirection function, change the "forwarding-action" to "redirect-action".The redirection action must be configured in the "redirect-action:REDIRECT:target" format. The "target" indicates the redirected target in the following formats:

    ```
    ipaddress (ipv6 supported)
    port/portchannel
    ipaddress@port/portchannel
    ipaddress@vrfname
    ipaddress1,ipaddress2… (Next hop group)
    ipaddress1,ipaddress2… @port/portchannel/vrfname (Next hop group)
    ```

    - protocol: indicates the IP protocol number. The value ranges from 0 to 255. For convenience, the system provides short names of common IP protocol numbers to replace specific IP protocol numbers, including IP_TCP, IP_UDP, and IP_ICMP.
    - sourece-ip-address: If this parameter is specified, the IP packets sent from a host or from hosts within a certain IP network segment are to be matched.
    - source-port: indicates the source port number of the matched packets. The value ranges from 0 to 65535. This option is available when the protocol type is IP_TCP or IP_UDP.
    - destionation-ip-address: If this option is configured, the packets destined for a specific host or hosts ona specific IP network segment are to be matched.
    - destination-port: indicates the destination port of the matched packet. The value ranges from 0 to 65535. This option is available when the protocol type is IP_TCP or IP_UDP.
    - tcp-flags: indicates the TCP FLAG bit. It includes TCP_FIN, TCP_SYN, TCP_RST, TCP_PSH, TCP_ACK, and TCP_URG.
    - log-action: If this option is configured, the matching log is periodically generated if packets are matched.
- L3V6 ACL json example:

```
{
    "acl": {
        "acl-sets": {
            "acl-set": {
                "TEST2": {
                    "acl-entries": {
                        "acl-entry": {
                            "1": {
                                "actions": {
                                    "config": {
                                        "forwarding-action": "ACCEPT",
                                        "log-action": "LOG_SYSLOG"
                                    }
                                },
                                "config": {
                                    "sequence-id": 1
                                },
                                "icmp": {
                                    "config": {
                                        "type": "1",
                                        "code": "1"
                                    }
                                },
                                "ip": {
                                    "config": {
                                        "protocol":"IP_ICMP",
                                        "source-ip-address": "201::2/128",
                                        "destination-ip-address":"0::0/0"
                                    }
                                }
                            },
                            "2": {
                                "actions": {
                                    "config": {
                                        "forwarding-action": "ACCEPT"
                                    }
                                },
                                "config": {
                                    "sequence-id": 2
                                },
                                "ip": {
                                    "config": {
                                        "protocol": "IP_TCP",
                                        "source-ip-address": "200::1/128",
                                        "destination-ip-address": "0::/0"
                                    }
                                },
                                "transport": {
                                    "config": {
                                        "source-port": "555",
                                        "destination-port": "2222",
```

```
                                    "tcp-flags": [
                                      "TCP_ACK",
                                      "TCP_SYN"
                                    ]
                                }
                            }
                        }
                    }
                },
                "config": {
                    "name": "TEST2"
                }
            }
        }
    }
}
```

- L3V6 ACL json example Parameters:
  - acl_rule-json: specifies the imported json file name.
  - sequence-id: indicates the sequence number of the rule entry. The value range is [1, 9000]. The sequence number determines the priority of the rule entry in the access list. The smaller the sequence number is, the larger the priority is. The higher the priority is, the packets are preferentially matched.
  - forwarding-action(ACCEPT) : If this option is set, it indicates that the rule belongs to the allowed class.
  - forwarding-action(REJECT) : If this option is configured, the keyword indicates that the rule is reject.
  - forwarding-action(TRAP) : If this option is configured, this rule matches packets and sends a copy to the CPU. At the same time, the forwarded packets are discarded.
  - forwarding-action(COPY) : If this option is configured, it indicates that the rule matches packets and sends a copy to the CPU. In addition, the packets forwarded are not affected.
  - redirect-action(REDIRECT:target) : If this option is configured, it indicates that the rule belongs to the redirection class.To use the ACL redirection function, change the "forwarding-action" to "redirect-action".The redirection action must be configured in the "redirect-action:REDIRECT:target" format. The "target" indicates the redirected target in the following formats:

    ```
    ipaddress (ipv6 supported)
    port/portchannel
    ipaddress@port/portchannel
    ipaddress@vrfname
    ipaddress1,ipaddress2… (Next hop group)
    ipaddress1,ipaddress2… @port/portchannel/vrfname (Next hop group)
    ```

    - protocol: indicates the IP protocol number. The value ranges from 0 to 255. For convenience, the system provides short names of common IP protocol numbers to replace specific IP protocol numbers, including IP_TCP, IP_UDP.
    - sourece-ip-address: If this parameter is specified, the IPv6 packets sent from a host or from hosts within a certain IPv6 network segment are to be matched.
    - source-port: indicates the source port number of the matched packets. The value ranges from 0 to 65535. This option is available when the protocol type is IP_TCP or IP_UDP.
    - destionation-ip-address: If this option is configured, the IPv6 packets destined for a specific host or hosts ona specific IPv6 network segment are to be matched.
    - destination-port: indicates the destination port of the matched packet. The value ranges from 0 to 65535. This option is available when the protocol type is IP_TCP or IP_UDP.
    - tcp-flags: indicates the TCP FLAG bit. It includes TCP_FIN, TCP_SYN, TCP_RST, TCP_PSH, TCP_ACK, and TCP_URG.
    - log-action: If this option is configured, the matching log is periodically generated if packets are matched.
- CTRLPLANE ACL json example:

```
{
    "acl": {
        "acl-sets": {
            "acl-set": {
                "TEST4": {
                    "acl-entries": {
                        "acl-entry": {
                            "1": {
                                "actions": {
                                    "config": {
                                        "forwarding-action": "REJECT",
                                        "log-action": "LOG_SYSLOG"
                                    }
                                },
                                "config": {
                                    "sequence-id": 10
                                },
                                "ip": {
                                    "config": {
                                        "source-ip-address": "192.168.2.2/32"
                                    }
                                },
                                "transport": {
                                    "config": {
                                        "destination-port": "2222"
                                    }
                                }
                            }
                        }
                    },
                    "config": {
                        "name": "CUSTOM"
                    }
                }
            }
        }
    }
}
```

- CTRLPLANE ACL json example Parameters:
  - acl_rule-json: specifies the imported json file name.
  - sequence-id: indicates the sequence number of the rule entry. The value range is [1, 9000]. The sequence number determines the priority of the rule entry in the access list. The smaller the sequence number is, the larger the priority is. The higher the priority is, the packets are preferentially matched.
  - forwarding-action(ACCEPT) : If this option is set, it indicates that the rule belongs to the allowed class.

- forwarding-action(REJECT) : If this option is configured, the keyword indicates that the rule is reject.
- source-ip-address: If this parameter is specified, the IP packets sent by a host with the source IP address or the packets sent by hosts within a certain IP network segment match the IP packets sent by any host. The value can be an IPv4 or IPv6 address.
- destination-port: indicates the matched packet port number. This field does not need to be specified by default.
- tcp-flags: indicates the TCP FLAG bit. It includes TCP_FIN, TCP_SYN, TCP_RST, TCP_PSH, TCP_ACK, and TCP_URG.

- L2 ACL json example:

```
{
    "acl": {
        "acl-sets": {
            "acl-set": {
                "CUSTOM": {
                    "acl-entries": {
                        "acl-entry": {
                            "1": {
                                "actions": {
                                    "config": {
                                        "forwarding-action": "ACCEPT",
                                        "log-action": "LOG_SYSLOG"
                                    }
                                },
                                "config": {
                                    "sequence-id": 10
                                },
                                "l2": {
                                    "config": {
                                        "ethertype": "2048",
                                        "destination-mac": "00:e0:f8:00:00:0c",
                                        "destination-mac-mask": "ff:ff:ff:ff:ff:ff"
                                    }
                                }
                            }
                        }
                    },
                    "config": {
                        "name": "CUSTOM"
                    }
                }
            }
        }
    }
}
```

- L2 ACL json example Parameters:
  - acl_rule-json: specifies the imported json file name.
  - sequence-id: indicates the sequence number of the rule entry. The value range is [1, 9000]. The sequence number determines the priority of the rule entry in the access list. The smaller the sequence number is, the larger the priority is. The higher the priority is, the packets are preferentially matched.
  - forwarding-action(ACCEPT) : If this option is set, it indicates that the rule belongs to the allowed class.
  - forwarding-action(REJECT) : If this option is configured, the keyword indicates that the rule is reject.
  - forwarding-action(TRAP) : If this option is configured, this rule matches packets and sends a copy to the CPU. At the same time, the forwarded packets are discarded.
  - forwarding-action(COPY) : If this option is configured, it indicates that the rule matches packets and sends a copy to the CPU. In addition, the packets forwarded are not affected.
  - redirect-action(REDIRECT:target) : If this option is configured, it indicates that the rule belongs to the redirection class.To use the ACL redirection function, change the "forwarding-action" to "redirect-action".The redirection action must be configured in the "redirect-action:REDIRECT:target" format. The "target" indicates the redirected target in the following formats:

    ```
    ipaddress (ipv6 supported)
    port/portchannel
    ipaddress@port/portchannel
    ipaddress@vrfname
    ipaddress1,ipaddress2… (Next hop group)
    ipaddress1,ipaddress2… @port/portchannel/vrfname (Next hop group)
    ```

  - ether type: If configured, Layer 2 packets of the specified Ethernet type must be matched.
  - source-mac: If this option is configured, it matches Layer 2 packets sent by a host with the source MAC address or packets sent by hosts within a certain MAC address segment.
  - destination-mac: indicates that Layer 2 packets whose destination mac address is a host or packets whose destination MAC address is a host ina specific MAC address segment are to be matched.
  - log-action: If this option is configured, the matching log is periodically generated if packets are matched.
- L3_QOS ACL json example:

```
{
    "acl": {
        "acl-sets": {
            "acl-set": {
                "TEST2": {
                    "acl-entries": {
                        "acl-entry": {
                            "1": {
                                "actions": {
                                    "config": {
                                        "forwarding-action": "ACCEPT",
                                        "log-action": "LOG_SYSLOG"
                                    }
                                },
                                "config": {
                                    "sequence-id": 1
                                },
                                "icmp": {
                                    "config": {
                                        "type": "1",
                                        "code": "1"
                                    }
                                },
                                "ip": {
                                    "config": {
                                        "protocol":"IP_ICMP",
                                        "source-ip-address": "172.20.3.1/32",
                                        "destination-ip-address":"172.20.2.0/24"
                                    }
                                }
                            },
                            "2": {
                                "actions": {
                                    "config": {
                                        "forwarding-action": "ACCEPT"
                                    }
                                },
                                "config": {
                                    "sequence-id": 2
                                },
                                "ip": {
                                    "config": {
                                        "protocol": "IP_TCP",
                                        "source-ip-address": "1.1.1.1/32",
                                        "destination-ip-address": "2.2.2.2/32"
                                    }
                                },
                                "transport": {
                                    "config": {
                                        "source-port": "555",
                                        "destination-port": "2222",
```

```
                                    "tcp-flags": [
                                      "TCP_ACK",
                                      "TCP_SYN"
                                    ]
                                }
                            }
                        }
                    }
                },
                "config": {
                    "name": "TEST2"
                }
            }
        }
    }
}
```

- L3_QOS ACL json example Parameters:
  - acl_rule-json: specifies the imported json file name.
  - sequence-id: indicates the sequence number of the rule entry. The value range is [1, 9000]. The sequence number determines the priority of the rule entry in the access list. The smaller the sequence number is, the larger the priority is. The higher the priority is, the packets are preferentially matched.
  - forwarding-action(ACCEPT) : If this option is set, it indicates that the rule belongs to the allowed class.
  - forwarding-action(REJECT) : If this option is configured, the keyword indicates that the rule is reject.
  - protocol: indicates the IP protocol number. The value ranges from 0 to 255. For convenience, the system provides short names of common IP protocol numbers to replace specific IP protocol numbers, including IP_TCP, IP_UDP, and IP_ICMP.
  - sourece-ip-address: If this parameter is specified, the IP packets sent from a host or from hosts within a certain IP network segment are to be matched.
  - source-port: indicates the source port number of the matched packets. The value ranges from 0 to 65535. This option is available when the protocol type is IP_TCP or IP_UDP.
  - destionation-ip-address: If this option is configured, the packets destined for a specific host or hosts ona specific IP network segment are to be matched.
  - destination-port: indicates the destination port of the matched packet. The value ranges from 0 to 65535. This option is available when the protocol type is IP_TCP or IP_UDP.
  - tcp-flags: indicates the TCP FLAG bit. It includes TCP_FIN, TCP_SYN, TCP_RST, TCP_PSH, TCP_ACK, and TCP_URG.
  - log-action: If this option is configured, the matching log is periodically generated if packets are matched.

- L3V6_QOS ACL json example:

```
{
    "acl": {
        "acl-sets": {
            "acl-set": {
                "TEST2": {
                    "acl-entries": {
                        "acl-entry": {
                            "1": {
                                "actions": {
                                    "config": {
                                        "forwarding-action": "ACCEPT",
                                        "log-action": "LOG_SYSLOG"
                                    }
                                },
                                "config": {
                                    "sequence-id": 1
                                },
                                "icmp": {
                                    "config": {
                                        "type": "1",
                                        "code": "1"
                                    }
                                },
                                "ip": {
                                    "config": {
                                        "protocol":"IP_ICMP",
                                        "source-ip-address": "172.20.3.1/32",
                                        "destination-ip-address":"172.20.2.0/24"
                                    }
                                }
                            },
                            "2": {
                                "actions": {
                                    "config": {
                                        "forwarding-action": "ACCEPT"
                                    }
                                },
                                "config": {
                                    "sequence-id": 2
                                },
                                "ip": {
                                    "config": {
                                        "protocol": "IP_TCP",
                                        "source-ip-address": "1.1.1.1/32",
                                        "destination-ip-address": "2.2.2.2/32"
                                    }
                                },
                                "transport": {
                                    "config": {
                                        "source-port": "555",
                                        "destination-port": "2222",
```

```
                                    "tcp-flags": [
                                      "TCP_ACK",
                                      "TCP_SYN"
                                    ]
                                }
                            }
                        }
                    }
                },
                "config": {
                    "name": "TEST2"
                }
            }
        }
    }
}
```

- L3V6_QOS ACL json example Parameters:
  - acl_rule-json: specifies the imported json file name.
  - sequence-id: indicates the sequence number of the rule entry. The value range is [1, 9000]. The sequence number determines the priority of the rule entry in the access list. The smaller the sequence number is, the larger the priority is. The higher the priority is, the packets are preferentially matched.
  - forwarding-action(ACCEPT) : If this option is set, it indicates that the rule belongs to the allowed class.
  - forwarding-action(REJECT) : If this option is configured, the keyword indicates that the rule is reject.
  - protocol: indicates the IP protocol number. The value ranges from 0 to 255. For convenience, the system provides short names of common IP protocol numbers to replace specific IP protocol numbers, including IP_TCP, IP_UDP.
  - sourece-ip-address: If this parameter is specified, the IPv6 packets sent from a host or from hosts within a certain IPv6 network segment are to be matched.
  - source-port: indicates the source port number of the matched packets. The value ranges from 0 to 65535. This option is available when the protocol type is IP_TCP or IP_UDP.
  - destionation-ip-address: If this option is configured, the IPv6 packets destined for a specific host or hosts ona specific IPv6 network segment are to be matched.
  - destination-port: indicates the destination port of the matched packet. The value ranges from 0 to 65535. This option is available when the protocol type is IP_TCP or IP_UDP.
  - tcp-flags: indicates the TCP FLAG bit. It includes TCP_FIN, TCP_SYN, TCP_RST, TCP_PSH, TCP_ACK, and TCP_URG.
  - log-action: If this option is configured, the matching log is periodically generated if packets are matched.

- L2_QOS ACL json example:

```
{
    "acl": {
        "acl-sets": {
            "acl-set": {
                "CUSTOM": {
                    "acl-entries": {
                        "acl-entry": {
                            "1": {
                                "actions": {
                                    "config": {
                                        "forwarding-action": "ACCEPT",
                                        "log-action": "LOG_SYSLOG"
                                    }
                                },
                                "config": {
                                    "sequence-id": 10
                                },
                                "12": {
                                    "config": {
                                        "ethertype": "2048",
                                        "destination-mac": "00:e0:f8:00:00:0c",
                                        "destination-mac-mask": "ff:ff:ff:ff:ff:ff"
                                    }
                                }
                            }
                        }
                    },
                    "config": {
                        "name": "CUSTOM"
                    }
                }
            }
        }
    }
}
```

- L2_QOS ACL json example Parameters:
  - acl_rule-json: specifies the imported json file name.
  - sequence-id: indicates the sequence number of the rule entry. The value range is [1, 9000]. The sequence number determines the priority of the rule entry in the access list. The smaller the sequence number is, the larger the priority is. The higher the priority is, the packets are preferentially matched.
  - forwarding-action(ACCEPT) : If this option is set, it indicates that the rule belongs to the allowed class.

    - forwarding-action(REJECT) : If this option is configured, the keyword indicates that the rule is reject.
    - ether type: If configured, Layer 2 packets of the specified Ethernet type must be matched.
    - source-mac: If this option is configured, it matches Layer 2 packets sent by a host with the source MAC address or packets sent by hosts within a certain MAC address segment.
    - destination-mac: indicates that Layer 2 packets whose destination mac address is a host or packets whose destination MAC address is a host ina specific MAC address segment are to be matched.
    - log-action: If this option is configured, the matching log is periodically generated if packets are matched.
- MIRROR ACL json example:

```
{
    "acl": {
        "acl-sets": {
            "acl-set": {
                "TEST2": {
                    "acl-entries": {
                        "acl-entry": {
                            "1": {
                                "actions": {
                                    "config": {
                                        "forwarding-action": "ACCEPT",
                                        "log-action": "LOG_SYSLOG"
                                    }
                                },
                                "config": {
                                    "sequence-id": 1
                                },
                                "icmp": {
                                    "config": {
                                        "type": "1",
                                        "code": "1"
                                    }
                                },
                                "ip": {
                                    "config": {
                                        "protocol":"IP_ICMP",
                                        "source-ip-address": "172.20.3.1/32",
                                        "destination-ip-address":"172.20.2.0/24"
                                    }
                                }
                            },
                            "2": {
                                "actions": {
                                    "config": {
                                        "forwarding-action": "ACCEPT"
                                    }
                                },
                                "config": {
                                    "sequence-id": 2
                                },
                                "icmp": {
                                    "config": {
                                        "type": "1",
                                        "code": "1"
                                    }
                                },
                                "ip": {
                                    "config": {
                                        "protocol": "IP_TCP",
                                        "source-ip-address": "1.1.1.1/32",
                                        "destination-ip-address": "2.2.2.2/32"
```

```
                                }
                            },
                            "transport": {
                                "config": {
                                    "source-port": "555",
                                    "destination-port": "2222",
                                    "tcp-flags": [
                                      "TCP_ACK",
                                      "TCP_SYN"
                                    ]
                                }
                            }
                        }
                    }
                },
                "config": {
                    "name": "TEST2"
                }
            }
        }
    }
}
```

- MIRROR ACL json example Parameters:
  - acl_rule-json: specifies the imported json file name.
  - sequence-id: indicates the sequence number of the rule entry. The value range is [1, 9000]. The sequence number determines the priority of the rule entry in the access list. The smaller the sequence number is, the larger the priority is. The higher the priority is, the packets are preferentially matched.
  - forwarding-action(ACCEPT) : If this option is configured, it indicates that the rule belongs to the allowed class. After this field is set to ACCEPT, the ACL RULE action of the MIRROR type in the ingress direction is converted to MIRROR_INGRESS_ACTION, indicating the traffic of the mirror ingress direction.
  - protocol: indicates the IP protocol number. The value ranges from 0 to 255. For convenience, the system provides short names of common IP protocol numbers to replace specific IP protocol numbers, including IP_TCP, IP_UDP, and IP_ICMP.
  - sourece-ip-address: If this parameter is specified, the IP packets sent from a host or from hosts within a certain IP network segment are to be matched.
  - source-port: indicates the source port number of the matched packets. The value ranges from 0 to 65535. This option is available when the protocol type is IP_TCP or IP_UDP.
  - destionation-ip-address: If this option is configured, the packets destined for a specific host or hosts ona specific IP network segment are to be matched.

    - destination-port: indicates the destination port of the matched packet. The value ranges from 0 to 65535. This option is available when the protocol type is IP_TCP or IP_UDP.
    - tcp-flags: indicates the TCP FLAG bit. It includes TCP_FIN, TCP_SYN, TCP_RST, TCP_PSH, TCP_ACK, and TCP_URG.
    - log-action: If this option is configured, the matching log is periodically generated if packets are matched.
- MIRRORV6 ACL json example:

```
{
    "acl": {
        "acl-sets": {
            "acl-set": {
                "TEST2": {
                    "acl-entries": {
                        "acl-entry": {
                            "1": {
                                "actions": {
                                    "config": {
                                        "forwarding-action": "ACCEPT",
                                        "log-action": "LOG_SYSLOG"
                                    }
                                },
                                "config": {
                                    "sequence-id": 1
                                },
                                "icmp": {
                                    "config": {
                                        "type": "1",
                                        "code": "1"
                                    }
                                },
                                "ip": {
                                    "config": {
                                        "protocol":"IP_ICMP",
                                        "source-ip-address": "201::2/128",
                                        "destination-ip-address":"0::0/0"
                                    }
                                }
                            },
                            "2": {
                                "actions": {
                                    "config": {
                                        "forwarding-action": "ACCEPT"
                                    }
                                },
                                "config": {
                                    "sequence-id": 2
                                },
                                "icmp": {
                                    "config": {
                                        "type": "1",
                                        "code": "1"
                                    }
                                },
                                "ip": {
                                    "config": {
                                        "protocol": "IP_TCP",
                                        "source-ip-address": "200::1/128",
                                        "destination-ip-address": "0::/0"
```

```
                                    }
                                },
                                "transport": {
                                    "config": {
                                        "source-port": "555",
                                        "destination-port": "2222",
                                        "tcp-flags": [
                                          "TCP_ACK",
                                          "TCP_SYN"
                                        ]
                                    }
                                }
                            }
                        }
                    },
                    "config": {
                        "name": "TEST2"
                    }
                }
            }
        }
    }
}
```

- MIRRORV6 ACL json example Parameters:
  - acl_rule-json: specifies the imported json file name.
  - sequence-id: indicates the sequence number of the rule entry. The value range is [1, 9000]. The sequence number determines the priority of the rule entry in the access list. The smaller the sequence number is, the larger the priority is. The higher the priority is, the packets are preferentially matched.
  - forwarding-action(ACCEPT) : If this option is configured, it indicates that the rule belongs to the allowed class. After this field is set to ACCEPT, the ACL RULE action of the MIRROR type in the ingress direction is converted to MIRROR_INGRESS_ACTION, indicating the traffic of the mirror ingress direction.
  - protocol: indicates the IP protocol number. The value ranges from 0 to 255. For convenience, the system provides short names of common IP protocol numbers to replace specific IP protocol numbers, including IP_TCP, IP_UDP, and IP_ICMP.
  - sourece-ip-address: If this parameter is specified, the IP packets sent from a host or from hosts within a certain IP network segment are to be matched.
  - source-port: indicates the source port number of the matched packets. The value ranges from 0 to 65535. This option is available when the protocol type is IP_TCP or IP_UDP.
  - destionation-ip-address: If this option is configured, the packets destined for a specific host or hosts ona specific IP network segment are to be matched.

- destination-port: indicates the destination port of the matched packet. The value ranges from 0 to 65535. This option is available when the protocol type is IP_TCP or IP_UDP.
- tcp-flags: indicates the TCP FLAG bit. It includes TCP_FIN, TCP_SYN, TCP_RST, TCP_PSH, TCP_ACK, and TCP_URG.
- log-action: If this option is configured, the matching log is periodically generated if packets are matched.

config acl add table

This command is used to create new ACL tables.You can use the high-capacity configuration mode and community configuration mode to create an ACL TABLE.The distinction between the high-capacity configuration mode and the community configuration mode applies only to the ACLs of the data plane.

- Usage:
  high-capacity configuration mode

  ```
  config acl add table [OPTIONS] <table_name> <table_type> [-d <description>] [-p <ports>] [-s (ingress | egre
  ```

  community configuration mode

  ```
  config acl add table [OPTIONS] <table_name> <table_type> [-d <description>] [-p <ports>] [-s (ingress | egre
  ```

- Parameters:
  - table_name: The name of the ACL table to create.
  - table_type: The type of ACL table to create (e.g. "L3", "L3V6", "MIRROR")
  - description: A description of the table for the user. (default is the table_name)
  - ports: A comma-separated list of ports/interfaces to add to the table. The behavior is as follows:
    - Physical ports will be bound as physical ports
    - Portchannels will be bound as portchannels - passing a portchannel member is invalid
    - VLANs will be expanded into their members (e.g. "Vlan1000" will become "Ethernet0,Ethernet2,Ethernet4...")
  - stage: The stage this ACL table will be applied to, either ingress or egress. (default is ingress)
  - cir_cbs: configuration example: 1000000_2000. The cir indicates the bandwidth limit per second (KBits). The cbs indicates the burst traffic limit (KBytes). This parameter is used for qos acl.
  - dscp-value: specifies the new dscp value of the packet. The value ranges from 0 to 63. This parameter is used for qos acl.
  - SSH|NTP|SNMP: indicates the service type of CTRLPLANE ACL. This parameter is used for CTRLPLANE acl.

- ACL restrictions in high-capacity configuration mode
  - In high-capacity configuration mode, only one object (physical interface or portchannel interface) can be applied to the ACL application in the egress direction.
  - In high-capacity configuration mode, when an ACL is applied to portchannel, only one portchannel interface can be applied to an ACL.
  - In high-capacity configuration mode, when an ACL is applied to vni, only one vni can be applied to an ACL.
  - In high-capacity configuration mode, ACL cannot be applied to both physical interfaces and portchannel interfaces.
  - After the ACL is configured in high-capacity mode, it cannot be changed to the community mode. After the ACL is configured as the community mode, it cannot be changed to the high-capacity mode.
- Examples:

```
admin@sonic:~$ sudo config acl add table EXAMPLE L3 -p Ethernet1,Ethernet4 -s ingress


admin@sonic:~$ sudo config acl add table EXAMPLE_2 L3V6 -p Ethernet2 -s egress


admin@sonic:~$ sudo config acl add table EXAMPLE_3 L3_QOS -p Ethernet5 -s ingress -sp 1024_2048 -sd 30


admin@sonic:~$ sudo config acl add table EXAMPLE_4 L2_QOS -p Ethernet3 -s ingress -sd 28


admin@sonic:~$ sudo config acl add table EXAMPLE_5 L3V6_QOS -p Ethernet6 -s ingress -sp 1000_2000


admin@sonic:~$ sudo config acl add table EXAMPLE_6 CTRLPLANE -ss SSH
```

config the interval for outputting ACL logs to match packet

This command is used to control the log output interval by setting the interval for packets to match logs. View ACL logging in the syslog file.

- Usage:

```
sudo config acl log-update interval <time>


sudo config acl log-update default
```

- Parameters:
  - time: log output interval, in minutes. The default value 0 indicates that no log is output.

- Examples:

```
admin@sonic:~$ sudo config acl add table TEST L3 -p Ethernet49 -s ingress
admin@sonic:~$ cat L3_ACL.json
{
    "acl": {
        "acl-sets": {
            "acl-set": {
                "TEST": {
                    "acl-entries": {
                        "acl-entry": {
                            "1": {
                                "actions": {
                                    "config": {
                                        "forwarding-action": "REJECT",
                                        "log-action": "LOG_SYSLOG"
                                    }
                                },
                                "config": {
                                    "sequence-id": 1
                                },
                                "ip": {
                                    "config": {
                                        "source-ip-address": "0.0.0.0/0",
                                        "destination-ip-address": "0.0.0.0/0"
                                    }
                                }
                            }
                        }
                    },
                    "config": {
                        "name": "TEST"
                    }
                }
            }
        }
    }
}
admin@sonic:~$ sudo config acl update incremental L3_ACL.json
admin@sonic:~$ sudo config acl log-update interval 1
admin@sonic:~$ show acl log-update interval
acl log-update interval 1


admin@sonic:~$ sudo config acl log-update interval 5
admin@sonic:~$ show acl log-update interval
acl log-update interval 5

admin@sonic:~$ sudo config acl log-update default
admin@sonic:~$ show acl log-update interval
acl log-update interval 0 (default)
```

config acl remove table

This command is used to create new ACL tables.

- Usage:

```
config acl remove table [OPTIONS] <table_name> [-p <ports>] [-up] [-ud]
```

- Parameters:
  - table_name: The name of the ACL table to create.
  - ports: A comma-separated list of ports/interfaces to add to the table. The behavior is as follows:
    - Physical ports will be bound as physical ports
  - -ud: unset_dscp. Example Delete the configured QOS dscp parameters.
  - -up: unset_policer. Delete the configured QOS policer parameters.
- Examples:

```
admin@sonic:~$ show acl table
Name    Type    Binding     Description    Stage    Dscp    CIR    CBS
------  ------  ----------  -------------  -------  ------  -----  -----
CUSTOM  L2      Ethernet1   CUSTOM         egress
TEST    L3      Ethernet49  TEST           ingress
admin@sonic:~$ sudo config acl remove table TEST
admin@sonic:~$ show acl table
Name    Type    Binding    Description    Stage    Dscp    CIR    CBS
------  ------  ---------  -------------  -------  ------  -----  -----
CUSTOM  L2      Ethernet1  CUSTOM         egress
```

```
admin@sonic:~$ show acl table
Name    Type    Binding    Description    Stage    Dscp    CIR    CBS
------  ------  ---------  -------------  -------  ------  -----  -----
TEST    L3_QOS  Ethernet1  TEST           ingress  30      1024   2048
admin@sonic:~$ sudo config acl remove table TEST -p Ethernet1
admin@sonic:~$ show acl table
Name    Type    Binding    Description    Stage    Dscp    CIR    CBS
------  ------  ---------  -------------  -------  ------  -----  -----
TEST    L3_QOS             TEST                    30      1024   2048
```

```
admin@sonic:~$ show acl table
Name    Type    Binding    Description    Stage    Dscp    CIR    CBS
------  ------  ---------  -------------  -------  ------  -----  -----
TEST    L3_QOS  Ethernet1  TEST           ingress  30      1024   2048
admin@sonic:~$ sudo config acl remove table TEST -up -ud
admin@sonic:~$ show acl table
Name    Type    Binding    Description    Stage    Dscp    CIR    CBS
------  ------  ---------  -------------  -------  ------  -----  -----
TEST    L3_QOS  Ethernet1  TEST           ingress
```

config acl remove rule

This command is used to delete a rule from a table.

- Usage:

```
sudo acl-loader delete <table_name> <rule_name>
```

- Parameters:
  - table_name: The name of the table to which the rule to be deleted belongs.
  - rule_name: The name of the rule to delete.
- Examples:

```
admin@sonic:~$ show acl rule
Table    Rule          Priority    Action    Match
-------  ------------  ----------  --------  ----------------------
TEST     RULE_1        9999        DROP      DST_IP: 0.0.0.0/0
                                             LOG_ACTION: LOG_SYSLOG
                                             SRC_IP: 0.0.0.0/0
TEST     RULE_2        9998        DROP      DST_IP: 0.0.0.0/0
                                             LOG_ACTION: LOG_SYSLOG
                                             SRC_IP: 0.0.0.1/32
TEST     DEFAULT_RULE  1           DROP      ETHER_TYPE: 2048
admin@sonic:~$ sudo acl-loader delete TEST RULE_1
admin@sonic:~$ show acl rule
Table    Rule          Priority    Action    Match
-------  ------------  ----------  --------  ----------------------
TEST     RULE_2        9998        DROP      DST_IP: 0.0.0.0/0
                                             LOG_ACTION: LOG_SYSLOG
                                             SRC_IP: 0.0.0.1/32
TEST     DEFAULT_RULE  1           DROP      ETHER_TYPE: 2048
```

ACL clear commands

config acl clear counters

This command is used to clear acl counters.

- Usage:

```
sudo sonic-clear acl counters [<table_name>]
```

- Examples:

```
admin@sonic:~$ show acl counters
RULE NAME     TABLE NAME      PRIO    PACKETS COUNT    BYTES COUNT  UPDATE TIME
------------  ------------  ------  ---------------  -------------  -------------------
RULE_1        TEST            9999         76042306     9733442816  2023-03-21 07:35:45
DEFAULT_RULE  TEST               1                0              0  1970-01-01 00:00:00
admin@sonic:~$ sudo sonic-clear acl counters

admin@sonic:~$ show acl counters
RULE NAME     TABLE NAME      PRIO    PACKETS COUNT    BYTES COUNT  UPDATE TIME
------------  ------------  ------  ---------------  -------------  -------------------
RULE_1        TEST            9999                0              0  1970-01-01 00:00:00
DEFAULT_RULE  TEST               1                0              0  1970-01-01 00:00:00


admin@sonic:~$ show acl counters
RULE NAME     TABLE NAME      PRIO    PACKETS COUNT    BYTES COUNT  UPDATE TIME
------------  ------------  ------  ---------------  -------------  -------------------
RULE_1        CUSTOM          9999         84264487    10785890048  2023-03-21 09:44:57
DEFAULT_RULE  CUSTOM             1                0              0  1970-01-01 00:00:00
RULE_1        TEST            9999         84258128    10785075968  2023-03-21 09:44:57
DEFAULT_RULE  TEST               1                0              0  1970-01-01 00:00:00
admin@sonic:~$ sudo sonic-clear acl counters TEST

admin@sonic:~$ show acl counters
RULE NAME     TABLE NAME      PRIO    PACKETS COUNT    BYTES COUNT  UPDATE TIME
------------  ------------  ------  ---------------  -------------  -------------------
RULE_1        CUSTOM          9999         85557677    10951382656  2023-03-21 09:45:07
DEFAULT_RULE  CUSTOM             1                0              0  1970-01-01 00:00:00
RULE_1        TEST            9999                0              0  1970-01-01 00:00:00
DEFAULT_RULE  TEST               1                0              0  1970-01-01 00:00:00
```

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ARP & NDP

ARP show commands

show arp

This command displays the ARP entries in the device with following options.

1. Display the entire table.
2. Display the ARP entries learnt on a specific interface.
3. Display the ARP of a specific ip-address.

- Usage:

```
show arp [-if <interface_name>] [<ip_address>]
```

- Details:
  - show arp: Displays all entries
  - show arp -if : Displays the ARP specific to the specified interface.
  - show arp : Displays the ARP specific to the specicied ip-address.
- Example:

```
admin@sonic:~$ show arp
 Address          MacAddress            Iface         Vlan
-------------     -----------------     -------       ------
192.168.1.183     88:5a:92:fb:bf:41     Ethernet44    -
192.168.1.175     88:5a:92:fc:95:81     Ethernet28    -
192.168.1.181     e4:c7:22:c1:07:7c     Ethernet40    -
192.168.1.179     88:5a:92:de:a8:bc     Ethernet36    -
192.168.1.118     00:1c:73:3c:de:43     Ethernet64    -
192.168.1.11      00:1c:73:3c:e1:38     Ethernet88    -
192.168.1.161     24:e9:b3:71:3a:01     Ethernet0     -
192.168.1.189     24:e9:b3:9d:57:41     Ethernet56    -
192.168.1.187     74:26:ac:8b:8f:c1     Ethernet52    -
192.168.1.165     88:5a:92:de:a0:7c     Ethernet8     -

Total number of entries 10
```

Optionally, you can specify the interface in order to display the ARPs learnt on that particular interface

- Example:

```
admin@sonic:~$ show arp -if Ethernet40
Address          MacAddress          Iface        Vlan
-------------    -----------------   ----------   ------
192.168.1.181    e4:c7:22:c1:07:7c   Ethernet40   -
Total number of entries 1
```

Optionally, you can specify an IP address in order to display only that particular entry

- Example:

```
admin@sonic:~$ show arp 192.168.1.181
Address          MacAddress          Iface        Vlan
-------------    -----------------   ----------   ------
192.168.1.181    e4:c7:22:c1:07:7c   Ethernet40   -
Total number of entries 1
```

show arp-aging-time

This command displays the ARP aging time.

- Usage:

```
show arp-aging-time
```

- Examples:

```
admin@sonic:~$ show arp-aging-time
Interface      Arp Reachable-time(sec)    Arp Stale-time(sec)
-----------  -------------------------  ---------------------
Ethernet1                           45                   1800
Ethernet2                           45                   1800
Ethernet3                           45                   1800
Ethernet4                           45                   1800
Ethernet5                           45                   1800
Ethernet6                           45                   1800
Ethernet7                           45                   1800
Ethernet8                           45                   1800
Ethernet9                           45                   1800
Ethernet10                          45                   1800
Ethernet11                          45                   1800
Ethernet12                          45                   1800
Ethernet13                          45                   1800
...
```

NDP show commands

show ndp

This command displays either all the IPv6 neighbor mac addresses, or for a particular IPv6 neighbor, or for all IPv6 neighbors reachable via a specific interface.

- Usage:

```
show ndp [-if|--iface <interface_name>] <ipv6_address>
```

- Example (show all IPv6 neighbors):

```
admin@sonic:~$ show ndp
Address                   MacAddress         Iface    Vlan    Status
------------------------  -----------------  -------  ------  ---------
fe80::20c:29ff:feb8:b11e  00:0c:29:b8:b1:1e  eth0     -       REACHABLE
fe80::20c:29ff:feb8:cff0  00:0c:29:b8:cf:f0  eth0     -       REACHABLE
fe80::20c:29ff:fef9:324   00:0c:29:f9:03:24  eth0     -       REACHABLE
Total number of entries 3
```

- Example (show specific IPv6 neighbor):

```
admin@sonic:~$ show ndp fe80::20c:29ff:feb8:b11e
Address                   MacAddress         Iface    Vlan    Status
------------------------  -----------------  -------  ------  ---------
fe80::20c:29ff:feb8:b11e  00:0c:29:b8:b1:1e  eth0     -       REACHABLE
Total number of entries 1
```

- Example (show IPv6 neighbors learned on a specific interface):

```
admin@sonic:~$ show ndp -if eth0
Address                   MacAddress         Iface    Vlan    Status
------------------------  -----------------  -------  ------  ---------
fe80::20c:29ff:feb8:b11e  00:0c:29:b8:b1:1e  eth0     -       REACHABLE
fe80::20c:29ff:feb8:cff0  00:0c:29:b8:cf:f0  eth0     -       REACHABLE
fe80::20c:29ff:fef9:324   00:0c:29:f9:03:24  eth0     -       REACHABLE
Total number of entries 3
```

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BFD

Configuring BFD requires entering vtysh session. The following example shows how to enter a vtysh session. The configure and show commands are used under vtysh session.

- Example:

```
admin@sonic:~$ vtysh

Hello, this is FRRouting (version 7.5.1-sonic).
Copyright 1996-2005 Kunihiro Ishiguro, et al.

sonic#
```

BFD config commands

peer

This command is used to add or delete bfd sessions in bfd configuration view.

- Usage:

```
[no] peer <address> [interface <intf-name>] [local-address <address>] [vrf <vrf-name>]
```

- Example:

```
admin@sonic:~$ vtysh

Hello, this is FRRouting (version 7.5.1-sonic).
Copyright 1996-2005 Kunihiro Ishiguro, et al.

sonic# con terminal
sonic(config)#
sonic(config)# bfd
sonic(config-bfd)#
sonic(config-bfd)# peer 1.1.1.1
sonic(config-bfd-peer)#
```

detect-multiplier

This command is used to set detect-multiplier value in bfd peer configuration view. This value ranges from 2 to 255 and default is 3.

- Usage:

```
[no] detect-multiplier <value>
```

- Example:

```
sonic(config-bfd-peer)# detect-multiplier 10
```

transmit-interval

This command is used to set the interval for bfd to send probe packets in bfd peer configuration view. This value ranges 10 to 60000 ms and default is 300.

- Usage:

```
[no] transmit-interval value
```

- Example:

```
sonic(conf-bfd-peer)# transmit-interval 100
```

receive-interval

This command is used to set the interval for bfd to receive probe packets in bfd peer configuration view. This value ranges 10 to 60000 ms and default is 300.

- Usage:

```
[no] receive-interval <value>
```

- Example:

```
sonic(conf-bfd-peer)# receive-interval 100
```

passive-mode

This command is used to enable or disable bfd passive mode
in bfd peer configuration view.

- Usage:

```
[no] passive-mode
```

- Example:

```
sonic(conf-bfd-peer)# passive-mode
```

echo-mode

This command is used to enable or disable bfd echo mode in bfd peer configuration view.

- Usage:

```
[no] echo-mode
```

- Example:

```
sonic(conf-bfd-peer)# echo-mode
```

echo-interval

This command is used to set the interval for bfd to send echo packets in bfd peer configuration view. This value ranges 10 to 60000 ms and default is 50.

- Usage:

```
[no] echo-interval <value>
```

- Example:

```
sonic(conf-bfd-peer)# echo-interval 100
```

shutdown

This command is used to shutdown bfd session in bfd peer configuration view.

- Usage:

```
[no] shutdown
```

- Example:

```
sonic(conf-bfd-peer)# shutdown
```

BFD show commands

show bfd peers

This command displays the state and key parameters of all BFD sessions in vtysh global view or use "do show xxx" in any view.

- Usage:

```
show bfd peers
```

- Example:

```
sonic(config-bfd-peer)# do show bfd peers
BFD Peers:
      peer 10.10.10.10 vrf default interface Ethernet1
              ID: 3119629624
              Remote ID: 0
              Active mode
              Echo mode: False
              Status: down
              Downtime: 2 hour(s), 37 minute(s), 36 second(s)
              Diagnostics: ok
              Remote diagnostics: ok
              Peer Type: configured
              Local timers:
                      Detect-multiplier: 3
                      Receive interval: 300ms
                      Transmission interval: 300ms
                      Echo transmission interval: 50ms
              Remote timers:
                      Detect-multiplier: 3
                      Receive interval: 1000ms
                      Transmission interval: 1000ms
                      Echo transmission interval: 0ms
  ...
  sonic(config-bfd-peer)#
```

show bfd peer

This command displays the state and key parameters of specified BFD session in vtysh global view or use "do show xxx" in any view.

- Usage:

```
show bfd peer <address> [ vrf <vrf-name> ] [ interface <interface-name> ] [ local-address <address> ]
```

- Example:

```
sonic(config-bfd-peer)# do show bfd peer 1.1.1.1 interface Ethernet1 local-address 1.1.1.2
BFD Peer:
      peer 1.1.1.1 vrf default interface Ethernet1
              ID: 1324817806
              Remote ID: 0
              Active mode
              Echo mode: False
              Status: down
              Downtime: 34 minute(s), 47 second(s)
              Diagnostics: ok
              Remote diagnostics: ok
              Peer Type: configured
              Local timers:
                      Detect-multiplier: 3
                      Receive interval: 300ms
                      Transmission interval: 300ms
                      Echo transmission interval: 50ms
              Remote timers:
                      Detect-multiplier: 3
                      Receive interval: 1000ms
                      Transmission interval: 1000ms
                      Echo transmission interval: 0ms

sonic(config-bfd-peer)#
```

Refer FRR Command Reference to know more about BFD commands.

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BGP

This section explains all the BGP show commands and BGP configuation commands in both "Quagga" and "FRR" routing software that are supported in SONiC.
In 201811 and older verisons "Quagga" was enabled by default. In current version "FRR" is enabled by default.
Most of the FRR show commands start with "show bgp". Similar commands in Quagga starts with "show ip bgp". All sub-options supported in all these show commands are common for FRR and Quagga.
Detailed show commands examples for Quagga are provided at the end of this document.This section captures only the commands supported by FRR.

BGP show commands

show bgp summary (Versions >= 201904 using default FRR routing stack)

show ip bgp summary (Versions <= 201811 using Quagga routing stack)

This command displays the summary of all IPv4 & IPv6 bgp neighbors that are configured and the corresponding states.

- Usage:
  Versions >= 201904 using default FRR routing stack

  ```
  show bgp summary
  ```

  Versions <= 201811 using Quagga routing stack

  ```
  show ip bgp summary
  ```

- Example:

```
admin@sonic:~$ show ip bgp summary

IPv4 Unicast Summary:
BGP router identifier 10.1.0.32, local AS number 65100 vrf-id 0
BGP table version 6465
RIB entries 12807, using 2001 KiB of memory
Peers 4, using 83 KiB of memory
Peer groups 2, using 128 bytes of memory

Neighbor        V         AS MsgRcvd MsgSent   TblVer  InQ OutQ  Up/Down State/PfxRcd NeighborName
10.0.0.57       4      64600    3995    4001        0    0    0 00:39:32         6400 Lab-T1-01
10.0.0.59       4      64600    3995    3998        0    0    0 00:39:32         6400 Lab-T1-02
10.0.0.61       4      64600    3995    4001        0    0    0 00:39:32         6400 Lab-T1-03
10.0.0.63       4      64600    3995    3998        0    0    0 00:39:32         6400 NotAvailable

Total number of neighbors 4
```

- Example:

```
admin@sonic:~$ show bgp summary

IPv4 Unicast Summary:
BGP router identifier 10.1.0.32, local AS number 65100 vrf-id 0
BGP table version 6465
RIB entries 12807, using 2001 KiB of memory
Peers 4, using 83 KiB of memory
Peer groups 2, using 128 bytes of memory

Neighbor        V         AS MsgRcvd MsgSent   TblVer  InQ OutQ  Up/Down State/PfxRcd
10.0.0.57       4      64600    3995    4001        0    0    0 00:39:32         6400
10.0.0.59       4      64600    3995    3998        0    0    0 00:39:32         6400
10.0.0.61       4      64600    3995    4001        0    0    0 00:39:32         6400
10.0.0.63       4      64600    3995    3998        0    0    0 00:39:32         6400

Total number of neighbors 4

IPv6 Unicast Summary:
BGP router identifier 10.1.0.32, local AS number 65100 vrf-id 0
BGP table version 12803
RIB entries 12805, using 2001 KiB of memory
Peers 4, using 83 KiB of memory
Peer groups 2, using 128 bytes of memory

Neighbor        V         AS MsgRcvd MsgSent   TblVer  InQ OutQ  Up/Down State/PfxRcd
fc00::72        4      64600    3995    5208        0    0    0 00:39:30         6400
fc00::76        4      64600    3994    5208        0    0    0 00:39:30         6400
fc00::7a        4      64600    3993    5208        0    0    0 00:39:30         6400
fc00::7e        4      64600    3993    5208        0    0    0 00:39:30         6400

Total number of neighbors 4
```

Click here to see the example for "show ip bgp summary" for Quagga.

show bgp neighbors (Versions >= 201904 using default FRR routing stack)

show ip bgp neighbors (Versions <= 201811 using Quagga routing stack)

This command displays all the details of IPv4 & IPv6 BGP neighbors when no optional argument is specified.

When the optional argument IPv4_address is specified, it displays the detailed neighbor information about that specific IPv4 neighbor.

Command has got additional optional arguments to display only the advertised routes, or the received routes, or all routes.

In order to get details for an IPv6 neigbor, use "show bgp ipv6 neighbor <ipv6_address>" command.

- Usage:

  Versions >= 201904 using default FRR routing stack

  ```
  show bgp neighbors [<ipv4-address> [advertised-routes | received-routes | routes]]
  ```

  Versions <= 201811 using Quagga routing stack

  ```
  show ip bgp neighbors [<ipv4-address> [advertised-routes | received-routes | routes]]
  ```

- Example:

```
admin@sonic:~$ show bgp neighbors
BGP neighbor is 10.0.0.57, remote AS 64600, local AS 65100, external link
Description: Router01T1
BGP version 4, remote router ID 100.1.0.29, local router ID 10.1.0.32
BGP state = Established, up for 00:42:15
Last read 00:00:00, Last write 00:00:03
Hold time is 10, keepalive interval is 3 seconds
Configured hold time is 10, keepalive interval is 3 seconds
Neighbor capabilities:
  4 Byte AS: advertised and received
  AddPath:
    IPv4 Unicast: RX advertised IPv4 Unicast and received
  Route refresh: advertised and received(new)
  Address Family IPv4 Unicast: advertised and received
  Hostname Capability: advertised (name: sonic-z9264f-9251,domain name: n/a) not received
  Graceful Restart Capabilty: advertised and received
    Remote Restart timer is 300 seconds
    Address families by peer:
      none
Graceful restart information:
  End-of-RIB send: IPv4 Unicast
  End-of-RIB received: IPv4 Unicast
Message statistics:
  Inq depth is 0
  Outq depth is 0
                       Sent       Rcvd
  Opens:                  2          1
  Notifications:          2          0
  Updates:             3206       3202
  Keepalives:           845        847
  Route Refresh:          0          0
  Capability:             0          0
  Total:               4055       4050
Minimum time between advertisement runs is 0 seconds

For address family: IPv4 Unicast
 Update group 1, subgroup 1
 Packet Queue length 0
 Inbound soft reconfiguration allowed
 Community attribute sent to this neighbor(all)
 6400 accepted prefixes

 Connections established 1; dropped 0
 Last reset 00:42:37, due to NOTIFICATION sent (Cease/Connection collision resolution)
 Local host: 10.0.0.56, Local port: 179
 Foreign host: 10.0.0.57, Foreign port: 46419
 Nexthop: 10.0.0.56
 Nexthop global: fc00::71
 Nexthop local: fe80::2204:fff:fe36:9449
 BGP connection: shared network
```

```
BGP Connect Retry Timer in Seconds: 120
Read thread: on  Write thread: on
```

Optionally, you can specify an IP address in order to display only that particular neighbor. In this mode, you can optionally specify whether you want to display all routes advertised to the specified neighbor, all routes received from the specified neighbor or all routes (received and accepted) from the specified neighbor.

- Example:

```
admin@sonic:~$ show bgp neighbors 10.0.0.57

admin@sonic:~$ show bgp neighbors 10.0.0.57 advertised-routes

admin@sonic:~$ show bgp neighbors 10.0.0.57 received-routes

admin@sonic:~$ show bgp neighbors 10.0.0.57 routes
```

  Click here to see the example for "show ip bgp neighbors" for Quagga.

**show ip bgp network

This command displays all the details of IPv4 Border Gateway Protocol (BGP) prefixes.

- Usage:

```
show ip bgp network [[<ipv4-address>|<ipv4-prefix>] [(bestpath | multipath | longer-prefixes | json)]]
```

- Example:
  NOTE: The "longer-prefixes" option is only available when a network prefix with a "/" notation is used.

```
admin@sonic:~$ show ip bgp network

admin@sonic:~$ show ip bgp network 10.1.0.32 bestpath

admin@sonic:~$ show ip bgp network 10.1.0.32 multipath

admin@sonic:~$ show ip bgp network 10.1.0.32 json

admin@sonic:~$ show ip bgp network 10.1.0.32/32 bestpath

admin@sonic:~$ show ip bgp network 10.1.0.32/32 multipath

admin@sonic:~$ show ip bgp network 10.1.0.32/32 json

admin@sonic:~$ show ip bgp network 10.1.0.32/32 longer-prefixes
```

show bgp ipv6 summary (Versions >= 201904 using default FRR routing stack)

show ipv6 bgp summary (Versions <= 201811 using Quagga routing stack)

This command displays the summary of all IPv6 bgp neighbors that are configured and the corresponding states.

- Usage:
  Versions >= 201904 using default FRR routing stack

  ```
  show bgp ipv6 summary
  ```

  Versions <= 201811 using Quagga routing stack

  ```
  show ipv6 bgp summary
  ```

- Example:

  ```
  admin@sonic:~$ show bgp ipv6 summary
  BGP router identifier 10.1.0.32, local AS number 65100 vrf-id 0
  BGP table version 12803
  RIB entries 12805, using 2001 KiB of memory
  Peers 4, using 83 KiB of memory
  Peer groups 2, using 128 bytes of memory

  Neighbor        V         AS MsgRcvd MsgSent   TblVer  InQ OutQ  Up/Down State/PfxRcd NeighborName
  fc00::72        4      64600    3995    5208        0    0    0 00:39:30         6400 Lab-T1-01
  fc00::76        4      64600    3994    5208        0    0    0 00:39:30         6400 Lab-T1-02
  fc00::7a        4      64600    3993    5208        0    0    0 00:39:30         6400 Lab-T1-03
  fc00::7e        4      64600    3993    5208        0    0    0 00:39:30         6400 Lab-T1-04

  Total number of neighbors 4
  ```

  Click here to see the example for "show ipv6 bgp summary" for Quagga.

show bgp ipv6 neighbors (Versions >= 201904 using default FRR routing stack)

show ipv6 bgp neighbors (Versions <= 201811 using Quagga routing stack)

This command displays all the details of one particular IPv6 Border Gateway Protocol (BGP) neighbor. Option is also available to display only the advertised routes, or the received routes, or all routes.

- Usage:
  Versions >= 201904 using default FRR routing stack

  ```
  show bgp ipv6 neighbors [<ipv6-address> [(advertised-routes | received-routes | routes)]]
  ```

Versions <= 201811 using Quagga routing stack

```
show ipv6 bgp neighbors [<ipv6-address> [(advertised-routes | received-routes | routes)]]
```

- Example:

```
admin@sonic:~$ show bgp ipv6 neighbors fc00::72 advertised-routes

admin@sonic:~$ show bgp ipv6 neighbors fc00::72 received-routes

admin@sonic:~$ show bgp ipv6 neighbors fc00::72 routes
```

Click here to see the example for "show ip bgp summary" for Quagga.

**show ipv6 bgp network

This command displays all the details of IPv6 Border Gateway Protocol (BGP) prefixes.

- Usage:

```
show ipv6 bgp network [[<ipv6-address>|<ipv6-prefix>] [(bestpath | multipath | longer-prefixes | json)]]
```

- Example:
  NOTE: The "longer-prefixes" option is only available when a network prefix with a "/" notation is used.

```
admin@sonic:~$ show ipv6 bgp network

admin@sonic:~$ show ipv6 bgp network fc00::72 bestpath

admin@sonic:~$ show ipv6 bgp network fc00::72 multipath

admin@sonic:~$ show ipv6 bgp network fc00::72 json

admin@sonic:~$ show ipv6 bgp network fc00::72/64 bestpath

admin@sonic:~$ show ipv6 bgp network fc00::72/64 multipath

admin@sonic:~$ show ipv6 bgp network fc00::72/64 json

admin@sonic:~$ show ipv6 bgp network fc00::72/64 longer-prefixes
```

show route-map

This command displays the routing policy that takes precedence over the other route processes that are configured.

- Usage:

```
show route-map
```

- Example:

```
admin@sonic:~$ show route-map
ZEBRA:
route-map RM_SET_SRC, permit, sequence 10
  Match clauses:
  Set clauses:
    src 10.12.0.102
  Call clause:
  Action:
    Exit routemap
ZEBRA:
route-map RM_SET_SRC6, permit, sequence 10
  Match clauses:
  Set clauses:
    src fc00:1::102
  Call clause:
  Action:
    Exit routemap
BGP:
route-map FROM_BGP_SPEAKER_V4, permit, sequence 10
  Match clauses:
  Set clauses:
  Call clause:
  Action:
    Exit routemap
BGP:
route-map TO_BGP_SPEAKER_V4, deny, sequence 10
  Match clauses:
  Set clauses:
  Call clause:
  Action:
    Exit routemap
BGP:
route-map ISOLATE, permit, sequence 10
  Match clauses:
  Set clauses:
    as-path prepend 65000
  Call clause:
  Action:
    Exit routemap
```

BGP config commands

This sub-section explains the list of configuration options available for BGP module for both IPv4 and IPv6 BGP neighbors.

config bgp shutdown all

This command is used to shutdown all the BGP IPv4 & IPv6 sessions.
When the session is shutdown using this command, BGP state in "show ip bgp summary" is displayed as "Idle (Admin)"

- Usage:

```
config bgp shutdown all
```

- Example:

```
admin@sonic:~$ sudo config bgp shutdown all
```

config bgp shutdown neighbor

This command is to shut down a BGP session with a neighbor by that neighbor's IP address or hostname

- Usage:

```
sudo config bgp shutdown neighbor (<ip_address> | <hostname>)
```

- Examples:

```
admin@sonic:~$ sudo config bgp shutdown neighbor 192.168.1.124
```

```
admin@sonic:~$ sudo config bgp shutdown neighbor SONIC02SPINE
```

config bgp startup all

This command is used to start up all the IPv4 & IPv6 BGP neighbors

- Usage:

```
config bgp startup all
```

- Example:

```
admin@sonic:~$ sudo config bgp startup all
```

config bgp startup neighbor

This command is used to start up the particular IPv4 or IPv6 BGP neighbor using either the IP address or hostname.

- Usage:

```
config bgp startup neighbor (<ip-address> | <hostname>)
```

- Examples:

```
admin@sonic:~$ sudo config bgp startup neighbor 192.168.1.124
```

```
admin@sonic:~$ sudo config bgp startup neighbor SONIC02SPINE
```

config bgp remove neighbor

This command is used to remove particular IPv4 or IPv6 BGP neighbor configuration using either the IP address or hostname.

- Usage:

```
config bgp remove neighbor <neighbor_ip_or_hostname>
```

- Examples:

```
admin@sonic:~$ sudo config bgp remove neighbor 192.168.1.124
```

```
admin@sonic:~$ sudo config bgp remove neighbor 2603:10b0:b0f:346::4a
```

```
admin@sonic:~$ sudo config bgp remove neighbor SONIC02SPINE
```

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Console

This section explains all Console show commands and configuration options that are supported in SONiC.

All commands are used only when SONiC is used as console switch.

All commands under this section are not applicable when SONiC used as regular switch.

Console show commands

show line

This command displays serial port or a virtual network connection status.

- Usage:

```
show line (-b|--breif)
```

- Example:

```
admin@sonic:~$ show line
  Line    Baud    Flow Control    PID    Start Time    Device
------  ------  --------------  -----  ------------  --------
     1    9600         Enabled      -             -   switch1
     2       -        Disabled      -             -
     3       -        Disabled      -             -
     4       -        Disabled      -             -
     5       -        Disabled      -             -
```

Optionally, you can display configured console ports only by specifying the `-b` or `--breif` flag.

- Example:

```
admin@sonic:~$ show line -b
  Line    Baud    Flow Control    PID    Start Time    Device
------  ------  --------------  -----  ------------  --------
     1    9600         Enabled      -             -   switch1
```

Console config commands

This sub-section explains the list of configuration options available for console management module.

config console enable

This command is used to enable SONiC console switch feature.

- Usage:

```
config console enable
```

- Example:

```
admin@sonic:~$ sudo config console enable
```

config console disable

This command is used to disable SONiC console switch feature.

- Usage:

```
config console disable
```

- Example:

```
admin@sonic:~$ sudo config console disable
```

config console add

This command is used to add a console port setting.

- Usage:

```
config console add <port_name> [--baud|-b <baud_rate>] [--flowcontrol|-f] [--devicename|-d <remote_device>]
```

- Example:

```
admin@sonic:~$ config console add 1 --baud 9600 --devicename switch1
```

config console del

This command is used to remove a console port setting.

- Usage:

```
config console del <port_name>
```

- Example:

```
admin@sonic:~$ sudo config console del 1
```

config console remote_device

This command is used to update the remote device name for a console port.

- Usage:

```
config console remote_device <port_name> <remote_device>
```

- Example:

```
admin@sonic:~$ sudo config console remote_device 1 switch1
```

config console baud

This command is used to update the baud rate for a console port.

- Usage:

```
config console baud <port_name> <baud_rate>
```

- Example:

```
admin@sonic:~$ sudo config console baud 1 9600
```

config console flow_control

This command is used to enable or disable flow control feature for a console port.

- Usage:

```
config console flow_control {enable|disable} <port_name>
```

- Example:

```
admin@sonic:~$ sudo config console flow_control enable 1
```

Console connect commands

connect line

This command allows user to connect to a remote device via console line with an interactive cli.

- Usage:

```
connect line <target> (-d|--devicename)
```

By default, the target is `port_name` .

- Example:

```
admin@sonic:~$ connect line 1
Successful connection to line 1
Press ^A ^X to disconnect
```

Optionally, you can connect with a remote device name by specifying the `-d` or `--devicename` flag.

- Example:

```
admin@sonic:~$ connect line --devicename switch1
Successful connection to line 1
Press ^A ^X to disconnect
```

connect device

This command allows user to connect to a remote device via console line with an interactive cli.

- Usage:

```
connect device <devicename>
```

The command is same with `connect line --devicename <devicename>`

- Example:

```
admin@sonic:~$ connect line 1
Successful connection to line 1
Press ^A ^X to disconnect
```

Console clear commands

sonic-clear line

This command allows user to connect to a remote device via console line with an interactive cli.

- Usage:

```
sonc-clear line <target> (-d|--devicename)
```

By default, the target is `port_name` .

- Example:

```
admin@sonic:~$ sonic-clear line 1
```

Optionally, you can clear with a remote device name by specifying the `-d` or `--devicename` flag.

- Example:

```
admin@sonic:~$ sonic-clear --devicename switch1
```

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COPP

Control Plane Policing (CoPP) provides policies to protect the CPU of the switch.

COPP show commands

show copp trap

This command is used to view the copp trap configuration

- Usage:

```
show copp trap
```

- Example:

```
admin@sonic:~$ show copp trap
name       trap_ids                    trap_group       always_enabled
---------  --------------------------  ---------------  ----------------
arp        arp_req,arp_resp            arp_group        true
bfd        bfd,bfdv6                   bfd_group        NA
bgp        bgp,bgpv6                   bgp_group        NA
dhcp       dhcp                        dhcp_group       NA
dhcpv6     dhcpv6                      dhcpv6_group     true
dhcpv6_l2  dhcpv6_l2                   dhcpv6_l2_group  true
ip2me      ip2me                       ip2me_group      true
isis       isis                        isis_group       true
lacp       lacp                        lacp_group       true
lldp       lldp                        lldp_group       NA
nat        src_nat_miss,dest_nat_miss  nat_group        NA
nd         neigh_discovery             nd_group         NA
ospf       ospf                        ospf_group       NA
ospf6      ospf6                       ospf6_group      NA
pim        pim                         pim_group        NA
sflow      sample_packet               sflow_group      NA
snmp       snmp                        snmp_group       NA
ssh        ssh                         ssh_group        NA
stp        stp                         stp_group        NA
udld       udld                        udld_group       NA
vrrp       vrrp,vrrpv6                 vrrp_group       NA
```

show copp group

This command is used to view the copp group configuration

- Usage:

```
show copp group
```

- Example:

```
admin@sonic:~$ show copp group
trap_group         queue  trap_action    trap_priority    meter_type    mode    color      cbs    cir  pbs
---------------  -------  -------------  ---------------  ------------  ------  -------  -----  -----  -----
arp_group              5  copy           5                packets       sr_tcm  blind     1500   1500  NA
bfd_group              7  trap           7                packets       sr_tcm  NA        3000   3000  NA
bgp_group              6  trap           6                packets       sr_tcm  NA        1500   1500  NA
default                0  trap           NA               packets       sr_tcm  NA        1500   1500  NA
dhcp_group             4  trap           4                packets       sr_tcm  NA         300    300  NA
dhcpv6_group           3  trap           3                packets       sr_tcm  NA        1500   1500  NA
dhcpv6_l2_group        3  trap           3                packets       sr_tcm  NA        1500   1500  NA
ip2me_group            2  trap           2                packets       sr_tcm  NA        2000   2000  NA
isis_group             3  trap           3                packets       sr_tcm  NA        1500   1500  NA
lacp_group             7  trap           7                packets       sr_tcm  NA         300    300  NA
lldp_group             3  trap           3                packets       sr_tcm  NA         300    300  NA
nat_group              1  trap           1                packets       sr_tcm  NA        1500   1500  NA
nd_group               5  copy           5                packets       sr_tcm  NA        1500   1500  NA
ospf6_group            6  trap           6                packets       sr_tcm  NA        1500   1500  NA
ospf_group             6  trap           6                packets       sr_tcm  NA        1500   1500  NA
pim_group              6  trap           6                packets       sr_tcm  NA        1500   1500  NA
sflow_group            1  trap           10               bytes         storm   NA        8000   8000  NA
snmp_group             4  trap           4                packets       sr_tcm  NA         300    300  NA
ssh_group              4  trap           4                packets       sr_tcm  NA         300    300  NA
stp_group              3  trap           3                packets       sr_tcm  NA         300    300  NA
udld_group             4  trap           4                packets       sr_tcm  NA         300    300  NA
vrrp_group             7  trap           7                packets       sr_tcm  NA         300    300  NA
```

show copp statistics

This command is used to view statistics on packet types

- Usage:

```
show copp statistics [-t|--type (count|rate)] [-m|--meter (packet|byte)] [-p|--protocol <packet-group>]
```

- Parameters:
  - packet-group: the group to which the protocol belongs.
- Example:

```
admin@sonic:~$ show copp statistics
Packet Type        Total Packets Rate    Green Packets Rate    Yellow Packets Rate    Red Packets Rate
---------------  --------------------  --------------------  ---------------------  ------------------
lldp_group                         0                     0                      0                   0
bgp_group                          0                     0                      0                   0
ospf_group                         0                     0                      0                   0
default                            0                     0                      0                   0
bfd_group                          0                     0                      0                   0
pim_group                          0                     0                      0                   0
ospf6_group                        0                     0                      0                   0
arp_group                          0                     0                      0                   0
isis_group                         0                     0                      0                   0
stp_group                          0                     0                      0                   0
vrrp_group                         0                     0                      0                   0
snmp_group                         0                     0                      0                   0
lacp_group                         0                     0                      0                   0
ip2me_group                        0                     0                      0                   0
dhcpv6_group                       0                     0                      0                   0
dhcpv6_l2_group                    0                     0                      0                   0


admin@sonic:~$ show copp  statistics -t count -m packet -p arp_group
Packet Type      Total Packets    Green Packets    Yellow Packets    Red Packets
-------------  ---------------  ---------------  ----------------  -------------
arp_group                   10               10                 0              0
```

COPP config commands

config copp algorithm

This command is used to specify the rate-limiting algorithm for protocol.

- Usage:

```
sudo config copp algorithm <packet-type> <mode> <color> [-g|--green_action <green_action>]
[-y|--yellow_action <yellow_action>][-r|--red_action <red_action>]
```

- Parameters:
  - packet-type: indicates the protocol type.
  - mode: speed limit algorithm.
  - color: speed limit algorithm working mode.
- Example:

```
admin@sonic:~$ sudo config copp algorithm arp sr_tcm blind
admin@sonic:~$ show copp group arp_group
trap_group      queue  trap_action      trap_priority  meter_type    mode    color      cbs    cir  pbs    p
------------  -------  -------------  ---------------  ------------  ------  -------  -----  -----  -----  -
arp_group           5  copy                         5  packets       sr_tcm  blind     1500   1500  NA     N
```

config copp bandwidth

This command is used to specify the packet type and set the CPU bandwidth for sending the packet.

- Usage:

```
sudo config copp bandwidth <packet-type> [-cir <cir-value>] [-cbs <cbs-value>] [-pir <pir-value>]
[-pbs <pbs-value>] [-m|--meter_type (packets|bytes)]
```

- Parameters:
  - packet-type: indicates the protocol type.
  - cir-value: committed information rate.
  - cbs-value: committed burst size.
  - pir-value: peak information rate.
  - pbs-value: peak burst size.
  - meter_type: Statistical unit of the speed limiting algorithm(packets|bytes).
- Example:

```
admin@sonic:~$ sudo config copp bandwith arp -cir 2000 -cbs 20000 -pir 3000 -pbs 30000
admin@sonic:~$ show copp group arp_group
trap_group      queue  trap_action      trap_priority  meter_type    mode    color      cbs    cir    pbs
------------  -------  -------------  ---------------  ------------  ------  -------  -----  -----  -----  -
arp_group           5  copy                         5  packets       sr_tcm  blind    20000   2000  30000
```

config copp packet_action

This command is used to configure how protocol packets are processed.

- Usage:

```
sudo config copp packet_action <packet-type> <packet-action>
```

- Parameters:
  - packet-type: indicates the protocol type.
  - packet-action: the packet processing mode,drop/forward/copy/copy_cancel/trap/log/deny/transit.
- Example:

```
admin@sonic:~$ sudo config copp packet_action arp trap
admin@sonic:~$ show copp group arp_group
trap_group      queue  trap_action      trap_priority  meter_type    mode    color      cbs    cir  pbs    p
------------  -------  -------------  ---------------  ------------  ------  -------  -----  -----  -----  .
arp_group           5  trap                         5  packets       sr_tcm  blind     1500   1500  NA     N
```

config copp queue

This command is used to configure the protocol priority queue.

- Usage:

```
sudo config copp packet_action <packet-type> <queue>
```

- Parameters:
  - packet-type: indicates the protocol type.
  - queue: priority queue,0~7.
- Example:

```
admin@sonic:~$ sudo config copp queue arp 5
admin@sonic:~$ show copp group arp_group
trap_group      queue  trap_action      trap_priority  meter_type    mode    color      cbs    cir  pbs    p
------------  -------  -------------  ---------------  ------------  ------  -------  -----  -----  -----  .
arp_group           5  trap                         5  packets       sr_tcm  blind     1500   1500  NA     N
```

config copp trap

This command is used to configure protocol.

- Usage:

```
sudo config copp trap (add|del) <packet-type>
sudo config copp trap set <packet-type> [-t|--trap_ids <trap_ids>] [-g|--group <packet-group>]
[-a|--always_enabled (true|false)]
```

- Parameters:
  - packet-type: indicates the protocol type.
  - trap-ids: protocol.
  - packet-group: group to which the protocol belongs.
  - always_enabled: used to install protocols which has no associated feature.
- Example:

```
admin@sonic:~$ sudo config copp trap set arp -a false
admin@sonic:~$ show copp trap
name    trap_ids                    trap_group    always_enabled
------  --------------------------  ------------  ----------------
arp     arp_req,arp_resp            arp_group     false
bfd     bfd,bfdv6                   bfd_group     NA
```

```
admin@sonic:~$ sudo config copp trap del arp
admin@sonic:~$ show copp trap
name    trap_ids                    trap_group    always_enabled
------  --------------------------  ------------  ----------------
bfd     bfd,bfdv6                   bfd_group     NA
bgp     bgp,bgpv6                   bgp_group     NA
```

COPP clear commands

clear copp statistics

This command is used to clear statistics on packet types

- Usage:

  ```
  sudo sonic-clear copp statistics [packet-group]
  ```

- Parameters:
  - packet-group: group to which the protocol belongs.
- Example:

```
admin@sonic:~$ show copp statistics -t count
Packet Type        Total Packets    Green Packets    Yellow Packets    Red Packets
---------------  ---------------  ---------------  ----------------  -------------
lldp_group                 19425            19425                 0              0
bgp_group                      0                0                 0              0
ospf_group                     0                0                 0              0
default                        0                0                 0              0
bfd_group                      0                0                 0              0
pim_group                      0                0                 0              0
ospf6_group                    0                0                 0              0
arp_group                     16               16                 0              0
isis_group                 40093            40093                 0              0
stp_group                   9550             9550                 0              0
vrrp_group                     0                0                 0              0
snmp_group                     0                0                 0              0
lacp_group                     0                0                 0              0
ip2me_group                    0                0                 0              0
dhcpv6_group                   0                0                 0              0
dhcpv6_l2_group              525              525                 0              0

admin@sonic:~$ sudo sonic-clear copp statistics lldp_group

admin@sonic:~$ show copp statistics -t count
Packet Type        Total Packets    Green Packets    Yellow Packets    Red Packets
---------------  ---------------  ---------------  ----------------  -------------
lldp_group                     2                2                 0              0
bgp_group                      0                0                 0              0
ospf_group                     0                0                 0              0
default                        0                0                 0              0
bfd_group                      0                0                 0              0
pim_group                      0                0                 0              0
ospf6_group                    0                0                 0              0
arp_group                     16               16                 0              0
isis_group                 40093            40093                 0              0
stp_group                   9550             9550                 0              0
vrrp_group                     0                0                 0              0
snmp_group                     0                0                 0              0
lacp_group                     0                0                 0              0
ip2me_group                    0                0                 0              0
dhcpv6_group                   0                0                 0              0
dhcpv6_l2_group              525              525                 0              0

admin@sonic:~$ sonic-clear copp statistics

admin@sonic:~$ show copp statistics -t count
Packet Type        Total Packets    Green Packets    Yellow Packets    Red Packets
---------------  ---------------  ---------------  ----------------  -------------
lldp_group                     0                0                 0              0
bgp_group                      0                0                 0              0
ospf_group                     0                0                 0              0
default                        0                0                 0              0
```

```
bfd_group                   0               0               0               0
pim_group                   0               0               0               0
ospf6_group                 0               0               0               0
arp_group                   0               0               0               0
isis_group                  0               0               0               0
stp_group                   0               0               0               0
vrrp_group                  0               0               0               0
snmp_group                  0               0               0               0
lacp_group                  0               0               0               0
ip2me_group                 0               0               0               0
dhcpv6_group                0               0               0               0
dhcpv6_l2_group             0               0               0               0
```

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DHCP Relay

DHCP Relay config commands

This sub-section of commands is used to enable or disable DHCP Relay function and add or remove the DHCP Relay Destination IP address(es) for a VLAN interface and enable or disable DHCP Relay option function.

config feature state dhcp_relay (enabled | disabled)

This command is used to load and start dhcp_relay docker.Refering to Feature config commands for the details of this command.

config dhcp_relay ipv4 enable/disable

This is the recommended command used to enable or disable DHCPv4 Relay function.

- Usage:

```
config dhcp_relay ipv4 (enable | disable)
```

- Example:

```
admin@sonic:~$ sudo config dhcp_relay ipv4 enable
Restarting DHCP relay service...


admin@sonic:~$ sudo config dhcp_relay ipv4 disable
Restarting DHCP relay service...
```

config vlan dhcp_relay enable --version 4

This command is used to enable DHCPv4 Relay function.

- Usage:

```
config vlan dhcp_relay enable --version 4
```

- Example:

```
admin@sonic:~$ sudo config vlan dhcp_relay enable --version 4
Enable DHCPv4 relay
Starting DHCPv4 relay service...
```

config vlan dhcp_relay disable --version 4

This command is used to disable DHCPv4 Relay function.

- Usage:

```
config vlan dhcp_relay disable --version 4
```

- Example:

```
admin@sonic:~$ sudo config vlan dhcp_relay disable --version 4
Disable DHCPv4 relay
Stopping DHCPv4 relay service...
```

config dhcp_relay ipv4 helper add/del

This is the recommanded command used to add or delete IPv4 DHCP Relay helper addresses to a VLAN. Note that more than one DHCP Relay helper addresses can be configured on a VLAN interface.

- Usage:

```
config dhcp_relay ipv4 helper (add | del) <vlan_id> <dhcp_helper_ips>
```

- Example:

```
admin@sonic:~$ sudo config dhcp_relay ipv4 helper add 1000 7.7.7.7
Added DHCP relay address [7.7.7.7] to Vlan1000
Restarting DHCP relay service...
```

```
admin@sonic:~$ sudo config dhcp_relay ipv4 helper add 1000 7.7.7.7 1.1.1.1
Added DHCP relay address [7.7.7.7, 1.1.1.1] to Vlan1000
Restarting DHCP relay service...


admin@sonic:~$ sudo config dhcp_relay ipv4 helper del 1000 7.7.7.7
Removed DHCP relay address [7.7.7.7] from Vlan1000
Restarting DHCP relay service...


admin@sonic:~$ sudo config dhcp_relay ipv4 helper del 1000 7.7.7.7 1.1.1.1
Removed DHCP relay address [7.7.7.7, 1.1.1.1] from Vlan1000
Restarting DHCP relay service...
```

config vlan dhcp_relay add

This command is used to add IPv4 DHCP Relay helper addresses to a VLAN. Note that more than one DHCP Relay helper addresses can be operated on a VLAN interface.

- Usage:

```
config vlan dhcp_relay add <vlan_id> <dhcp_relay_destination_ips>
```

- Example:

```
admin@sonic:~$ sudo config vlan dhcp_relay add 1000 7.7.7.7
Added DHCP relay destination address ['7.7.7.7'] to Vlan1000
Restarting DHCP relay service...


admin@sonic:~$ sudo config vlan dhcp_relay add 1000 7.7.7.7 1.1.1.1
Added DHCP relay destination address ['7.7.7.7', '1.1.1.1'] to Vlan1000
Restarting DHCP relay service...
```

config vlan dhcp_relay delete

This command is used to delete a configured DHCP Relay Destination IP address or multiple IP addresses from a VLAN interface.

- Usage:

```
config vlan dhcp_relay del <vlan-id> <dhcp_relay_destination_ips>
```

- Example:

```
admin@sonic:~$ sudo config vlan dhcp_relay del 1000 7.7.7.7
Removed DHCP relay destination address 7.7.7.7 from Vlan1000
Restarting DHCP relay service...


admin@sonic:~$ sudo config vlan dhcp_relay del 1000 7.7.7.7 1.1.1.1
Removed DHCP relay destination address ('7.7.7.7', '1.1.1.1') from Vlan1000
Restarting DHCP relay service...
```

config dhcp_relay ipv4 opt82 enable/disable

This is the recommanded command used to enable or disable DHCPv4 Relay opt82 function.

- Usage:

```
config dhcp_relay ipv4 opt82 (enable | disable)
```

- Example:

```
admin@sonic:~$ sudo config dhcp_relay ipv4 opt82 enable
Restarting DHCP relay service...


admin@sonic:~$ sudo config dhcp_relay ipv4 opt82 disable
Restarting DHCP relay service...
```

config vlan dhcp_relay v4_opt82 enable

This command is used to enable DHCPv4 Relay opt82 function.

- Usage:

```
sudo config vlan dhcp_relay v4_opt82 enable
```

- Example:

```
admin@sonic:~$ sudo config vlan dhcp_relay v4_opt82 enable
DHCPv4 relay option82 has been enabled
Restarting DHCPv4 relay service...
```

config vlan dhcp_relay v4_opt82 disable

This command is used to disable DHCPv4 Relay opt82 function.

- Usage:

```
sudo config vlan dhcp_relay v4_opt82 disable
```

- Example:

```
admin@sonic:~$ sudo config vlan dhcp_relay v4_opt82 disable
DHCPv4 relay option82 has been disabled
Restarting DHCPv4 relay service...
```

config dhcp_relay ipv6 enable/disable

This is the recommended command used to enable or disable DHCPv6 Relay function.

- Usage:

```
sudo config dhcp_relay ipv6 (enable | disable)
```

- Example:

```
admin@sonic:~$ sudo config dhcp_relay ipv6 enable
Restarting DHCP relay service...


admin@sonic:~$ sudo config dhcp_relay ipv6 disable
Restarting DHCP relay service...
```

config dhcp_relay ipv6 destination add/del

This command is used to add or del IPv6 DHCP Relay destination addresses to a VLAN. Note that more than one DHCP Relay Destination addresses can be operated on a VLAN interface.

- Usage:

```
config dhcp_relay ipv6 destination (add | del) <vlan_id> <dhcp_destination_ips>
```

- Example:

```
admin@sonic:~$ sudo config dhcp_relay ipv6 destination add 1000 fc02:2000::1
Added DHCP relay address [fc02:2000::1] to Vlan1000
Restarting DHCP relay service...


admin@sonic:~$ sudo config dhcp_relay ipv6 destination add 1000 fc02:2000::1 fc02:2000::2
Added DHCP relay address [fc02:2000::1, fc02:2000::2] to Vlan1000
Restarting DHCP relay service...


admin@sonic:~$ sudo config dhcp_relay ipv6 destination del 1000 fc02:2000::1
Removed DHCP relay address [fc02:2000::1] from Vlan1000
Restarting DHCP relay service...
```

```
admin@sonic:~$ sudo config dhcp_relay ipv6 destination del 1000 fc02:2000::1 fc02:2000::2
Removed DHCP relay address [fc02:2000::1, fc02:2000::2] from Vlan1000
Restarting DHCP relay service...
```

config dhcp_relay ipv6 opt18 enable/disable

This command is used to enable or disable DHCPv6 Relay option18(interface-id option) on a vlan interface.

- Usage:

```
config dhcp_relay ipv6 opt18 (enable | disable) <vlan-id>
```

- Example:

```
admin@sonic:~$ sudo config dhcp_relay ipv6 opt18 enable 100
Restarting DHCP relay service...


admin@sonic:~$ sudo config dhcp_relay ipv6 opt18 disable 100
Restarting DHCP relay service...
```

config dhcp_relay ipv6 opt79 enable/disable

This command is used to enable or disable DHCPv6 Relay option79(Client Link-Layer Address Option) on a vlan interface.

- Usage:

```
config dhcp_relay ipv6 opt79 (enable | disable) <vlan-id>
```

- Example:

```
admin@sonic:~$ sudo config dhcp_relay ipv6 opt79 enable 100
Restarting DHCP relay service...


admin@sonic:~$ sudo config dhcp_relay ipv6 opt79 disable 100
Restarting DHCP relay service...
```

DHCP Relay show commands

This sub-section of commands is used to show the DHCP Relay IP address(es) in a VLAN interface and show dhcpv6_relay counter of a VLAN.

show runningconfiguration dhcp_relay ipv4

This command is used to dispaly the status of DHCPv4 Relay function and DHCPv4 Relay opt82 function.

- Usage:

```
show runningconfiguration dhcp_relay ipv4
```

- Example:

```
admin@sonic:~$ show runningconfiguration dhcp_relay ipv4
----------------------------  -----
DHCPv4 Relay Status:           FALSE
DHCPv4 Relay Option82 Status:  FALSE
----------------------------  -----
```

show runningconfiguration dhcp_relay ipv6

This command is used to dispaly the status of DHCPv6 Relay function, DHCPv6 Relay option18 and option79 function.

- Usage:

```
show runningconfiguration dhcp_relay ipv6
```

- Example:

```
admin@sonic:~$ show runningconfiguration dhcp_relay ipv6
-------------------  ----
DHCPv6 Relay Staus:  TRUE
-------------------  ----
+-------------+---------------------------------+---------------------------------+
| Interface   | DHCPv6 Relay Option18 Status    | DHCPv6 Relay Option79 Status    |
+=============+=================================+=================================+
| Vlan100     | FALSE                           | TRUE                            |
+-------------+---------------------------------+---------------------------------+
```

show dhcp_relay ipv4 helper

This command is used to show ipv4 dhcp_relay helper.

- Usage:

```
show dhcp_relay ipv4 helper
```

- Example:

```
admin@sonic:~$ show dhcp_relay ipv4 helper
+-------------+----------------------+
|   Interface |   DHCP Relay Address |
+=============+======================+
|    Vlan1000 |            172.2.2.1 |
+-------------+----------------------+
```

show dhcp_relay ipv6 destination

This command is used to show ipv6 dhcp_relay destination.

- Usage:

```
show dhcp_relay ipv6 destination
```

- Example:

```
admin@sonic:~$ show dhcp_relay ipv6 destination
+-------------+----------------------+
|   Interface |   DHCP Relay Address |
+=============+======================+
|    Vlan1000 |              2001::1 |
+-------------+----------------------+
```

show dhcp_relay ipv6 counters

This command is used to show ipv6 dhcp_relay counters.

- Usage:

```
show dhcp_relay ipv6 counters
```

- Example:

```
admin@sonic:~$ sudo sonic-clear dhcp_relay counters
     Message Type    Vlan1000
------------------  ----------
             Unknown           0
             Solicit           0
           Advertise           0
             Request           5
             Confirm           0
               Renew           0
              Rebind           0
               Reply           0
             Release           0
             Decline           0
         Reconfigure           0
Information-Request           0
       Relay-Forward           0
         Relay-Reply           0
           Malformed           0
```

DHCP Relay clear commands

This sub-section of commands is used to clear the DHCP Relay counters.

sonic-clear dhcp_relay ipv6 counter

This command is used to clear ipv6 dhcp_relay counters.

- Usage:

```
sonic-clear dhcp_relay ipv6 counter [-i <interface>]
```

- Example:

```
admin@sonic:~$ sudo sonic-clear dhcp_relay ipv6 counters
```

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Drop Counters

This section explains all the Configurable Drop Counters show commands and configuration options that are supported in SONiC.

Drop Counters show commands

show dropcounters capabilities

This command is used to show the drop counter capabilities that are available on this device. It displays the total number of drop counters that can be configured on this device as well as the drop reasons that can be configured for the counters.

- Usage:

```
show dropcounters capabilities
```

- Examples:

```
admin@sonic:~$ show dropcounters capabilities
Counter Type            Total
--------------------  -------
PORT_INGRESS_DROPS          3
SWITCH_EGRESS_DROPS         2

PORT_INGRESS_DROPS:
      L2_ANY
      SMAC_MULTICAST
      SMAC_EQUALS_DMAC
      INGRESS_VLAN_FILTER
      EXCEEDS_L2_MTU
      SIP_CLASS_E
      SIP_LINK_LOCAL
      DIP_LINK_LOCAL
      UNRESOLVED_NEXT_HOP
      DECAP_ERROR

SWITCH_EGRESS_DROPS:
      L2_ANY
      L3_ANY
      A_CUSTOM_REASON
```

show dropcounters configuration

This command is used to show the current running configuration of the drop counters on this device.

- Usage:

```
show dropcounters configuration [-g <group name>]
```

- Examples:

```
admin@sonic:~$ show dropcounters configuration
Counter   Alias     Group  Type                Reasons              Description
--------  --------  -----  ------------------  -------------------  --------------
DEBUG_0   RX_LEGIT  LEGIT  PORT_INGRESS_DROPS  SMAC_EQUALS_DMAC     Legitimate port-level RX pipeline drops
                                               INGRESS_VLAN_FILTER
DEBUG_1   TX_LEGIT  None   SWITCH_EGRESS_DROPS EGRESS_VLAN_FILTER   Legitimate switch-level TX pipeline dro

admin@sonic:~$ show dropcounters configuration -g LEGIT
Counter   Alias     Group  Type                Reasons              Description
--------  --------  -----  ------------------  -------------------  --------------
DEBUG_0   RX_LEGIT  LEGIT  PORT_INGRESS_DROPS  SMAC_EQUALS_DMAC     Legitimate port-level RX pipeline drops
                                               INGRESS_VLAN_FILTER
```

show dropcounters counts

This command is used to show the current statistics for the configured drop counters. Standard drop counters are displayed as well for convenience.

Because clear (see below) is handled on a per-user basis different users may see different drop counts.

- Usage:

  ```
  show dropcounters counts [-g <group name>] [-t <counter type>]
  ```

- Example:

```
admin@sonic:~$ show dropcounters counts
    IFACE    STATE    RX_ERR    RX_DROPS    TX_ERR    TX_DROPS   RX_LEGIT
---------  -------  --------  ----------  --------  ----------  ---------
Ethernet0        U        10         100         0           0         20
Ethernet4        U         0        1000         0           0        100
Ethernet8        U       100          10         0           0          0

DEVICE  TX_LEGIT
------  --------
sonic       1000

admin@sonic:~$ show dropcounters counts -g LEGIT
    IFACE    STATE    RX_ERR    RX_DROPS    TX_ERR    TX_DROPS   RX_LEGIT
---------  -------  --------  ----------  --------  ----------  ---------
Ethernet0        U        10         100         0           0         20
Ethernet4        U         0        1000         0           0        100
Ethernet8        U       100          10         0           0          0

admin@sonic:~$ show dropcounters counts -t SWITCH_EGRESS_DROPS
DEVICE  TX_LEGIT
------  --------
sonic       1000
```

Drop Counters config commands

config dropcounters install

This command is used to initialize a new drop counter. The user must specify a name, type, and initial list of drop reasons.

This command will fail if the given name is already in use, if the type of counter is not supported, or if any of the specified drop reasons are not supported. It will also fail if all avaialble counters are already in use on the device.

- Usage:

```
config dropcounters install <counter name> <counter type> <reasons list> [-d <description>] [-g <group>] [-a
```

- Example:

```
admin@sonic:~$ sudo config dropcounters install DEBUG_2 PORT_INGRESS_DROPS [EXCEEDS_L2_MTU,DECAP_ERROR] -d '
```

config dropcounters add_reasons

This command is used to add drop reasons to an already initialized counter.

This command will fail if any of the specified drop reasons are not supported.

- Usage:

```
config dropcounters add_reasons <counter name> <reasons list>
```

- Example:

```
admin@sonic:~$ sudo config dropcounters add_reasons DEBUG_2 [SIP_CLASS_E]
```

config dropcounters remove_reasons

This command is used to remove drop reasons from an already initialized counter.

- Usage:

```
config dropcounters remove_reasons <counter name> <reasons list>
```

- Example:

```
admin@sonic:~$ sudo config dropcounters remove_reasons DEBUG_2 [SIP_CLASS_E]
```

config dropcounters delete

This command is used to delete a drop counter.

- Usage:

```
config dropcounters delete <counter name>
```

- Example:

```
admin@sonic:~$ sudo config dropcounters delete DEBUG_2
```

Drop Counters clear commands

sonic-clear dropcounters

This comnmand is used to clear drop counters. This is done on a per-user basis.

- Usage:

```
sonic-clear dropcounters
```

- Example:

```
admin@sonic:~$ sonic-clear dropcounters
Cleared drop counters
```

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Dynamic Buffer Management

This section explains all the show and configuration commands regarding the dynamic buffer management.

Dynamic buffer management is responsible for calculating buffer size according to the ports' configured speed and administrative state. In order to enable dynamic buffer management feature, the ports' speed must be configured. For this please refer Interface naming mode config commands

Configuration commands

configure shared headroom pool

This command is used to configure the shared headroom pool. The shared headroom pool can be enabled in the following ways:

- Configure the over subscribe ratio. In this case, the size of shared headroom pool is calculated as the accumulative xoff of all of the lossless PG divided by the over subscribe ratio.
- Configure the size.

In case both of the above parameters have been configured, the `size` will take effect. To disable shared headroom pool, configure both parameters to zero.

- Usage:

```
config buffer shared-headroom-pool over-subscribe-ratio <over-subscribe-ratio>
config buffer shared-headroom-pool size <size>
```

  The range of over-subscribe-ratio is from 1 to number of ports inclusive.
- Example:

```
admin@sonic:~$ sudo config shared-headroom-pool over-subscribe-ratio 2
admin@sonic:~$ sudo config shared-headroom-pool size 1024000
```

configure a custom pool

This command is used to configure a custom pool.

- Usage:

```
admin@sonic:~$ sudo config buffer pool -h
Usage: config buffer pool [OPTIONS] COMMAND [ARGS]...

  Configure buffer pool

Options:
  -?, -h, --help  Show this message and exit.

Commands:
  remove  Remove buffer pool
  set     Confifure buffer pool
```

- Example:

```
admin@sonic:~$ sudo config buffer pool set def_ingress_pool -t ingress -x 2560 -s 2560000
admin@sonic:~$ sudo config buffer pool remove def_ingress_pool
```

configure a lossless buffer profile

This command is used to configure a lossless buffer profile.

- Usage:

```
config buffer profile add <profile_name> --pool <pool_name> --mode <static | dynamic> [--xo
config buffer profile set <profile_name> --pool <pool_name> --mode <static | dynamic> [--xo
config buffer profile remove <profile_name>
```

  All the parameters are devided to two groups, one for headroom and one for dynamic_th. For any command at lease one group of parameters should be provided.
  For headroom parameters:
  - `xon` is madantory.
  - If shared headroom pool is disabled:
    - At lease one of `xoff` and `size` should be provided and the other will be optional and conducted via the formula `xon + xoff = size`.
    - `xon + xoff <= size`;
  - If shared headroom pool is enabled:
    - `xoff` should be provided.
    - `size = xoff` if it is not provided.

  If only dynamic_th parameter is provided, the `headroom_type` will be set as `dynamic` and `xon`, `xoff` and `size` won't be set. This is only used for non default dynamic_th. In this case, the profile won't be deployed to ASIC directly. It can be configured to a lossless PG and then a dynamic

profile will be generated based on the port's speed, cable length, and MTU and deployed to the ASIC.
The subcommand `add` is designed for adding a new buffer profile to the system.
The subcommand `set` is designed for modifying an existing buffer profile in the system.
For a profile with dynamically calculated headroom information, only `dynamic_th` can be modified.
The subcommand `remove` is designed for removing an existing buffer profile from the system.
When removing a profile, it shouldn't be referenced by any entry in `CONFIG_DB.BUFFER_PG`.

- Example:

```
admin@sonic:~$ sudo config buffer profile add --mode static --size 2560 --xoff 2560 --static_th 25600 --pool
admin@sonic:~$ sudo config buffer profile remove profile1
```

config interface cable_length

This command is used to configure the length of the cable connected to a port. The cable_length is in unit of meters and must be suffixed with "m".

- Usage:

```
config interface cable_length <interface_name> <cable_length>
```

- Example:

```
admin@sonic:~$ sudo config interface cable_length Ethernet0 40m
```

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config interface buffer priority-group lossless

This command is used to configure the priority groups on which lossless traffic runs.

- Usage:

```
config interface buffer priority-group lossless add <interface_name> <pg_map> [profile]
config interface buffer priority-group lossless set <interface_name> <pg_map> [profile]
config interface buffer priority-group lossless remove <interface_name> [<pg_map>]
```

The <pg_map> can be in one of the following two forms:
  - For a range of priorities, the lower bound and upper bound connected by a dash, like `3-4`
  - For a single priority, the number, like `6`

The `pg-map` represents the map of priorities for lossless traffic. It should be a string and in form of a bit map like `3-4`. The `-` connects the lower bound and upper bound of a range of priorities.
The subcommand `add` is designed for adding a new lossless PG on top of current PGs. The new PG range must be disjoint with all existing PGs.

For example, currently the PG range 3-4 exist on port Ethernet4, to add PG range 4-5 will fail because it isn't disjoint with 3-4. To add PG range 5-6 will succeed. After that both range 3-4 and 5-6 will work as lossless PG.
The `override-profile` parameter is optional. When provided, it represents the predefined buffer profile for headroom override.
The subcommand `set` is designed for modifying an existing PG from dynamic calculation to headroom override or vice versa. The `pg-map` must be an existing PG.
The subcommand `remove` is designed for removing an existing PG. The option `pg-map` must be an existing PG. All lossless PGs will be removed in case no `pg-map` provided.

- Example:
  To configure lossless_pg on a port:

```
admin@sonic:~$ sudo config interface buffer priority-group lossless add Ethernet0 3-4
```

  To change the profile used for lossless_pg on a port:

```
admin@sonic:~$ sudo config interface buffer priority-group lossless set Ethernet0 3-4 new-profile
```

  To remove one lossless priority from a port:

```
admin@sonic:~$ sudo config interface buffer priority-group lossless remove Ethernet0 6
```

  To remove all lossless priorities from a port:

```
admin@sonic:~$ sudo config interface buffer priority-group lossless remove Ethernet0
```

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config interface buffer queue

This command is used to configure the buffer profiles for queues.

- Usage:

```
config interface buffer queue add <interface_name> <queue_map> <profile>
config interface buffer queue set <interface_name> <queue_map> <profile>
config interface buffer queue remove <interface_name> <queue_map>
```

  The <queue_map> represents the map of queues. It can be in one of the following two forms:
  - For a range of priorities, the lower bound and upper bound connected by a dash, like `3-4`
  - For a single priority, the number, like `6`

  The subcommand `add` is designed for adding a buffer profile for a group of queues. The new queue range must be disjoint with all queues with buffer profile configured.

For example, currently the buffer profile configured on queue 3-4 on port Ethernet4, to configure buffer profile on queue 4-5 will fail because it isn't disjoint with 3-4. To configure it on range 5-6 will succeed.

The `profile` parameter represents a predefined egress buffer profile to be configured on the queues.

The subcommand `set` is designed for modifying an existing group of queues.

The subcommand `remove` is designed for removing buffer profile on an existing group of queues.

- Example:

  To configure buffer profiles for queues on a port:

  ```
  admin@sonic:~$ sudo config interface buffer queue add Ethernet0 3-4 egress_lossless_profile
  ```

  To change the profile used for queues on a port:

  ```
  admin@sonic:~$ sudo config interface buffer queue set Ethernet0 3-4 new-profile
  ```

  To remove a group of queues from a port:

  ```
  admin@sonic:~$ sudo config interface buffer queue remove Ethernet0 3-4
  ```

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Show commands

show buffer information

This command is used to display the status of buffer pools and profiles currently deployed to the ASIC.

- Usage:

  ```
  show mmu
  ```

- Example:

  ```
  admin@sonic:~$ show mmu
          Pool Name      Type    Mode    Share Size    Headroom Size
  -----------------  -------  ------  ------------  ---------------
  egress_lossy_pool   egress  static      28487680               NA
  ingress_lossy_pool  ingress  static      26236928          2250752
            Profile Name     Type           Pool Used     Mode    Guaranteed Size    Share Thr
  ---------------------  -------  ------------------  -------  -----------------  ----------
  egress_unicast_profile   egress   egress_lossy_pool  dynamic               2048
  ingress_lossy_profile  ingress  ingress_lossy_pool   static               4096            3
  ```

show buffer configuration

This command is used to display the status of buffer pools and profiles currently configured.

- Usage:

```
show buffer configuration
```

- Example:

```
admin@sonic:~$ show buffer configuration
Lossless traffic pattern:
--------------------  -
default_dynamic_th    0
over_subscribe_ratio  0
--------------------  -

Pool: ingress_lossless_pool
----  --------
type  ingress
mode  dynamic
----  --------

Pool: egress_lossless_pool
----  --------
type  egress
mode  dynamic
size  34340822
----  --------

Pool: ingress_lossy_pool
----  --------
type  ingress
mode  dynamic
----  --------

Pool: egress_lossy_pool
----  --------
type  egress
mode  dynamic
----  --------

Profile: q_lossy_profile
----------  -------------------------------
dynamic_th  3
pool        [BUFFER_POOL:egress_lossy_pool]
size        0
----------  -------------------------------

Profile: egress_lossy_profile
----------  -------------------------------
dynamic_th  3
pool        [BUFFER_POOL:egress_lossy_pool]
size        4096
----------  -------------------------------

Profile: egress_lossless_profile
----------  ---------------------------------
dynamic_th  7
pool        [BUFFER_POOL:egress_lossless_pool]
size        0
```

```
----------  ---------------------------------

Profile: ingress_lossless_profile
----------  ---------------------------------
dynamic_th  0
pool        [BUFFER_POOL:ingress_lossless_pool]
size        0
----------  ---------------------------------

Profile: ingress_lossy_profile
----------  ------------------------------
dynamic_th  3
pool        [BUFFER_POOL:ingress_lossy_pool]
size        0
----------  ------------------------------
```

show buffer counter

This command is used to display the status of buffer statictis currently deployed to the ASIC.

- Usage:

  ```
  show buffer statistics priority-group [-p <port_name>]
  show buffer statistics queue [-p <port_name>]
  ```

  - Parameters:
    - port_name Port name
- Example:

```
admin@sonic:~$ show buffer statistics priority-group -p Ethernet2
    Port    Priority Group    Guaranteed Used    Guaranteed Available    Share Used    Share
---------  ----------------  -----------------  ----------------------  ------------  ------
Ethernet2                 0               4096                       0          2304
Ethernet2                 1               4096                       0      14324736
Ethernet2                 2               4096                       0          1536
Ethernet2                 3               4096                       0          5376
Ethernet2                 4               4096                       0          1024
Ethernet2                 5               2560                       0       1789440
Ethernet2                 6               4096                       0       5313792
Ethernet2                 7               4096                       0         16896
admin@sonic:~$ show buffer statistics queue -p Ethernet6
    Port    Queue    Guaranteed Used    Guaranteed Available    Share Used    Share Availab
---------  -------  -----------------  ----------------------  ------------  --------------
Ethernet6      UC0                7424                       0          5376           6157
Ethernet6      UC1            14366208                       0      14364160
Ethernet6      UC2                4352                       0          3328           6159
Ethernet6      UC3               11008                       0          9984           6152
Ethernet6      UC4                7424                       0          5376           6157
Ethernet6      UC5             1873920                       0       1871360           3674
Ethernet6      UC6             5289216                       0       5287168            875
Ethernet6      UC7               10240                       0          8192           6154
```

ECN

This section explains all the Explicit Congestion Notification (ECN) show commands and ECN configuation options that are supported in SONiC.

ECN show commands

This sub-section contains the show commands that are supported in ECN.

show ecn

This command displays all the WRED profiles that are configured in the device.

- Usage:

  ```
  show ecn
  ```

- Example:

```
admin@sonic:~/hhh$ show ecn cfg
  Profile Name    Max Threshold    Min Threshold    Drop Probability    Weight    Ecn Enable
--------------  ---------------  ---------------  ------------------  --------  ------------
          wred              512              256                  60        15       disable
admin@sonic:~/hhh$ show ecn apply
  Interface    Queue    Ecn Wred Profile
-----------  -------  ------------------
  Ethernet6        5                wred
```

ECN config commands

This sub-section contains the configuration commands that can configure the WRED profiles.

config ecn

This command configures the possible fields in a particular WRED profile that is specified using "-profile " argument.
The list of the WRED profile fields that are configurable is listed in the below "Usage".

- Usage:

```
config ecn set -profile <profile-name> -rmax <red-threshold-max> -rmin <red-threshold-min> -
config ecn ecn enable <profile-name> <none | green | yellow | red | green_yellow | green_red
config ecn apply -profile <profile-name> -queue_map <queue_map> -port <interface_name>
```

  - Parameters:
    - profile_name Profile name
    - max_th Set max threshold
    - min_th Set min threshold
- Example (Configures the "max threshold" for the WRED profile name "wredprofileabcd". It will create the WRED profile if it does not exist.):

```
admin@sonic:~$ sudo config ecn set -profile default -rmax 5080 -rmin 2540 -ymax 5080 -ymin 2
admin@sonic:~$ sudo config ecn enable default all
admin@sonic:~$ sudo config ecn apply -profile default -queue_map 0-2 -port Ethernet1
```

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fast reboot

fast-reboot command enables a switch to reboot up quickly, with minimum disruption to the data planecommand initiates a fast reboot of the device.

This command requires root privilege.

- Usage:

```
fasr-reboot [-h|-?|-v|-f|-i|-d|-r|-k|-x|-c <control plane assistant IP list>|-s|-t|-D]
```

- Parameters:

```
-h,-? : get this help
-v    : turn on verbose mode
-f    : force execution - ignore Orchagent RESTARTCHECK failure
-i    : force execution - ignore ASIC MD5-checksum-verification
-d    : force execution - ignore database integrity check
-r    : reboot with /sbin/reboot
-k    : reboot with /sbin/kexec -e [default]
-x    : execute script with -x flag
-c    : specify control plane assistant IP list
-s    : strict mode: do not proceed without:
        - control plane assistant IP list.
-t    : Don't tag the current kube images as latest
-D    : detached mode - closing terminal will not cause stopping reboot
```

- Example:

```
admin@sonic:~$  sudo fast-reboot -v
Mon 20 Mar 2023 10:23:44 AM UTC Saving counters folder before warmboot...
Mon 20 Mar 2023 10:23:46 AM UTC Collecting logs to check ssd health before fast-reboot...
Mon 20 Mar 2023 10:23:46 AM UTC Stopping lldp.timer ...
Mon 20 Mar 2023 10:23:46 AM UTC Stopped lldp.timer ...
Mon 20 Mar 2023 10:23:46 AM UTC Stopping mgmt-framework.timer ...
Mon 20 Mar 2023 10:23:46 AM UTC Stopped mgmt-framework.timer ...
Mon 20 Mar 2023 10:23:46 AM UTC Stopping pmon.timer ...
Mon 20 Mar 2023 10:23:46 AM UTC Stopped pmon.timer ...
Mon 20 Mar 2023 10:23:46 AM UTC Stopping snmp.timer ...
Mon 20 Mar 2023 10:23:46 AM UTC Stopped snmp.timer ...
Mon 20 Mar 2023 10:23:46 AM UTC Stopping telemetry.timer ...
Mon 20 Mar 2023 10:23:46 AM UTC Stopped telemetry.timer ...
Mon 20 Mar 2023 10:23:46 AM UTC Stopping lldp ...
Mon 20 Mar 2023 10:23:48 AM UTC Stopped lldp
Mon 20 Mar 2023 10:23:48 AM UTC Stopping radv ...
Mon 20 Mar 2023 10:23:49 AM UTC Stopped radv
Mon 20 Mar 2023 10:23:49 AM UTC Stopping teamd ...
Mon 20 Mar 2023 10:23:49 AM UTC Stopped teamd
Mon 20 Mar 2023 10:23:49 AM UTC Stopping bgp ...
Mon 20 Mar 2023 10:23:54 AM UTC Stopped bgp
Mon 20 Mar 2023 10:23:54 AM UTC Stopping swss ...
Mon 20 Mar 2023 10:24:03 AM UTC Stopped swss
Mon 20 Mar 2023 10:24:03 AM UTC Stopping syncd ...
Mon 20 Mar 2023 10:24:13 AM UTC Stopped syncd
Mon 20 Mar 2023 10:24:13 AM UTC Stopping all remaining containers ...
Mon 20 Mar 2023 10:24:16 AM UTC Stopped all remaining containers ...
Mon 20 Mar 2023 10:24:18 AM UTC Enabling Watchdog before fast-reboot
Mon 20 Mar 2023 10:24:18 AM UTC Rebooting with /sbin/kexec -e to SONiC-OS-SONiC_1.3.0_20230320003403 ...
```

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Feature

SONiC includes a capability in which Feature state can be enabled/disabled which will make corresponding feature docker container to start/stop.

Also SONiC provide capability in which Feature docker container can be automatically shut down and restarted if one of critical processes running in the container exits unexpectedly. Restarting the entire feature container ensures that configuration is reloaded and all processes in the feature container get restarted, thus increasing the likelihood of entering a healthy state.

Feature show commands

show feature config

Shows the config of given feature or all if no feature is given. The "fallback" is shown only if configured. The fallback defaults to "true" when not configured.

- Usage:

```
show feature config [<feature name>]
```

- Example:

```
admin@sonic:~$ show feature config
Feature         State     AutoRestart    Owner    fallback
--------------  --------  -------------  -------  ----------
bgp             enabled   enabled        local
database        enabled   disabled       local
dhcp_relay      enabled   enabled        kube
lldp            enabled   enabled        kube     true
mgmt-framework  enabled   enabled        local
nat             disabled  enabled        local
pmon            enabled   enabled        kube
radv            enabled   enabled        kube
sflow           disabled  enabled        local
snmp            enabled   enabled        kube
swss            enabled   enabled        local
syncd           enabled   enabled        local
teamd           enabled   enabled        local
telemetry       enabled   enabled        kube
```

show feature status

Shows the status of given feature or all if no feature is given. The "fallback" defaults to "true" when not configured.
The subset of features are configurable for remote management and only those report additional data.

- Usage:

```
show feature status [<feature name>]
```

- Example:

```
admin@sonic:~$ show feature status
Feature         State     AutoRestart    SystemState    UpdateTime           ContainerId    ContainerVersion
--------------  --------  -------------  -------------  -------------------  -------------  ----------------
bgp             enabled   enabled        up
database        enabled   disabled
dhcp_relay      enabled   enabled        up             2020-11-15 18:21:09  249e70102f55   20201230.100
lldp            enabled   enabled        up             2020-11-15 18:21:09  779c2d55ee12   20201230.100
mgmt-framework  enabled   enabled        up
nat             disabled  enabled
pmon            enabled   enabled        up             2020-11-15 18:20:27  a2b9ffa8aba3   20201230.100
radv            enabled   enabled        up             2020-11-15 18:21:05  d8ff27dcfe46   20201230.100
sflow           disabled  enabled
snmp            enabled   enabled        up             2020-11-15 18:25:51  8b7d5529e306   20201230.111
swss            enabled   enabled        up
syncd           enabled   enabled        up
teamd           enabled   enabled        up
telemetry       enabled   enabled        down           2020-11-15 18:24:59                 20201230.100
```

config feature owner

Configures the owner for a feature as "local" or "kube". The "local" implies starting the feature container from local image. The "kube" implies that kubernetes server is made eligible to deploy the feature. The deployment of a feature by kubernetes is conditional based on many factors like, whether the kube server is configured or not, connected-to-kube-server or not and if that master has manifest for this feature for this switch or not and more. At some point in future, the deployment *could* happen and till that point the feature can run from local image, called "fallback". The fallback is allowed by default and it could be toggled to "not allowed". When fallback is not allowed, the feature would run only upon deployment by kubernetes master.

- Usage:

```
config feature owner [<feature name>] [local/kube]
```

- Example:

```
admin@sonic:~$ sudo config feature owner snmp kube
```

config feature fallback

Features configured for "kube" deployment could be allowed to fallback to using local image, until the point of successful kube deployment. The fallback is allowed by default.

- Usage:

```
config feature fallback [<feature name>] [on/off]
```

- Example:

```
admin@sonic:~$ sudo config feature fallback snmp on
```

show feature autorestart

This command will display the status of auto-restart for feature container.

- Usage:

```
show feature autorestart [<feature_name>]
admin@sonic:~$ show feature autorestart
Feature     AutoRestart
----------  --------------
bgp         enabled
database    always_enabled
dhcp_relay  enabled
lldp        enabled
pmon        enabled
radv        enabled
snmp        enabled
swss        enabled
syncd       enabled
teamd       enabled
telemetry   enabled
```

Optionally, you can specify a feature name in order to display
status for that feature

Feature config commands

config feature state <feature_name>

This command will configure the state for a specific feature.

- Usage:

```
config feature state <feature_name> (enabled | disabled)
admin@sonic:~$ sudo config feature state bgp disabled
```

config feature autorestart <feature_name> <autorestart_status>

This command will configure the status of auto-restart for a specific feature container.

- Usage:

```
config feature autorestart <feature_name> (enabled | disabled)
admin@sonic:~$ sudo config feature autorestart bgp disabled
```

NOTE: If the existing state or auto-restart value for a feature is "always_enabled" then config commands are don't care and will not update state/auto-restart value.

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Flow Counters

This section explains all the Flow Counters show commands and clear commands that are supported in SONiC. Flow counters are usually used for debugging, troubleshooting and performance enhancement processes. Flow counters supports case like:

- Host interface traps (number of received traps per Trap ID)

Flow Counters show commands

show flowcnt-trap stats

This command is used to show the current statistics for the registered host interface traps.

Because clear (see below) is handled on a per-user basis different users may see different counts.

- Usage:

```
show flowcnt-trap stats
```

- Example:

```
admin@sonic:~$ show flowcnt-trap stats
Trap Name    Packets    Bytes      PPS
---------  ---------  -------  -------
     dhcp        100    2,000  50.25/s

For multi-ASIC:
admin@sonic:~$ show flowcnt-trap stats
ASIC ID    Trap Name    Packets    Bytes      PPS
-------  -----------  ---------  -------  -------
  asic0         dhcp        100    2,000  50.25/s
  asic1         dhcp        200    3,000  45.25/s
```

Flow Counters clear commands

sonic-clear flowcnt-trap

This command is used to clear the current statistics for the registered host interface traps. This is done on a per-user basis.

- Usage:

```
sonic-clear flowcnt-trap
```

- Example:

```
admin@sonic:~$ sonic-clear flowcnt-trap
Trap Flow Counters were successfully cleared
```

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FTP

FTP Server config commands

config ftp-server enable

This command is used to enable FTP server function.

- Usage:

```
sudo config ftp-server enable
```

- Example:

```
admin@sonic:~$ sudo config ftp-server enable
Restarting vsftpd-config service...
```

config ftp-server disable

This command is used to disable FTP server function.

- Usage:

```
sudo config ftp-server disable
```

- Example:

```
admin@sonic:~$ sudo config ftp-server disable
Restarting vsftpd-config service...
```

config ftp-server timeout

This command is used to set FTP server max idle time. It is in seconds and can be configured from 1 to 3600. The default value is 600. Server will disconnect it if FTP client did nothing after the max idle time.

- Usage:

```
sudo config ftp-server timeout <timeout>
```

- Example:

```
admin@sonic:~$ sudo config ftp-server timeout 300
Restarting vsftpd-config service...
```

config ftp-server max-sessions

This command is used to set the maximum number of FTP clients that can be concurrently connected to the FTP server. The value ranges from 1 to 20. The default value is 10.

- Usage:

```
sudo config ftp-server max-sessions <max_sessions>
```

- Example:

```
admin@sonic:~$ sudo config ftp-server max-sessions 5
Restarting vsftpd-config service...
```

config ftp-server login-times

This command is used to set the maximum login times which presents the times that a user can perform account and password authentication during login of an FTP session. The default value is 1, which means if an incorrect user name or password is entered once, the session is terminated and other users are allowed to go online. If the configuration is more than 1, the client needs to use the "user' command to re-enter the user name and password after one failed login. The value ranges from 1 to 10. The default value is 1.

- Usage:

```
sudo config ftp-server login-times <login-times>
```

- Example:

```
admin@sonic:~$ sudo config ftp-server login-times 5
Restarting vsftpd-config service...
```

FTP Server show commands

show ftp-server

This command is used to display the status of FTP Server function, configured values of login times, max sessions and timeout.

- Usage:

```
show ftp-server
```

- Example:

```
admin@sonic:~$ show ftp-server
enable : Y
timeout : 300 s
max sessions : 10
login_times : 1
```

FTP Client commands

This subsection describes how to log in to a FTP Server and related commonly used commands.

ftp

This command is used to log in a FTP Server.

- Usage:

```
ftp <server-address>
```

- Example:

```
admin@sonic:~$ ftp 10.110.197.248
Connected to 10.110.197.248.
220 (vsFTPd 3.0.3)
Name (10.110.197.248:admin): admin
331 Please specify the password.
Password:
530 Login incorrect.
Login failed.
ftp> user
(username) admin
331 Please specify the password.
Password:
230 Login successful.
Remote system type is UNIX.
Using binary mode to transfer files.
ftp>
```

put

This command is used to upload files.

- Usage:

```
put <local-directory/local-file> <remote-directory/remote-file>
```

- Example:

```
admin@sonic:~$ ftp 172.20.92.130
Connected to 172.20.92.130.
220 Microsoft FTP Service
Name (172.20.92.130:admin): admin
331 Password required
Password:
230 User logged in.
Remote system type is Windows_NT.
ftp> put /home/admin/test/client_file.txt sonic/client_file.txt
local: /home/admin/test/client_file.txt remote: sonic/client_file.txt
200 PORT command successful.
125 Data connection already open; Transfer starting.
226 Transfer complete.
ftp>
```

get

This command is used to download files.

- Usage:

```
get <remote-directory/remote-file> <local-directory/local-file>
```

- Example:

```
admin@sonic:~$ ftp 172.20.92.130
Connected to 172.20.92.130.
220 Microsoft FTP Service
Name (172.20.92.130:admin): admin
331 Password required
Password:
230 User logged in.
Remote system type is Windows_NT.
ftp> get sonic/server_file.txt /home/admin/test/server_file.txt
local: /home/admin/test/server_file.txt remote: sonic/server_file.txt
200 PORT command successful.
125 Data connection already open; Transfer starting.
226 Transfer complete.
ftp>
```

passive

This command is used to switch the connection mode between passive and active with FTP Server.

- Usage:

```
passive
```

- Example:

```
admin@sonic:~$ ftp 172.20.92.130
Connected to 172.20.92.130.
220 Microsoft FTP Service
Name (172.20.92.130:admin): admin
331 Password required
Password:
230 User logged in.
Remote system type is Windows_NT.
ftp> passive
Passive mode on.
ftp> passive
Passive mode off.
ftp>
```

binary/ascii

This command is used to switch the data transfer mode between binary and ascii.

- Usage:

```
binary
```

```
ascii
```

- Example:

```
admin@sonic:~$ ftp 172.20.92.130
Connected to 172.20.92.130.
220 Microsoft FTP Service
Name (172.20.92.130:admin): admin
331 Password required
Password:
230 User logged in.
Remote system type is Windows_NT.
ftp> binary
200 Type set to I.
ftp>
ftp> ascii
200 Type set to A.
ftp>
```

status

This command is used to display information of FTP Client.

- Usage:

```
status
```

- Example:

```
admin@sonic:~$ ftp 172.28.48.112
Connected to 172.28.48.112.
220 (vsFTPd 3.0.3)
Name (172.28.48.112:admin): admin
331 Please specify the password.
Password:
230 Login successful.
Remote system type is UNIX.
Using binary mode to transfer files.
ftp> status
Connected to 172.28.48.112.
No proxy connection.
Connecting using address family: any.
Mode: stream; Type: binary; Form: non-print; Structure: file
Verbose: on; Bell: off; Prompting: on; Globbing: on
Store unique: off; Receive unique: off
Case: off; CR stripping: on
Quote control characters: on
Ntrans: off
Nmap: off
Hash mark printing: off; Use of PORT cmds: on
Tick counter printing: off
ftp>
```

rstatus

This command is used to display information of FTP Server.

- Usage:

```
rstatus
```

- Example:

```
admin@sonic:~$ ftp 172.28.48.112
Connected to 172.28.48.112.
220 (vsFTPd 3.0.3)
Name (172.28.48.112:admin): sdk
331 Please specify the password.
Password:
230 Login successful.
Remote system type is UNIX.
Using binary mode to transfer files.
ftp> rstatus
211-FTP server status:
    Connected to ::ffff:172.20.37.43
    Logged in as sdk
    TYPE: ASCII
    No session bandwidth limit
    Session timeout in seconds is 300
    Control connection is plain text
    Data connections will be plain text
    At session startup, client count was 1
    vsFTPd 3.0.3 - secure, fast, stable
211 End of status
ftp>
```

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Gearbox

This section explains all the Gearbox PHY show commands that are supported in SONiC.

Gearbox show commands

This sub-section contains the show commands that are supported for gearbox phy.

show gearbox interfaces status

This command displays information about the gearbox phy interface lanes, speeds and status. Data is displayed for both MAC side and line side of the gearbox phy

- Usage:

```
show gearbox interfaces status
```

- Example:

```
home/admin# show gearbox interfaces status
  PHY Id    Interface    MAC Lanes    MAC Lane Speed    PHY Lanes    PHY Lane Speed    Line Lanes    Line Lane Sp
--------  -----------  -----------  ----------------  -----------  ----------------  ------------  --------------
       1    Ethernet0  25,26,27,28               10G      200,201               20G           206
       1    Ethernet4  29,30,31,32               10G      202,203               20G           207
       1    Ethernet8  33,34,35,36               10G      204,205               20G           208
```

show gearbox phys status

This command displays basic information about the gearbox phys configured on the switch.

- Usage:

```
show gearbox phys status
```

- Example:

```
/home/admin# show gearbox phys status
  PHY Id     Name    Firmware
--------  -------  ----------
       1  sesto-1        v0.1
```

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Update Device Hostname Configuration Commands

This sub-section of commands is used to change device hostname without traffic being impacted.

config hostname

This command is used to change device hostname without traffic being impacted.

- Usage:

```
config hostname <new_hostname>
```

- Example:

```
admin@sonic:~$ sudo config hostname CSW06
Please note loaded setting will be lost after system reboot. To preserve setting, run `config save`.
```

Interfaces

Interface Show Commands

This sub-section lists all the possible show commands for the interfaces available in the device. Following example gives the list of possible shows on interfaces.
Subsequent pages explain each of these commands in detail.

- Example:

```
admin@sonic:~$ show interfaces -?

Show details of the network interfaces

Options:
  -?, -h, --help  Show this message and exit.

Commands:
alias          Show Interface Name/Alias Mapping
autoneg        Show interface autoneg information
breakout       Show Breakout Mode information by interfaces
counters       Show interface counters
description    Show interface status, protocol and description
errdisable     Show interfaces errdisable
info           Show interfaces info command
media          Show interfaces media type
mpls           Show Interface MPLS status
naming_mode    Show interface naming_mode status
neighbor       Show neighbor related information
portchannel    Show PortChannel information
qos-map        Show interface QoS map information
status         Show Interface status information
storm_control  Show Interface storm_control
tpid           Show Interface tpid information
transceiver    Show SFP Transceiver information
vlan-info      Show interfaces vlan info command
ip_statisitcs  Show interface ip_statisitcs information
```

show interfaces alias

This show command displays the alias for all interfaces i.e. interface name, alias. For a single interface, provide the interface name with the sub-command.

- Usage:

```
show interfaces alias
show interfaces alias <interface_name>
```

- Example:

```
admin@sonic:~$ show interfaces autoneg status
Name        Alias
----------  ------------------
Ethernet1   twentyfiveGigE0/1
Ethernet2   twentyfiveGigE0/2
Ethernet3   twentyfiveGigE0/3
Ethernet4   twentyfiveGigE0/4
Ethernet5   twentyfiveGigE0/5
Ethernet6   twentyfiveGigE0/6
Ethernet7   twentyfiveGigE0/7

admin@sonic:~$ show interfaces alias Ethernet54
Name        Alias
----------  --------------
Ethernet54  hundredGigE0/6
```

show interfaces autoneg

This show command displays the port auto negotiation status for all interfaces i.e. interface name, auto negotiation mode, speed, advertised speeds, interface type, advertised interface types, operational status, admin status. For a single interface, provide the interface name with the sub-command.

- Usage:

```
show interfaces autoneg status
show interfaces autoneg status <interface_name>
```

- Example:

```
admin@sonic:~$ show interfaces autoneg status
  Interface    Auto-Neg Mode    Speed    Adv Speeds    Type    Adv Types    Oper    Admin
-----------  ---------------  -------  ------------  ------  -----------  ------  -------
  Ethernet0          enabled      25G       10G,25G      CR       CR,CR4      up       up
  Ethernet4         disabled     100G           all     CR4          all      up       up

admin@sonic:~$ show interfaces autoneg status Ethernet8
  Interface    Auto-Neg Mode    Speed    Adv Speeds    Type    Adv Types    Oper    Admin
-----------  ---------------  -------  ------------  ------  -----------  ------  -------
  Ethernet8         disabled     100G           N/A     CR4          N/A      up       up
```

show interfaces breakout (Versions >= 202006)

This show command displays the port capability for all interfaces i.e. index, lanes, default_brkout_mode, breakout_modes(i.e. available breakout modes) and brkout_mode (i.e. current

breakout mode). To display current breakout mode, "current-mode" subcommand can be used.For a single interface, provide the interface name with the sub-command.

- Usage:

```
show interfaces breakout
show interfaces breakout current-mode
show interfaces breakout current-mode <interface_name>
```

- Example:

```
admin@lnos-x1-a-fab01:~$ show interfaces  breakout
{
    "Ethernet0": {
        "index": "1,1,1,1",
        "default_brkout_mode": "1x100G[40G]",
        "child ports": "Ethernet0",
        "child port speed": "100G",
        "breakout_modes": "1x100G[40G],2x50G,4x25G[10G]",
        "Current Breakout Mode": "1x100G[40G]",
        "lanes": "65,66,67,68",
        "alias_at_lanes": "Eth1/1, Eth1/2, Eth1/3, Eth1/4"
    },... continue
}
```

The "current-mode" subcommand is used to display current breakout mode for all interfaces.

```
admin@lnos-x1-a-fab01:~$ show interfaces  breakout current-mode
+-------------+-------------------------+
| Interface   | Current Breakout Mode   |
+=============+=========================+
| Ethernet0   | 4x25G[10G]              |
+-------------+-------------------------+
| Ethernet4   | 4x25G[10G]              |
+-------------+-------------------------+
| Ethernet8   | 4x25G[10G]              |
+-------------+-------------------------+
| Ethernet12  | 4x25G[10G]              |
+-------------+-------------------------+

admin@lnos-x1-a-fab01:~$ show interfaces  breakout current-mode Ethernet0
+-------------+-------------------------+
| Interface   | Current Breakout Mode   |
+=============+=========================+
| Ethernet0   | 4x25G[10G]              |
+-------------+-------------------------+
```

show interfaces counters

This show command displays packet counters for all interfaces since the last time the counters were cleared. To display l3 counters "rif" subcommand can be used. There is no facility to display counters for one specific l2 interface. For l3 interfaces a single interface output mode is present. Optional argument "-a" provides two additional columns - RX-PPS and TX_PPS.
Optional argument "-p" specify a period (in seconds) with which to gather counters over.

- Usage:

```
show interfaces counters [-a|--printall] [-p|--period <period>]
show interfaces counters errors
show interfaces counters rates
show interfaces counters rif [-p|--period <period>] [-i <interface_name>]
```

- Example:

```
admin@sonic:~$ show interfaces counters
      IFACE    STATE            RX_OK       RX_BPS    RX_UTIL    RX_ERR    RX_DRP    RX_OVR            TX_OK
-----------  -------  ---------------  -----------  ---------  --------  --------  --------  ---------------
  Ethernet0        U  471,729,839,997  653.87 MB/s     12.77%         0    18,682         0  409,682,385,925
  Ethernet4        U  453,838,006,636  632.97 MB/s     12.36%         0     1,636         0  388,299,875,056
  Ethernet8        U  549,034,764,539  761.15 MB/s     14.87%         0    18,274         0  457,603,227,659
 Ethernet12        U  458,052,204,029  636.84 MB/s     12.44%         0    17,614         0  388,341,776,615
 Ethernet16        U   16,679,692,972   13.83 MB/s      0.27%         0    17,605         0   18,206,586,265
 Ethernet20        U   47,983,339,172   35.89 MB/s      0.70%         0     2,174         0   58,986,354,359
 Ethernet24        U   33,543,533,441   36.59 MB/s      0.71%         0     1,613         0   43,066,076,376

admin@sonic:~$ show interfaces counters -i Ethernet4,Ethernet12-16
      IFACE    STATE            RX_OK       RX_BPS    RX_UTIL    RX_ERR    RX_DRP    RX_OVR            TX_OK
-----------  -------  ---------------  -----------  ---------  --------  --------  --------  ---------------
  Ethernet4        U  453,838,006,636  632.97 MB/s     12.36%         0     1,636         0  388,299,875,056
 Ethernet12        U  458,052,204,029  636.84 MB/s     12.44%         0    17,614         0  388,341,776,615
 Ethernet16        U   16,679,692,972   13.83 MB/s      0.27%         0    17,605         0   18,206,586,265
```

The "errors" subcommand is used to display the interface errors.

- Example:

```
admin@str-s6000-acs-11:~$ show interface counters errors
    IFACE    STATE    RX_ERR    RX_DRP    RX_OVR    TX_ERR    TX_DRP    TX_OVR
-----------  -------  --------  --------  --------  --------  --------  --------
  Ethernet0        U         0         4         0         0         0         0
  Ethernet4        U         0         0         0         0         0         0
  Ethernet8        U         0         1         0         0         0         0
 Ethernet12        U         0         0         0         0         0         0
```

The "rates" subcommand is used to disply only the interface rates.

- Example:

```
admin@str-s6000-acs-11:/usr/bin$ show int counters rates
    IFACE    STATE    RX_OK    RX_BPS    RX_PPS    RX_UTIL    TX_OK    TX_BPS    TX_PPS    TX_UTIL
-----------  -------  -------  --------  --------  ---------  -------  --------  --------  ---------
  Ethernet0        U   467510       N/A       N/A        N/A   466488       N/A       N/A        N/A
  Ethernet4        U   469679       N/A       N/A        N/A   469245       N/A       N/A        N/A
  Ethernet8        U   466660       N/A       N/A        N/A   465982       N/A       N/A        N/A
 Ethernet12        U   466579       N/A       N/A        N/A   466318       N/A       N/A        N/A
```

The "rif" subcommand is used to display l3 interface counters. Layer 3 interfaces include router interfaces, portchannels and vlan interfaces.

- Example:

```
admin@sonic:~$ show interfaces counters rif
         IFACE    RX_OK      RX_BPS    RX_PPS    RX_ERR    TX_OK    TX_BPS    TX_PPS    TX_ERR
---------------  -------  ----------  --------  --------  -------  --------  --------  --------
PortChannel0001   62,668  107.81 B/s    1.34/s         3        6  0.02 B/s    0.00/s         0
PortChannel0002   62,645  107.77 B/s    1.34/s         3        2  0.01 B/s    0.00/s         0
PortChannel0003   62,481  107.56 B/s    1.34/s         3        3  0.01 B/s    0.00/s         0
PortChannel0004   62,732  107.88 B/s    1.34/s         2        3  0.01 B/s    0.00/s         0
       Vlan1000        0    0.00 B/s    0.00/s         0        0  0.00 B/s    0.00/s         0
```

Optionally, you can specify a layer 3 interface name to display the counters in single interface mode.

- Example:

```
admin@sonic:~$ show interfaces counters rif PortChannel0001
PortChannel0001
---------------

        RX:
              3269 packets
            778494 bytesq
                 3 error packets
               292 error bytes
        TX:
                 0 packets
                 0 bytes
                 0 error packets
                 0 error bytes
```

Optionally, you can specify a period (in seconds) with which to gather counters over. Note that this function will take `<period>` seconds to execute.

- Example:

```
admin@sonic:~$ show interfaces counters -p 5
      IFACE    STATE    RX_OK       RX_BPS    RX_UTIL    RX_ERR    RX_DRP    RX_OVR    TX_OK       TX_BPS    TX
-----------  -------  -------  -----------  ---------  --------  --------  --------  -------  -----------  ----
Ethernet0         U      515   59.14 KB/s      0.00%         0         0         0    1,305  127.60 KB/s      0
Ethernet4         U      305   26.54 KB/s      0.00%         0         0         0      279   39.12 KB/s      0
Ethernet8         U      437   42.96 KB/s      0.00%         0         0         0      182   18.37 KB/s      0
Ethernet12        U      284   40.79 KB/s      0.00%         0         0         0      160   13.03 KB/s      0
Ethernet16        U      377   32.64 KB/s      0.00%         0         0         0      214   18.01 KB/s      0
Ethernet20        U      284   36.81 KB/s      0.00%         0         0         0      138  8758.25 B/s      0
Ethernet24        U      173   16.09 KB/s      0.00%         0         0         0      169   11.39 KB/s      0
```

- NOTE: Interface counters can be cleared by the user with the following command:

```
admin@sonic:~$ sonic-clear counters
```

- NOTE: Layer 3 interface counters can be cleared by the user with the following command:

```
admin@sonic:~$ sonic-clear rifcounters
```

show interfaces description

This command displays the key fields of the interfaces such as Operational Status, Administrative Status, Alias and Description.

- Usage:

```
show interfaces description [<interface_name>]
```

- Example:

```
admin@sonic:~$ show interfaces description
Interface    Oper    Admin            Alias           Description
-----------  ------  -------  ---------------  --------------------
Ethernet0    down       up   hundredGigE1/1  T0-1:hundredGigE1/30
Ethernet4    down       up   hundredGigE1/2  T0-2:hundredGigE1/30
Ethernet8    down     down   hundredGigE1/3        hundredGigE1/3
Ethernet12   down     down   hundredGigE1/4        hundredGigE1/4
```

- Example (to only display the description for interface Ethernet4):

```
admin@sonic:~$ show interfaces description Ethernet4
Interface    Oper    Admin           Alias           Description
-----------  ------  -------  --------------  --------------------
Ethernet4    down       up  hundredGigE1/2  T0-2:hundredGigE1/30
```

show interfaces errdisable

This command displays the error disable of the interfaces such as Status, Reason.

- Usage:

```
show interfaces errdisable
```

- Example:

```
admin@sonic:~$ show interfaces errdisable
Interface         Status       Reason
-----------  -------------  -----------
Ethernet50  Error disable  link-dither
```

show interfaces info

This command displays the information of the interfaces such as Description, Status, Line protocol status, MAC, Speed, Bandwidth, Admin FEC, Oper FEC, MTU, Interface IP, Interface IPv6, Vlan, Link up delay, Link down delay, Statistic.

- Usage:

```
show interfaces info
show interfaces info [<interface_name>]
```

- Example:

```
admin@sonic:~$ show interfaces info
=============== Interface Ethernet1 ===============
  Description:
  Admin status: up
  Line protocol status: down
  MAC: 58:69:6c:fb:20:19
  Speed: 25.0G
  Bandwidth: 25.0G
  Admin FEC: none    Oper FEC: none
  MTU: 9100
  Interface IP:
  Interface IPv6:
  Vlan:
    Native vlan: 1
  Link up delay:   0 s 0 ms
  Link down delay: 0 s 0 ms
  Statistic:
    RX packets 0  bytes 0 (0.0 B)
    RX errors 0  dropped 0  overruns 0  frame 0
    TX packets 0  bytes 0 (0.0 B)
    TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
=============== Interface Ethernet2 ===============
  Description:
  Admin status: up
  Line protocol status: down
  MAC: 58:69:6c:fb:20:19
  Speed: 25.0G
  Bandwidth: 25.0G
  Admin FEC: none    Oper FEC: none
  MTU: 9100
  Interface IP:
  Interface IPv6:
  Vlan:
    Native vlan: 1
  Link up delay:   0 s 0 ms
  Link down delay: 0 s 0 ms
  Statistic:
    RX packets 0  bytes 0 (0.0 B)
    RX errors 0  dropped 0  overruns 0  frame 0
    TX packets 0  bytes 0 (0.0 B)
    TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

- Example:

```
admin@sonic:~$ show interfaces info Ethernet56
=============== Interface Ethernet56 ===============
  Description:
  Admin status: up
  Line protocol status: down
  MAC: 58:69:6c:fb:20:19
  Speed: 100.0G
  Bandwidth: 100.0G
  Admin FEC: none    Oper FEC: none
  MTU: 9100
  Interface IP:
  Interface IPv6:
  Vlan:
    Native vlan: 1
  Link up delay:   0 s 0 ms
  Link down delay: 0 s 0 ms
  Statistic:
    RX packets 0  bytes 0 (0.0 B)
    RX errors 0  dropped 0  overruns 0  frame 0
    TX packets 0  bytes 0 (0.0 B)
    TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

show interfaces media

This command displays the media type of the interfaces.

- Usage:

```
show interfaces media
```

- Example:

```
admin@sonic:~$ show interfaces media
Media type Configure
+-------------+--------------+
| port name   | media_type   |
+=============+==============+
| Ethernet22  | fiber        |
+-------------+--------------+
```

show interfaces storm_control

This command displays the configuration of broadcast, multicast, and unicast traffic suppression.

- Usage:

```
show interfaces storm_control
show interfaces storm_control [<interface_name>]
```

- Example:

```
admin@sonic:~$ show interfaces storm_control
Interface    Broadcast Control    Multicast Control    Unicast Control
-----------  -------------------  -------------------  -----------------
Ethernet1             Disabled             Disabled           Disabled
Ethernet2             Disabled             Disabled           Disabled
Ethernet3             Disabled             Disabled           Disabled
Ethernet4             Disabled             Disabled           Disabled
Ethernet5             Disabled             Disabled           Disabled
```

- Example:

```
admin@sonic:~$ show interfaces storm_control Ethernet55
Interface    Broadcast Control    Multicast Control    Unicast Control
-----------  -------------------  -------------------  -----------------
Ethernet55             Disabled             Disabled           Disabled
```

show interfaces vlan-info

This command displays the configuration of vlan interfaces.

- Usage:

```
show interfaces vlan-info
show interfaces vlan-info [<vlan_name>]
```

- Example:

```
admin@sonic:~$ show interfaces vlan-info
=============== Interface Vlan20 ===============
  Description:
  Admin status: up
  Line protocol status: down
  MAC: 00:22:22:22:22:22
  Interface IP:
    192.168.30.20/24
  Interface IPv6:
=============== Interface Vlan100 ===============
  Description:
  Admin status: up
  Line protocol status: down
  MAC: 58:69:6c:fb:20:19
  Interface IP:
    192.168.20.20/24
  Interface IPv6:
```

- Example:

```
admin@sonic:~$ show interfaces vlan-info Vlan20
=============== Interface Vlan20 ===============
  Description:
  Admin status: up
  Line protocol status: down
  MAC: 00:22:22:22:22:22
  Interface IP:
    192.168.30.20/24
  Interface IPv6:
```

show interfaces ip-statisitcs

This command displays the configuration of vlan interfaces.

- Usage:

```
show interfaces ip-statisitcs state
```

- Example:

```
admin@sonic:~$ show interfaces ip-statisitcs state
Interface    ip_statistics state
-----------  --------------------
  Ethernet1               disable
  Ethernet2               disable
  Ethernet3               disable
  Ethernet4               disable
  Ethernet5               disable
  Ethernet6               disable
  Ethernet7               disable
```

show interfaces mpls

This command is used to display the configured MPLS state for the list of configured interfaces.

- Usage:

```
show interfaces mpls [<interface_name>]
```

- Example:

```
admin@sonic:~$ show interfaces mpls
Interface    MPLS State
-----------  ------------
Ethernet0    disable
Ethernet4    enable
Ethernet8    enable
Ethernet12   disable
Ethernet16   disable
Ethernet20   disable
```

- Example (to only display the MPLS state for interface Ethernet4):

```
admin@sonic:~$ show interfaces mpls Ethernet4
Interface    MPLS State
-----------  ------------
Ethernet4    enable
```

show interfaces tpid

This command displays the key fields of the interfaces such as Operational Status, Administrative Status, Alias and TPID.

- Usage:

```
show interfaces tpid [<interface_name>]
```

- Example:

```
admin@sonic:~$ show interfaces tpid
      Interface            Alias    Oper    Admin    TPID
---------------  ---------------  ------  -------  ------
      Ethernet0   fortyGigE1/1/1      up       up  0x8100
      Ethernet1   fortyGigE1/1/2      up       up  0x8100
      Ethernet2   fortyGigE1/1/3    down     down  0x8100
      Ethernet3   fortyGigE1/1/4    down     down  0x8100
      Ethernet4   fortyGigE1/1/5      up       up  0x8100
      Ethernet5   fortyGigE1/1/6      up       up  0x8100
      Ethernet6   fortyGigE1/1/7      up       up  0x9200
      Ethernet7   fortyGigE1/1/8      up       up  0x88A8
      Ethernet8   fortyGigE1/1/9      up       up  0x8100
      ...
     Ethernet63  fortyGigE1/4/16    down     down  0x8100
PortChannel0001              N/A      up       up  0x8100
PortChannel0002              N/A      up       up  0x8100
PortChannel0003              N/A      up       up  0x8100
PortChannel0004              N/A      up       up  0x8100
admin@sonic:~$
```

- Example (to only display the TPID for interface Ethernet6):

```
admin@sonic:~$ show interfaces tpid Ethernet6
  Interface           Alias    Oper    Admin    TPID
-----------  --------------  ------  -------  ------
  Ethernet6  fortyGigE1/1/7      up       up  0x9200
admin@sonic:~$
```

show interfaces naming_mode

Refer sub-section Interface-Naming-Mode

show interfaces neighbor

This command is used to display the list of expected neighbors for all interfaces (or for a particular interface) that is configured.

- Usage:

```
show interfaces neighbor expected [<interface_name>]
```

- Example:

```
admin@sonic:~$ show interfaces neighbor expected
LocalPort    Neighbor    NeighborPort    NeighborLoopback    NeighborMgmt    NeighborType
-----------  ----------  --------------  ------------------  --------------  --------------
Ethernet112  Router01T1  Ethernet1       None                10.16.205.100   ToRRouter
Ethernet116  Router02T1  Ethernet1       None                10.16.205.101   SpineRouter
Ethernet120  Router03T1  Ethernet1       None                10.16.205.102   LeafRouter
Ethernet124  Router04T1  Ethernet1       None                10.16.205.103   LeafRouter
```

show interfaces portchannel

This command displays information regarding port-channel interfaces

- Usage:

```
show interfaces portchannel
```

- Example:

```
admin@sonic:~$ show interfaces portchannel
Flags: A - active, I - inactive, Up - up, Dw - Down, N/A - not available, S - selected, D - deselected
  No.  Team Dev       Protocol     Ports
-----  -------------  -----------  --------------------------
   24  PortChannel24  LACP(A)(Up)  Ethernet28(S) Ethernet24(S)
   48  PortChannel48  LACP(A)(Up)  Ethernet52(S) Ethernet48(S)
   40  PortChannel40  LACP(A)(Up)  Ethernet44(S) Ethernet40(S)
    0  PortChannel0   LACP(A)(Up)  Ethernet0(S) Ethernet4(S)
    8  PortChannel8   LACP(A)(Up)  Ethernet8(S) Ethernet12(S)
```

show interface status

This command displays some more fields such as Lanes, Speed, MTU, Type, Asymmetric PFC status and also the operational and administrative status of the interfaces

- Usage:

```
show interfaces status [<interface_name>]
```

- Example (show interface status of all interfaces):

```
admin@sonic:~$ show interfaces status
Interface            Lanes    Speed    MTU            Alias    Oper    Admin    Type    Asym PFC
-----------  ---------------  -------  -----  ---------------  ------  -------  ------  ----------
Ethernet0      49,50,51,52     100G   9100   hundredGigE1/1    down       up     N/A         off
Ethernet4      53,54,55,56     100G   9100   hundredGigE1/2    down       up     N/A         off
Ethernet8      57,58,59,60     100G   9100   hundredGigE1/3    down     down     N/A         off
<contiues to display all the interfaces>
```

- Example (to only display the status for interface Ethernet0):

```
admin@sonic:~$ show interface status Ethernet0
Interface     Lanes    Speed    MTU            Alias    Oper    Admin
-----------  --------  -------  -----  --------------  ------  -------
Ethernet0   101,102      40G   9100   fortyGigE1/1/1      up       up
```

- Example (to only display the status for range of interfaces):

```
admin@sonic:~$ show interfaces status Ethernet8,Ethernet168-180
Interface              Lanes    Speed    MTU            Alias     Oper    Admin    Type   Asym PFC
-----------  -----------------  -------  -----  ---------------  ------  -------  ------  ----------
  Ethernet8      49,50,51,52     100G    9100    hundredGigE3     down     down     N/A         N/A
Ethernet168       9,10,11,12     100G    9100    hundredGigE43    down     down     N/A         N/A
Ethernet172      13,14,15,16     100G    9100    hundredGigE44    down     down     N/A         N/A
Ethernet176  109,110,111,112     100G    9100    hundredGigE45    down     down     N/A         N/A
Ethernet180  105,106,107,108     100G    9100    hundredGigE46    down     down     N/A         N/A
```

show interfaces transceiver

This command is already explained here

Interface Config Commands

This sub-section explains the following list of configuration on the interfaces.

1. ip - To add or remove IP address for the interface
2. pfc - to set the PFC configuration for the interface
3. shutdown - to administratively shut down the interface
4. speed - to set the interface speed
5. startup - to bring up the administratively shutdown interface
6. breakout - to set interface breakout mode
7. autoneg - to set interface auto negotiation mode
8. advertised-speeds - to set interface advertised speeds
9. advertised-types - to set interface advertised types
10. type - to set interface type
11. mpls - To add or remove MPLS operation for the interface
12. carrier_delay - Carrier delay configuration
13. description - Description configuration
14. error_down - Error down configuration
15. fec - Set interface fec
16. lacp-port-priority - Set interface lacp_port_priority
17. link_dither - Link_dither configuration
18. mediatype - Set interface media type [fiber, copper, backplane]
19. mtu - Set interface mtu
20. storm_control - Storm configuration
21. switchmode - Switchmode configuration
22. arp - Switchmode configuration
23. ip_statistics - Config ip_statistics enable or disable
24. fastlink - Fastlink configuration

From 201904 release onwards, the “config interface” command syntax is changed and the format is as follows:

- config interface interface_subcommand <interface_name>
  i.e Interface name comes after the subcommand
- Ex: config interface startup Ethernet63

The syntax for all such interface_subcommands are given below under each command

NOTE: In older versions of SONiC until 201811 release, the command syntax was

```
config interface <interface_name> interface_subcommand
```

config interface ip add <interface_name> <ip_addr> [default_gw] (Versions >= 201904)

config interface <interface_name> ip add <ip_addr> (Versions <= 201811)

This command is used for adding the IP address for an interface.
IP address for either physical interface or for portchannel or for VLAN interface or for Loopback interface can be configured using this command.
While configuring the IP address for the management interface "eth0", users can provide the default gateway IP address as an optional parameter from release 201911.

- Usage:
  Versions >= 201904

  ```
  config interface ip add <interface_name> <ip_addr>
  ```

  Versions <= 201811

  ```
  config interface <interface_name> ip add <ip_addr>
  ```

- Example:
  Versions >= 201904

  ```
  admin@sonic:~$ sudo config interface ip add Ethernet63 10.11.12.13/24
  admin@sonic:~$ sudo config interface ip add eth0 20.11.12.13/24 20.11.12.254
  ```

  Versions <= 201811

  ```
  admin@sonic:~$ sudo config interface Ethernet63 ip add 10.11.12.13/24
  ```

VLAN interface names take the form of `vlan<vlan_id>` . E.g., VLAN 100 will be named `vlan100`

- Example:
  Versions >= 201904

  ```
  admin@sonic:~$ sudo config interface ip add Vlan100 10.11.12.13/24
  ```

  Versions <= 201811

  ```
  admin@sonic:~$ sudo config interface vlan100 ip add 10.11.12.13/24
  ```

config interface ip remove <interface_name> <ip_addr> (Versions >= 201904)

config interface <interface_name> ip remove <ip_addr> (Versions <= 201811)

- Usage:
  Versions >= 201904

  ```
  config interface ip remove <interface_name> <ip_addr>
  ```

  Versions <= 201811

  ```
  config interface ip remove <interface_name> <ip_addr>
  ```

- Example:
  Versions >= 201904

  ```
  admin@sonic:~$ sudo config interface ip remove Ethernet63 10.11.12.13/24
  admin@sonic:~$ sudo config interface ip remove eth0 20.11.12.13/24
  ```

  Versions <= 201811

  ```
  admin@sonic:~$ sudo config interface Ethernet63 ip remove 10.11.12.13/24
  ```

VLAN interface names take the form of `vlan<vlan_id>` . E.g., VLAN 100 will be named `vlan100`

- Example:
  Versions >= 201904

  ```
  admin@sonic:~$ sudo config interface ip remove vlan100 10.11.12.13/24
  ```

  Versions <= 201811

  ```
  admin@sonic:~$ sudo config interface vlan100 ip remove 10.11.12.13/24
  ```

config interface pfc priority <interface_name> (on | off)

This command is used to set PFC on a given priority of a given interface to either "on" or "off". Once it is successfully configured, it will show current losses priorities on the given interface. Otherwise, it will show error information

- Example:
  Versions >= 201904

```
admin@sonic:~$ sudo config interface pfc priority Ethernet0 3 off

Interface      Lossless priorities
-----------  ---------------------
Ethernet0                        4

admin@sonic:~$ sudo config interface pfc priority Ethernet0 8 off
Usage: pfc config priority [OPTIONS] STATUS INTERFACE PRIORITY

Error: Invalid value for "priority": invalid choice: 8. (choose from 0, 1, 2, 3, 4, 5, 6, 7)

admin@sonic:~$ sudo config interface pfc priority Ethernet101 3 off
Cannot find interface Ethernet101

admin@sonic:~$ sudo config interface pfc priority Ethernet0 3 on

Interface    Lossless priorities
-----------  ---------------------
Ethernet0    3,4
```

config interface pfc asymmetric <interface_name> (Versions >= 201904)

config interface <interface_name> pfc asymmetric (Versions <= 201811)

This command is used for setting the asymmetric PFC for an interface to either "on" or "off". Once if it is configured, use "show interfaces status" to check the same.

- Usage:
  Versions >= 201904

  ```
  config interface pfc asymmetric <interface_name> on/off (for 201904+ version)
  ```

  Versions <= 201811

  ```
  config interface <interface_name> pfc asymmetric on/off (for 201811- version)
  ```

- Example:
  Versions >= 201904

  ```
  admin@sonic:~$ sudo config interface pfc asymmetric Ethernet60 on
  ```

  Versions <= 201811

  ```
  admin@sonic:~$ sudo config interface Ethernet60 pfc asymmetric on
  ```

config interface shutdown <interface_name> (Versions >= 201904)

config interface <interface_name> shutdown (Versions <= 201811)

This command is used to administratively shut down either the Physical interface or port channel interface. Once if it is configured, use "show interfaces status" to check the same.

- Usage:
  Versions >= 201904

  ```
  config interface shutdown <interface_name> (for 201904+ version)
  ```

  Versions <= 201811

  ```
  config interface <interface_name> shutdown (for 201811- version)
  ```

- Example:
  Versions >= 201904

  ```
  admin@sonic:~$ sudo config interface shutdown Ethernet63
  ```

  Versions <= 201811

  ```
  admin@sonic:~$ sudo config interface Ethernet63 shutdown
  ```

  shutdown multiple interfaces

  ```
  admin@sonic:~$ sudo config interface shutdown Ethernet8,Ethernet16-20,Ethernet32
  ```

config interface startup <interface_name> (Versions >= 201904)

config interface <interface_name> startup (Versions <= 201811)

This command is used for administratively bringing up the Physical interface or port channel interface.Once if it is configured, use "show interfaces status" to check the same.

- Usage:
  Versions >= 201904

  ```
  config interface startup <interface_name> (for 201904+ version)
  ```

  Versions <= 201811

  ```
  config interface <interface_name> startup (for 201811- version)
  ```

- Example:
  Versions >= 201904

```
admin@sonic:~$ sudo config interface startup Ethernet63
```

Versions <= 201811

```
admin@sonic:~$ sudo config interface Ethernet63 startup
```

startup multiple interfaces

```
admin@sonic:~$ sudo config interface startup Ethernet8,Ethernet16-20,Ethernet32
```

config interface <interface_name> speed (Versions >= 202006)

Dynamic breakout feature is supported in SONiC from 202006 version.
User can configure any speed specified under "breakout_modes" keys for the parent interface in the platform-specific port configuration file (i.e. platform.json).

For example for a breakout mode of 2x50G[25G,10G] the default speed is 50G but the interface also supports 25G and 10G.

Refer DPB HLD DOC to know more about this command.

config interface speed <interface_name> (Versions >= 201904)

config interface <interface_name> speed (Versions <= 201811)

This command is used to configure the speed for the Physical interface. Use the value 40000 for setting it to 40G and 100000 for 100G. Users need to know the device to configure it properly.

- Usage:
  Versions >= 201904

  ```
  config interface speed <interface_name> <speed_value>
  ```

  Versions <= 201811

  ```
  config interface <interface_name> speed <speed_value>
  ```

- Example (Versions >= 201904):

  ```
  admin@sonic:~$ sudo config interface speed Ethernet63 40000
  ```

- Example (Versions <= 201811):

  ```
  admin@sonic:~$ sudo config interface Ethernet63 speed 40000
  ```

config interface transceiver lpmode

This command is used to enable or disable low-power mode for an SFP transceiver

- Usage:

```
config interface transceiver lpmode <interface_name> (enable | disable)
```

- Examples:

```
user@sonic~$ sudo config interface transceiver lpmode Ethernet0 enable
Enabling low-power mode for port Ethernet0...  OK

user@sonic~$ sudo config interface transceiver lpmode Ethernet0 disable
Disabling low-power mode for port Ethernet0...  OK
```

config interface transceiver reset

This command is used to reset an SFP transceiver

- Usage:

```
config interface transceiver reset <interface_name>
```

- Examples:

```
user@sonic~$ sudo config interface transceiver reset Ethernet0
Resetting port Ethernet0...  OK
```

config interface mtu <interface_name> (Versions >= 201904)

This command is used to configure the mtu for the Physical interface. Use the value 1500 for setting max transfer unit size to 1500 bytes.

- Usage:
  Versions >= 201904

```
config interface mtu <interface_name> <mtu_value>
```

- Example (Versions >= 201904):

```
admin@sonic:~$ sudo config interface mtu Ethernet64 1500
```

config interface tpid <interface_name> (Versions >= 202106)

This command is used to configure the TPID for the Physical/PortChannel interface. default is 0x8100. Other allowed values if supported by HW SKU (0x9100, 0x9200, 0x88A8).

- Usage:
  Versions >= 202106

```
config interface tpid <interface_name> <tpid_value>
```

- Example (Versions >= 202106):

```
admin@sonic:~$ sudo config interface tpid Ethernet64 0x9200
```

config interface breakout (Versions >= 202006)

This command is used to set active breakout mode available for user-specified interface based on the platform-specific port configuration file(i.e. platform.json)
and the current mode set for the interface.

Based on the platform.json and the current mode set in interface, this command acts on setting breakout mode for the interface.

Double tab i.e. to see the available breakout option customized for each interface provided by the user.

- Usage:

```
sudo config interface breakout  --help
Usage: config interface breakout [OPTIONS] <interface_name> MODE

  Set interface breakout mode

  Options:
    -f, --force-remove-dependencies
                                  Clear all depenedecies internally first.
    -l, --load-predefined-config    load predefied user configuration (alias,
                                    lanes, speed etc) first.
    -y, --yes
    -v, --verbose                 Enable verbose output
    -?, -h, --help                Show this message and exit.
```

- Example :

```
admin@sonic:~$ sudo config interface breakout  Ethernet0 <tab><tab>
<tab provides option for breakout mode>
1x100G[40G]  2x50G        4x25G[10G]
```

This command also provides "--force-remove-dependencies/-f" option to CLI, which will automatically determine and remove the configuration dependencies using Yang models.

```
admin@sonic:~$ sudo config interface breakout  Ethernet0 4x25G[10G] -f -l -v -y
```

For details please refer DPB HLD DOC to know more about this command.

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config interface autoneg <interface_name> (Versions >= 202106)

This command is used to set port auto negotiation mode.

- Usage:

```
sudo config interface autoneg --help
Usage: config interface autoneg [OPTIONS] <interface_name> <mode>

  Set interface auto negotiation mode

Options:
  -v, --verbose   Enable verbose output
  -h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config interface autoneg Ethernet0 enabled

admin@sonic:~$ sudo config interface autoneg Ethernet0 disabled
```

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config interface advertised-speeds <interface_name> (Versions >= 202106)

This command is used to set port advertised speed.

- Usage:

```
sudo config interface advertised-speeds --help
Usage: config interface advertised-speeds [OPTIONS] <interface_name> <speed_list>

  Set interface advertised speeds

Options:
  -v, --verbose   Enable verbose output
  -h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config interface advertised-speeds Ethernet0 all

admin@sonic:~$ sudo config interface advertised-speeds Ethernet0 50000,100000
```

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config interface advertised-types <interface_name> (Versions >= 202106)

This command is used to set port advertised interface types.

- Usage:

```
sudo config interface advertised-types --help
Usage: config interface advertised-types [OPTIONS] <interface_name> <interface_type_list>

  Set interface advertised types

Options:
  -v, --verbose   Enable verbose output
  -h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config interface advertised-types Ethernet0 all

admin@sonic:~$ sudo config interface advertised-types Ethernet0 CR,CR4
```

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config interface type <interface_name> (Versions >= 202106)

This command is used to set port interface type.

- Usage:

```
sudo config interface type --help
Usage: config interface type [OPTIONS] <interface_name> <interface_type_value>

  Set interface type

Options:
  -v, --verbose   Enable verbose output
  -h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config interface type Ethernet0 CR4
```

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config interface cable_length (Versions >= 202006)

This command is used to configure the length of the cable connected to a port. The cable_length is in unit of meters and must be suffixed with "m".

For details please refer dynamic buffer management

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config interface lossless_pg (Versions >= 202006)

This command is used to configure the priority groups on which lossless traffic runs.

For details please refer dynamic buffer management

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config interface headroom_override (Versions >= 202006)

This command is used to configure a static buffer profile on a port's lossless priorities. There shouldn't be any `lossless_pg` configured on the port when configuring `headroom_override`. The port's headroom won't be updated after `headroom_override` has been configured on the port.

For details please refer dynamic buffer management

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config interface mpls add <interface_name> (Versions >= 202106)

This command is used for adding MPLS operation on the interface.
MPLS operation for either physical, portchannel, or VLAN interface can be configured using this command.

- Usage:

```
sudo config interface mpls add --help
Usage: config interface mpls add [OPTIONS] <interface_name>

  Add MPLS operation on the interface

Options:
  -?, -h, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config interface mpls add Ethernet4
```

config interface mpls remove <interface_name> (Versions >= 202106)

This command is used for removing MPLS operation on the interface.
MPLS operation for either physical, portchannel, or VLAN interface can be configured using this command.

- Usage:

```
sudo config interface mpls remove --help
Usage: config interface mpls remove [OPTIONS] <interface_name>

  Remove MPLS operation from the interface

Options:
  -?, -h, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config interface mpls remove Ethernet4
```

config interface carrier_delay <interface_name> (Versions >= 202111)

This command is used to set port interface down/up delay time.

- Usage:

```
config interface carrier_delay --help
  Carrier delay configuration

Options:
  -h, -?, --help  Show this message and exit.

Commands:
  down  set interface down delay time
  up    set interface up delay time
```

- Example:

```
admin@sonic:~$ sudo config interface carrier_delay down Ethernet22 100
admin@sonic:~$ sudo config interface carrier_delay up Ethernet22 100
```

config interface description <interface_name> (Versions >= 202111)

This command is used to set port interface description.

- Usage:

```
config interface description --help
  Description configuration

Options:
  -h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config interface description Ethernet44 "Example"
```

config interface error_down command sub_cmd (Versions >= 202111)

This command is used to recover port interface link status.

- Usage:

```
config interface error_down --help
  Error down configuration

Options:
  -?, -h, --help  Show this message and exit.

Commands:
  auto_recovery  Error down auto_recovery configuration
  recovery       Error down recovery configuration
```

- Example:

```
admin@sonic:~$ sudo config interface error_down auto_recovery enable
admin@sonic:~$ sudo config interface error_down auto_recovery disable
admin@sonic:~$ sudo config interface error_down auto_recovery interval 100
admin@sonic:~$ sudo config interface error_down recovery link_dither
```

config interface fec <interface_name> (Versions >= 202111)

This command is used to set port interface fec mode.

- Usage:

```
config interface fec --help
  Set interface fec

Options:
  -v, --verbose   Enable verbose output
  -h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config interface fec Ethernet23 rs
```

config interface lacp-port-priority <interface_name> (Versions >= 202111)

This command is used to set port interface priority to negotiate in LACP.

- Usage:

```
config interface lacp-port-priority --help
  Set interface lacp_port_priority

Options:
  -v, --verbose   Enable verbose output
  -h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config interface lacp-port-priority Ethernet44 1000
```

config interface link_dither <disable | enable> (Versions >= 202111)

This command is used to disable the port when port flapping occurs.

- Usage:

```
config interface link_dither --help
  Link_dither configuration

Options:
  -?, -h, --help  Show this message and exit.

Commands:
  disable
  enable
```

- Example:

```
admin@sonic:~$ sudo config interface link_dither disable
admin@sonic:~$ sudo config interface link_dither enable
```

config interface mediatype <interface_name> (Versions >= 202111)

This command is used to set port interface media type.

- Usage:

```
config interface mediatype --help
  Set interface media type [fiber, copper, backplane]

Options:
  -v, --verbose   Enable verbose output
  -h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config interface mediatype Ethernet44 fiber
```

config interface mtu <interface_name> (Versions >= 202111)

This command is used to set port interface mtu size.

- Usage:

```
config interface mtu --help
  Set interface mtu

Options:
  -v, --verbose   Enable verbose output
  -?, -h, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config interface mtu Ethernet44 1500
```

config interface storm_control <interface_name> command (Versions >= 202111)

This command is used to configure interface packet storm control.

- Usage:

```
config interface storm_control --help
  Storm configuration

Options:
  -?, -h, --help  Show this message and exit.

Commands:
  broadcast  broadcast storm control
  multicast  Multicast storm control
  unicast    Unicast storm control
```

- Example:

```
admin@sonic:~$ sudo config interface storm_control Ethernet44 broadcast kbps 1214
admin@sonic:~$ sudo config interface storm_control Ethernet43 broadcast level 20
admin@sonic:~$ sudo config interface storm_control Ethernet42 broadcast pps 1214
```

config interface switchmode command (Versions >= 202111)

This command is used to configure interface vlan tagging mode.

- Usage:

```
config interface switchmode --help
  Switchmode configuration

Options:
  -?, -h, --help  Show this message and exit.

Commands:
  access     Set interface access mode.
  no-access  Set interface default access mode.
  no-trunk   Remove interface all trunk configuration.
  trunk      Set interface trunk mode.
```

- Example:

```
admin@sonic:~$ sudo config interface switchmode access 100 Ethernet22
admin@sonic:~$ sudo config interface switchmode no-access Ethernet22
admin@sonic:~$ sudo config interface switchmode trunk pvid 20 Ethernet22
admin@sonic:~$ sudo config interface switchmode trunk vlan-range 100-104 Ethernet22
admin@sonic:~$ sudo config interface switchmode trunk no-vlan-range 100-101 Ethernet22
admin@sonic:~$ sudo config interface switchmode no-trunk Ethernet22
```

config interface arp command

This command is used to configure interface arp aging time and gratuitous arp.

- Usage:

```
config interface arp -h
  Arp configuration

Options:
  -?, -h, --help  Show this message and exit.

Commands:
adv-gratuitous           Enable/Disable advertising gratuitous_arp to the interface
adv-gratuitous-interval  Set advertising gratuitous_arp interval time to the interface
gratuitous               Enable/Disable gratuitous_arp to the interface
reachable-time           Add arp reachable_time to the interface
stale-time               Add arp aging_time to the interface
```

- Example:

```
admin@sonic:~$ sudo config interface arp adv-gratuitous Ethernet22 enabled
admin@sonic:~$ sudo config interface arp adv-gratuitous-interval Ethernet22 10
admin@sonic:~$ sudo config interface arp gratuitous Ethernet22 enabled
admin@sonic:~$ sudo config interface arp reachable-time Ethernet30 1800
admin@sonic:~$ sudo config interface arp stale-time Ethernet30 60
```

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config interface ip-statistics command

This command is used to configure interface arp aging time and gratuitous arp.

- Usage:

```
config interface ip-statistics -h
  Config ip_statistics enable or disable

  Options:
    -h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config interface ip-statistics all enable
admin@sonic:~$ sudo config interface ip-statistics Ethernet12 enable
admin@sonic:~$ sudo config interface ip-statistics Ethernet12 disable
```

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config interface fastlink command

This command is used to configure interface arp aging time and gratuitous arp.

- Usage:

```
config interface ip-statistics -h
  Config ip_statistics enable or disable

  Options:
    -h, -?, --help  Show this message and exit.

  Commands:
    disable
    enable
```

- Example:

```
admin@sonic:~$ sudo cconfig interface fastlink enable
admin@sonic:~$ sudo config interface fastlink disable
```

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Interface Naming Mode

Interface naming mode show commands

This command displays the current interface naming mode. Interface naming mode originally set to 'default'. Interfaces are referenced by default SONiC interface names.
Users can change the naming_mode using "config interface_naming_mode" command.

show interfaces naming_mode

This command displays the current interface naming mode

- Usage:

```
show interfaces naming_mode
```

- Examples:

```
admin@sonic:~$ show interfaces naming_mode
default
```

  - "default" naming mode will display all SONiC interface names in 'show' commands and accept SONiC interface names as parameters in 'config commands

```
admin@sonic:~$ show interfaces naming_mode
alias
```

- "alias" naming mode will display all hardware vendor interface aliases in 'show' commands and accept hardware vendor interface aliases as parameters in 'config commands

Interface naming mode config commands

config interface_naming_ mode

This command is used to change the interface naming mode.
Users can select between default mode (SONiC interface names) or alias mode (Hardware vendor names).
The user must log out and log back in for changes to take effect. Note that the newly-applied interface mode will affect all interface-related show/config commands.

NOTE: Some platforms do not support alias mapping. In such cases, this command is not applicable. Such platforms always use the same SONiC interface names.

- Usage:

```
config interface_naming_mode (default | alias)
```

  - Interface naming mode is originally set to 'default'. Interfaces are referenced by default SONiC interface names:
- Example:

```
admin@sonic:~$ show interfaces naming_mode
default

admin@sonic:~$ show interface status Ethernet0
  Interface     Lanes    Speed    MTU            Alias    Oper    Admin
-----------  --------  -------  -----   --------------  ------  -------
  Ethernet0   101,102      40G   9100   fortyGigE1/1/1      up       up

admin@sonic:~$ sudo config interface_naming_mode alias
Please logout and log back in for changes take effect.
```

  - After user logs out and logs back in again, interfaces will then referenced by hardware vendor aliases:

```
admin@sonic:~$ show interfaces naming_mode
alias

admin@sonic:~$ sudo config interface fortyGigE1/1/1 shutdown
admin@sonic:~$ show interface status fortyGigE1/1/1
  Interface     Lanes    Speed    MTU            Alias    Oper    Admin
-----------  --------  -------  -----  --------------  ------  -------
  Ethernet0   101,102      40G   9100   fortyGigE1/1/1    down     down
```

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Interface Vrf binding

Interface vrf bind & unbind config commands

config interface vrf bind

This command is used to bind a interface to a vrf.
By default, all L3 interfaces will be in default vrf. Above vrf bind command will let users bind interface to a vrf.

Using the bind or unbind vrf command will cause L3 interfaces to lose all IP addresses, arp and routes.

- Usage:

```
config interface vrf bind <interface_name> <vrf_name>
```

config interface vrf unbind

This command is used to ubind a interface from a vrf.
This will move the interface to default vrf.

- Usage:

```
config interface vrf unbind <interface_name> <vrf_name>
```

Interface vrf binding show commands

To display interface vrf binding information, user can use show vrf command. Please refer sub-section Vrf-show-command.

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IP / IPv6

IP route config commands

This sub-section explains the installation and deletion of IPv4 static routes.

ip route

This command is used to config IPv4 static route.

- Usage:

```
ip route NETWORK GATEWAY [DISTANCE] [table TABLENO] [nexthop-vrf VRFNAME] [vrf VRFNAME] [tag TAG]
ip route NETWORK IFNAME [DISTANCE] [table TABLENO] [nexthop-vrf VRFNAME] [vrf VRFNAME] [tag TAG]
ip route NETWORK GATEWAY IFNAME [DISTANCE] [table TABLENO] [nexthop-vrf VRFNAME] [vrf VRFNAME] [tag TAG]
ip route NETWORK (blackhole|reject) [DISTANCE] [table TABLENO] [nexthop-vrf VRFNAME] [vrf VRFNAME] [tag TAG]
```

- Example:

```
admin@sonic:~$ sudo vtysh -c "configure terminal" -c "ip route 1.1.1.1/24 2.2.2.2"
admin@sonic:~$ sudo vtysh -c "configure terminal" -c "no ip route 1.1.1.1/24 2.2.2.2"
```

IP route arp-to-host interface config commands

This sub-section explains the installation and deletion of arp-to-host on a specicified interface.

ip route arp-to-host interface

This command is used to enable arp-to-host on a specicified interface.

- Usage:

```
ip route arp-to-host interface interface-name
```

- Example:

```
admin@sonic:~$ sudo vtysh -c "configure terminal" -c "ip route arp-to-host interface Ethernet1"
admin@sonic:~$ sudo vtysh -c "configure terminal" -c "no ip route arp-to-host interface Ethernet1"
```

IP route arp-to-host tag config commands

This sub-section explains the tag of arp-to-host.

ip route arp-to-host tag

This command is used to configure the tag of arp-to-host.

- Usage:

```
ip route arp-to-host tag tag-numbe
```

- Example:

```
admin@sonic:~$ sudo vtysh -c "configure terminal" -c "ip route arp-to-host tag 10"
admin@sonic:~$ sudo vtysh -c "configure terminal" -c "no ip route arp-to-host tag"
```

IP show commands

This sub-section explains the various IP protocol specific show commands that are used to display the following.

1. route - Show IP (IPv4) routing table
2. bgp - Show IPv4 BGP (Border Gateway Protocol) information (Explained in the bgp section)
3. interfaces - Show IPv4 of L3 interfaces
4. prefix-list - Show IPv4 prefix-list
5. protocol - Show IPv4 protocol information

show ip route

This command displays either all the route entries from the routing table or a ipv4 specific route.

- Usage:

```
show ip route [<vrf-name>] [<ip_address>]
```

- Example:

```
admin@sonic:~$ show ip route
Codes: K - kernel route, C - connected, S - static, R - RIP,
       O - OSPF, I - IS-IS, B - BGP, P - PIM, A - Babel,
       > - selected route, * - FIB route
S>* 0.0.0.0/0 [200/0] via 10.11.162.254, eth0
C>* 1.1.0.0/16 is directly connected, Vlan100
C>* 10.1.1.0/31 is directly connected, Ethernet112
C>* 10.1.1.2/31 is directly connected, Ethernet116
C>* 10.11.162.0/24 is directly connected, eth0
C>* 127.0.0.0/8 is directly connected, lo
C>* 240.127.1.0/24 is directly connected, docker0
```

    - Optionally, you can specify an IP address in order to display only routes to that particular IP address

- Example:

```
admin@sonic:~$ show ip route 10.1.1.0
Routing entry for 10.1.1.0/31
  Known via "connected", distance 0, metric 0, best
  * directly connected, Ethernet112
```

  - Vrf-name can also be specified to get IPv4 routes programmed in the vrf.
  - Example:

```
admin@sonic:~$ show ip route vrf Vrf-red
  Codes: K - kernel route, C - connected, S - static, R - RIP,
  O - OSPF, I - IS-IS, B - BGP, E - EIGRP, N - NHRP,
  T - Table, v - VNC, V - VNC-Direct, A - Babel, D - SHARP,
  F - PBR, f - OpenFabric,
  > - selected route, * - FIB route
  VRF Vrf-red:
  C>*  11.1.1.1/32 is directly connected, Loopback11, 21:50:47
  C>*  100.1.1.0/24 is directly connected, Vlan100, 03w1d06h

admin@sonic:~$ show ip route vrf Vrf-red 11.1.1.1/32
  Routing entry for 11.1.1.1/32
  Known via "connected", distance 0, metric 0, vrf Vrf-red, best
  Last update 21:57:53 ago
  * directly connected, Loopback11
```

show ip interfaces

This command displays the details about all the Layer3 IP interfaces in the device for which IP address has been assigned.
The type of interfaces include the following.

1. Front panel physical ports.
2. PortChannel.
3. VLAN interface.
4. Loopback interfaces
5. docker interface and
6. management interface

- Usage:

```
show ip interfaces
```

- Example:

```
admin@sonic:~$ show ip interfaces
Interface       Master          IPv4 address/mask     Admin/Oper
--------------  ------------    ------------------    --------------
Loopback0                       1.0.0.1/32            up/up
Loopback11      Vrf-red         11.1.1.1/32           up/up
Loopback100     Vrf-blue        100.0.0.1/32          up/up
PortChannel01                   10.0.0.56/31          up/down
PortChannel02                   10.0.0.58/31          up/down
PortChannel03                   10.0.0.60/31          up/down
PortChannel04                   10.0.0.62/31          up/down
Vlan100         Vrf-red         1001.1.1/24           up/up
Vlan1000                        192.168.0.1/27        up/up
docker0                         240.127.1.1/24        up/down
eth0                            10.3.147.252/23       up/up
lo                              127.0.0.1/8           up/up
```

show ip protocol

This command displays the route-map that is configured for the routing protocol.
Refer the routing stack Quagga Command Reference or FRR Command Reference to know more about this command.

- Usage:

```
show ip protocol
```

- Example:

```
admin@sonic:~$ show ip protocol
Protocol    : route-map
------------------------
system      : none
kernel      : none
connected   : none
static      : none
rip         : none
ripng       : none
ospf        : none
ospf6       : none
isis        : none
bgp         : RM_SET_SRC
pim         : none
hsls        : none
olsr        : none
babel       : none
any         : none
```

IPv6 route config commands

This sub-section explains the installation and deletion of IPv6 static routes.

ipv6 route

This command is used to config static route.

- Usage:

```
ipv6 route NETWORK GATEWAY [DISTANCE] [table TABLENO] [nexthop-vrf VRFNAME] [vrf VRFNAME] [tag TAG]
ipv6 route NETWORK IFNAME [DISTANCE] [table TABLENO] [nexthop-vrf VRFNAME] [vrf VRFNAME] [tag TAG]
ipv6 route NETWORK GATEWAY IFNAME [DISTANCE] [table TABLENO] [nexthop-vrf VRFNAME] [vrf VRFNAME] [tag TAG]
ipv6 route NETWORK (blackhole|reject) [DISTANCE] [table TABLENO] [nexthop-vrf VRFNAME] [vrf VRFNAME] [tag TA
```

- Example:

```
admin@sonic:~$ sudo vtysh -c "configure terminal" -c "ipv6 route 100::1/120 200::1"
admin@sonic:~$ sudo vtysh -c "configure terminal" -c "no ipv6 route 100::1/120 200::1"
```

IPv6 route nd-to-route interface config commands

This sub-section explains the installation and deletion of ND route on a specicified interface.

ipv6 route nd-to-route interface

This command is used to enable nd-to-route on a specicified interface.

- Usage:

```
ipv6 route nd-to-route interface interface-name [ipv6-prefix X:X:X:X::X/<0-128>] [prefix-len masklen]
```

- Example:

```
admin@sonic:~$ sudo vtysh -c "configure terminal" -c "ipv6 route nd-to-route interface Ethernet1 prefix-len
admin@sonic:~$ sudo vtysh -c "configure terminal" -c "no ipv6 route nd-to-route interface Ethernet1"
```

IPv6 route nd-to-route tag config commands

This sub-section explains the tag of nd-to-route.

ipv6 route nd-to-route tag

This command is used to configure the tag of nd-to-route.

- Usage:

```
ipv6 route nd-to-route tag tag-numbe
```

- Example:

```
admin@sonic:~$ sudo vtysh -c "configure terminal" -c "ipv6 route nd-to-route tag 10"
admin@sonic:~$ sudo vtysh -c "configure terminal" -c "no ipv6 route nd-to-route tag"
```

IPv6 show commands

This sub-section explains the various IPv6 protocol specific show commands that are used to display the following.

1. route - Show IP (IPv6) routing table
2. bgp - Show IPv6 BGP (Border Gateway Protocol) information (Explained in the bgp section
3. interfaces - Show IPv6 of L3 interfaces
4. prefix-list - Show IPv6 prefix-list
5. protocol - Show IPv6 protocol information

show ipv6 route

This command displays either all the IPv6 route entries from the routing table or a specific IPv6 route.

- Usage:

```
show ipv6 route [<vrf-name>] [<ipv6_address>]
```

- Example:

```
admin@sonic:~$ show ipv6 route
Codes: K - kernel route, C - connected, S - static, R - RIPng,
       O - OSPFv6, I - IS-IS, B - BGP, A - Babel,
       > - selected route, * - FIB route

C>* ::1/128 is directly connected, lo
C>* 2018:2001::/126 is directly connected, Ethernet112
C>* 2018:2002::/126 is directly connected, Ethernet116
C>* fc00:1::32/128 is directly connected, lo
C>* fc00:1::102/128 is directly connected, lo
C>* fc00:2::102/128 is directly connected, eth0
C * fe80::/64 is directly connected, Vlan100
C * fe80::/64 is directly connected, Ethernet112
C * fe80::/64 is directly connected, Ethernet116
C * fe80::/64 is directly connected, Bridge
C * fe80::/64 is directly connected, PortChannel0011
C>* fe80::/64 is directly connected, eth0
```

- Optionally, you can specify an IPv6 address in order to display only routes to that particular IPv6 address
- Example:

```
admin@sonic:~$ show ipv6 route  fc00:1::32
Routing entry for fc00:1::32/128
  Known via "connected", distance 0, metric 0, best
  * directly connected, lo
```

Vrf-name can also be specified to get IPv6 routes programmed in the vrf.

- Example:

```
admin@sonic:~$ show ipv6 route vrf Vrf-red
  Codes: K - kernel route, C - connected, S - static, R - RIP,
  O - OSPF, I - IS-IS, B - BGP, E - EIGRP, N - NHRP,
  T - Table, v - VNC, V - VNC-Direct, A - Babel, D - SHARP,
  F - PBR, f - OpenFabric,
  > - selected route, * - FIB route
  VRF Vrf-red:
       C>*  1100::1/128 is directly connected, Loopback11, 21:50:47
       C>*  100::/112 is directly connected, Vlan100, 03w1d06h
       C>*  fe80::/64 is directly connected, Loopback11, 21:50:47
       C>*  fe80::/64 is directly connected, Vlan100, 03w1d06h

 admin@sonic:~$ show ipv6 route vrf Vrf-red 1100::1/128
   Routing entry for 1100::1/128
   Known via "connected", distance 0, metric 0, vrf Vrf-red, best
   Last update 21:57:53 ago
   * directly connected, Loopback11
```

show ipv6 interfaces

This command displays the details about all the Layer3 IPv6 interfaces in the device for which IPv6 address has been assigned.
The type of interfaces include the following.

1. Front panel physical ports.
2. PortChannel.
3. VLAN interface.
4. Loopback interfaces
5. management interface

- Usage:

```
show ipv6 interfaces
```

- Example:

```
admin@sonic:~$ show ipv6 interfaces
Interface        Master     IPv6 address/mask                          Admin/Oper
-----------      --------   -----------------------------------------  ------------
Bridge                      fe80::7c45:1dff:fe08:cdd%Bridge/64         up/up
Loopback11       Vrf-red    1100::1/128                                up/up
PortChannel01               fc00::71/126                               up/down
PortChannel02               fc00::75/126                               up/down
PortChannel03               fc00::79/126                               up/down
PortChannel04               fc00::7d/126                               up/down
Vlan100          Vrf-red    100::1/112                                 up/up
                            fe80::eef4:bbff:fefe:880a%Vlan100/64
eth0                        fe80::eef4:bbff:fefe:880a%eth0/64          up/up
lo                          fc00:1::32/128                             up/up
```

show ipv6 protocol

This command displays the route-map that is configured for the IPv6 routing protocol.
Refer the routing stack Quagga Command Reference or FRR Command Reference to know more about this command.

- Usage:

```
show ipv6 protocol
```

- Example:

```
admin@sonic:~$ show ipv6 protocol
Protocol    : route-map
------------------------
system      : none
kernel      : none
connected   : none
static      : none
rip         : none
ripng       : none
ospf        : none
ospf6       : none
isis        : none
bgp         : RM_SET_SRC6
pim         : none
hsls        : none
olsr        : none
babel       : none
any         : none
```

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IPv6 Link Local

IPv6 Link Local config commands

This section explains all the commands that are supported in SONiC to configure IPv6 Link-local.

config interface ipv6 enable use-link-local-only <interface_name>

This command enables user to enable an interface to forward L3 traffic with out configuring an address. This command creates the routing interface based on the auto generated IPv6 link-local address. This command can be used even if an address is configured on the interface.

- Usage:

```
config interface ipv6 enable use-link-local-only <interface_name>
```

- Example:

```
admin@sonic:~$ sudo config interface ipv6 enable use-link-local-only Vlan206
admin@sonic:~$ sudo config interface ipv6 enable use-link-local-only PortChannel007
admin@sonic:~$ sudo config interface ipv6 enable use-link-local-only Ethernet52
```

config interface ipv6 disable use-link-local-only <interface_name>

This command enables user to disable use-link-local-only configuration on an interface.

- Usage:

```
config interface ipv6 disable use-link-local-only <interface_name>
```

- Example:

```
admin@sonic:~$ sudo config interface ipv6 disable use-link-local-only Vlan206
admin@sonic:~$ sudo config interface ipv6 disable use-link-local-only PortChannel007
admin@sonic:~$ sudo config interface ipv6 disable use-link-local-only Ethernet52
```

config ipv6 enable link-local

This command enables user to enable use-link-local-only command on all the interfaces globally.

- Usage:

```
sudo config ipv6 enable link-local
```

- Example:

```
admin@sonic:~$ sudo config ipv6 enable link-local
```

config ipv6 disable link-local

This command enables user to disable use-link-local-only command on all the interfaces globally.

- Usage:

```
sudo config ipv6 disable link-local
```

- Example:

```
admin@sonic:~$ sudo config ipv6 disable link-local
```

IPv6 Link Local show commands

show ipv6 link-local-mode

This command displays the link local mode of all the interfaces.

- Usage:

```
show ipv6 link-local-mode
```

- Example:

```
root@sonic:/home/admin# show ipv6 link-local-mode
+------------------+----------+
| Interface Name   | Mode     |
+==================+==========+
| Ethernet16       | Disabled |
+------------------+----------+
| Ethernet18       | Enabled  |
+------------------+----------+
```

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Kubernetes

Kubernetes show commands

show kubernetes server config

This command displays the kubernetes server configuration, if any, else would report as not configured.

- Usage:

```
show kubernetes server config
```

- Example:

```
admin@sonic:~$ show kubernetes server config
ip           port    insecure    disable
-----------  ------  ----------  ---------
10.3.157.24  6443    True        False
```

show kubernetes server status

This command displays the kubernetes server status.

- Usage:

```
show kubernetes server status
```

- Example:

```
admin@sonic:~$ show kubernetes server status
ip           port    connected    update-time
-----------  ------  -----------  -------------------
10.3.157.24  6443    true         2020-11-15 18:25:05
```

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Linux Kernel Dump

This section demonstrates the show commands and configuration commands of Linux kernel dump mechanism in SONiC.

Linux Kernel Dump show commands

show kdump config

This command shows the configuration of Linux kernel dump.

- Usage:

```
show kdump config
```

- Example:

```
admin@sonic:$ show kdump config
Kdump administrative mode: Disabled
Kdump operational mode: Unready
Kdump memory researvation: 0M-2G:256M,2G-4G:320M,4G-8G:384M,8G-:448M
Maximum number of Kdump files: 3
```

show kdump files

This command shows the Linux kernel core dump files and dmesg files which are generated by kernel dump tool.

- Usage:

```
show kdump files
```

- Example:

```
admin@sonic:~$ show kdump files
          Kernel core dump files                       Kernel dmesg files
---------------------------------------- ----------------------------------------
/var/crash/202106242344/kdump.202106242344 /var/crash/202106242344/dmesg.202106242344
/var/crash/202106242337/kdump.202106242337 /var/crash/202106242337/dmesg.202106242337
```

show kdump logging <file_name> <num_of_lines>

By default, this command will show the last 10 lines of latest dmesg file.
This command can also accept a specific file name and number of lines as arguments.

- Usage:

```
show kdump logging
```

- Example:

```
admin@sonic:~$ show kdump logging
[ 157.642053] RSP: 002b:00007fff1beee708 EFLAGS: 00000246 ORIG_RAX: 0000000000000001
[ 157.732635] RAX: ffffffffffffffda RBX: 0000000000000002 RCX: 00007fc3887d4504
[ 157.818015] RDX: 0000000000000002 RSI: 000055d388eceb40 RDI: 0000000000000001
[ 157.903401] RBP: 000055d388eceb40 R08: 000000000000000a R09: 00007fc3888255f0
[ 157.988784] R10: 000000000000000a R11: 0000000000000246 R12: 00007fc3888a6760
[ 158.074166] R13: 0000000000000002 R14: 00007fc3888a1760 R15: 0000000000000002
[ 158.159553] Modules linked in: nft_chain_route_ipv6(E) nft_chain_route_ipv4(E) xt_TCPMSS(E) dummy(E) team_
[ 159.016731] intel_rapl_perf(E) pcspkr(E) sg(E) iTCO_wdt(E) iTCO_vendor_support(E) mei_me(E) mei(E) bonding
[ 159.864532] libahci(E) mlxsw_core(E) devlink(E) ehci_pci(E) ehci_hcd(E) crc32c_intel(E) libata(E) i2c_i801
[ 160.075846] CR2: 0000000000000000
```

You can specify a file name in order to show its last 10 lines.

- Example:

```
admin@sonic:~$ show kdump logging dmesg.202106242337
[ 654.120195] RSP: 002b:00007ffe697690f8 EFLAGS: 00000246 ORIG_RAX: 0000000000000001
[ 654.210778] RAX: ffffffffffffffda RBX: 0000000000000002 RCX: 00007fcfca27b504
[ 654.296157] RDX: 0000000000000002 RSI: 000055a6e4d1b3f0 RDI: 0000000000000001
[ 654.381543] RBP: 000055a6e4d1b3f0 R08: 000000000000000a R09: 00007fcfca2cc5f0
[ 654.466925] R10: 000000000000000a R11: 0000000000000246 R12: 00007fcfca34d760
[ 654.552310] R13: 0000000000000002 R14: 00007fcfca348760 R15: 0000000000000002
[ 654.637694] Modules linked in: binfmt_misc(E) nft_chain_route_ipv6(E) nft_chain_route_ipv4(E) xt_TCPMSS(E)
[ 655.493833] intel_uncore(E) intel_rapl_perf(E) pcspkr(E) sg(E) iTCO_wdt(E) iTCO_vendor_support(E) mei_me(E
[ 656.337476] gpio_ich(E) ahci(E) mlxsw_core(E) libahci(E) devlink(E) crc32c_intel(E) libata(E) i2c_i801(E)
[ 656.569590] CR2: 0000000000000000
```

You can also specify a file name and number of lines in order to show the last number of lines.

- Example:

```
admin@sonic:~$ show kdump logging dmesg.202106242337 -l 20
[ 653.525427] __handle_sysrq.cold.9+0x45/0xf2
[ 653.576487] write_sysrq_trigger+0x2b/0x30
[ 653.625472] proc_reg_write+0x39/0x60
[ 653.669252] vfs_write+0xa5/0x1a0
[ 653.708881] ksys_write+0x57/0xd0
[ 653.748501] do_syscall_64+0x53/0x110
[ 653.792287] entry_SYSCALL_64_after_hwframe+0x44/0xa9
[ 653.852707] RIP: 0033:0x7fcfca27b504
[ 653.895452] Code: 00 f7 d8 64 89 02 48 c7 c0 ff ff ff ff eb b3 0f 1f 80 00 00 00 00 48 8d 05 f9 61 0d 00 8
[ 654.120195] RSP: 002b:00007ffe697690f8 EFLAGS: 00000246 ORIG_RAX: 0000000000000001
[ 654.210778] RAX: ffffffffffffffda RBX: 0000000000000002 RCX: 00007fcfca27b504
[ 654.296157] RDX: 0000000000000002 RSI: 000055a6e4d1b3f0 RDI: 0000000000000001
[ 654.381543] RBP: 000055a6e4d1b3f0 R08: 000000000000000a R09: 00007fcfca2cc5f0
[ 654.466925] R10: 000000000000000a R11: 0000000000000246 R12: 00007fcfca34d760
[ 654.552310] R13: 0000000000000002 R14: 00007fcfca348760 R15: 0000000000000002
[ 654.637694] Modules linked in: binfmt_misc(E) nft_chain_route_ipv6(E) nft_chain_route_ipv4(E) xt_TCPMSS(E)
[ 655.493833] intel_uncore(E) intel_rapl_perf(E) pcspkr(E) sg(E) iTCO_wdt(E) iTCO_vendor_support(E) mei_me(E
[ 656.337476] gpio_ich(E) ahci(E) mlxsw_core(E) libahci(E) devlink(E) crc32c_intel(E) libata(E) i2c_i801(E)
[ 656.569590] CR2: 0000000000000000
```

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LLDP

LLDP show commands

show lldp table

This command displays the brief summary of all LLDP neighbors.

- Usage:

```
show lldp table
```

- Example:

```
admin@sonic:~$ show lldp table
Capability codes: (R) Router, (B) Bridge, (O) Other
LocalPort    RemoteDevice       RemotePortID         Capability    RemotePortDescr
-----------  -----------------  -------------------  ------------  --------------------
Ethernet112  T1-1               hundredGigE1/2       BR            T0-2:hundredGigE1/29
Ethernet116  T1-2               hundredGigE1/2       BR            T0-2:hundredGigE1/30
eth0         swtor-b2lab2-1610  GigabitEthernet 0/2  OBR
-----------------------------------------------
Total entries displayed:  3
```

show lldp neighbors

This command displays more details about all LLDP neighbors or only the neighbors connected to a specific interface.

- Usage:

```
show lldp neighbors <interface_name>
```

- Example1: To display all neighbors in all interfaces

```
admin@sonic:~$ show lldp neighbors
-------------------------------------------------------------------------------
LLDP neighbors:
-------------------------------------------------------------------------------
Interface:    eth0, via: LLDP, RID: 1, Time: 0 day, 12:21:21
  Chassis:
    ChassisID:    mac 00:01:e8:81:e3:45
    SysName:      swtor-b2lab2-1610
    SysDescr:     SONiC Software Version: SONiC.SONiC_1.3.3_20230925044746 - HwSku: M2-W6510-48GT4V - Distri
    TTL:          20
    Capability:   Repeater, on
    Capability:   Bridge, on
    Capability:   Router, on
  Port:
    PortID:       ifname GigabitEthernet 0/2
  VLAN:         162, pvid: yes
-------------------------------------------------------------------------------
Interface:    Ethernet116, via: LLDP, RID: 3, Time: 0 day, 12:20:49
  Chassis:
    ChassisID:    mac 4c:76:25:e7:f0:c0
    SysName:      T1-2
    SysDescr:     Debian GNU/Linux 8 (jessie) Linux 4.9.0-8-amd64 #1 SMP Debian 4.9.110-3+deb9u6 (2015-12-19
    TTL:          120
    MgmtIP:       10.11.162.40
    Capability:   Bridge, on
    Capability:   Router, on
    Capability:   Wlan, off
    Capability:   Station, off
  Port:
    PortID:       local hundredGigE1/2
    PortDescr:    T0-2:hundredGigE1/30
-------------------------------------------------------------------------------
```

Optionally, you can specify an interface name in order to display only that particular interface

- Example2:

```
admin@sonic:~$ show lldp neighbors Ethernet112
show lldp neighbors Ethernet112
-------------------------------------------------------------------------------
LLDP neighbors:
-------------------------------------------------------------------------------
Interface:    Ethernet112, via: LLDP, RID: 2, Time: 0 day, 19:24:17
  Chassis:
    ChassisID:    mac 4c:76:25:e5:e6:c0
    SysName:      T1-1
    SysDescr:     Debian GNU/Linux 8 (jessie) Linux 4.9.0-8-amd64 #1 SMP Debian 4.9.110-3+deb9u6 (2015-12-19
    TTL:          120
    MgmtIP:       10.11.162.41
    Capability:   Bridge, on
    Capability:   Router, on
    Capability:   Wlan, off
    Capability:   Station, off
  Port:
    PortID:       local hundredGigE1/2
    PortDescr:    T0-2:hundredGigE1/29
-------------------------------------------------------------------------------
```

show lldp mode

This command displays the brief summary of all LLDP neighbors.

- Usage:

```
show lldp mode
show lldp mode [<interface_name>]
```

- Example:

```
admin@sonic:~$ show lldp mode
ports       lldp-mode
----------  -----------
Ethernet1   rx-and-tx
Ethernet2   rx-and-tx
Ethernet3   rx-and-tx
Ethernet4   rx-and-tx
Ethernet5   rx-and-tx
```

- Example:

```
admin@sonic:~$ show lldp mode Ethernet22
ports       lldp-mode
----------  -----------
Ethernet22  rx-and-tx
```

LLDP config commands

config lldp mode set <interface_name> (Versions >= 202111)

This command is used to set port interface fec mode.

- Usage:

```
config lldp mode --help
  Config LLDP (Link Layer Discovery Protocol) work mode

Options:
  -h, -?, --help  Show this message and exit.

Commands:
  set
```

- Example:

```
admin@sonic:~$ sudo config lldp mode set Ethernet44 tx
```

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Load Balancing

Load Balancing show commands

This sub-section lists all the possible show commands for the load balancing available in the device.
Following example gives the list of possible shows on load_balance.
Subsequent pages explain each of these commands in detail.

- Example:

```
admin@sonic:~$ show load_balance -h
Usage: show load_balance [OPTIONS] COMMAND [ARGS]...

  Show load_balance information

Options:
  -h, -?, --help  Show this message and exit.

Commands:
  ecmp  Show load_balance ecmp information
  lag   Show load_balance lag information
```

show load balance ecmp

This command displays the configuration of ECMP.

- Usage:

```
show load_balance ecmp
```

- Examples:

```
admin@sonic:~$ show load_balance ecmp
Hash Algorithm : CRC
IPV4 Field : dst-ip,l4-dst-port,l4-src-port,protocol,src-ip
IPV6 Field : dst-ip,l4-dst-port,l4-src-port,protocol,src-ip
Hash Seed  : 0
```

show load balance lag

This command displays the configuration of ECMP.

- Usage:

```
show load_balance lag
```

- Examples:

```
admin@sonic:~$ show load_balance lag
Hash Algorithm : CRC
IPV4 Field : dst-ip,l4-dst-port,l4-src-port,protocol,src-ip
IPV6 Field : dst-ip,l4-dst-port,l4-src-port,protocol,src-ip
Hash Seed  : 0
```

Load Balancing config commands

config load balance ecmp

This command use to set the load balance configuration of ECMP.

- Usage:

```
admin@sonic:~$ sudo config load-balance ecmp -h
Usage: config load-balance ecmp [OPTIONS] COMMAND [ARGS]...

  ecmp related configuration

Options:
  -?, -h, --help  Show this message and exit.

Commands:
  enhanced        ecmp enhanced related configuration
  hash-algorithm  ecmp hash algorithm configuration


admin@sonic:~$ sudo config load-balance ecmp enhanced -h
Usage: config load-balance ecmp enhanced [OPTIONS] COMMAND [ARGS]...

  ecmp enhanced related configuration

Options:
  -?, -h, --help  Show this message and exit.

Commands:
  hash-seed  ecmp hash_seed configuration
  ipv4       ecmp ipv4_field configuration
  ipv6       ecmp ipv6_field configuration


admin@sonic:~$ sudo config load-balance ecmp hash-algorithm -h
Usage: config load-balance ecmp hash-algorithm [OPTIONS] [CRC|XOR|RANDOM|CRC_32LO|CRC_32HI|(

  ecmp hash algorithm configuration

Options:
  -?, -h, --help  Show this message and exit.
```

- Examples:

```
admin@sonic:~$ sudo config load-balance ecmp enhanced hash-seed 10
admin@sonic:~$ sudo config load-balance ecmp hash-algorithm XOR
```

config load balance lag

This command use to set the load balance configuration of LAG.

- Usage:

```
admin@sonic:~$ sudo config load-balance lag -h
Usage: config load-balance lag [OPTIONS] COMMAND [ARGS]...

  lag related configuration

Options:
  -?, -h, --help  Show this message and exit.

Commands:
  enhanced        lag enhanced related configuration
  hash-algorithm  lag hash algorithm configuration


admin@sonic:~$ sudo config load-balance lag enhanced -h
Usage: config load-balance lag enhanced [OPTIONS] COMMAND [ARGS]...

  lag enhanced related configuration

Options:
  -?, -h, --help  Show this message and exit.

Commands:
  hash-seed  lag hash_seed configuration
  ipv4       lag ipv4_field configuration
  ipv6       lag ipv6_field configuration


admin@sonic:~$ sudo config load-balance lag hash-algorithm -h
Usage: config load-balance lag hash-algorithm [OPTIONS] [CRC|XOR|RANDOM|CRC_32LO|CRC_32HI|CI

  lag hash algorithm configuration

Options:
  -?, -h, --help  Show this message and exit.
```

- Examples:

```
admin@sonic:~$ sudo config load-balance lag enhanced hash-seed 10
admin@sonic:~$ sudo config load-balance lag hash-algorithm XOR
```

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Loading, Reloading And Saving Configuration

This section explains the commands that are used to load the configuration from either the ConfigDB or from the minigraph.

Loading configuration from JSON file

config load

This command is used to load the configuration from a JSON file like the file which SONiC saves its configuration to, `/etc/sonic/config_db.json`
This command loads the configuration from the input file (if user specifies this optional filename, it will use that input file. Otherwise, it will use the default `/etc/sonic/config_db.json` file as the input file) into CONFIG_DB.
The configuration present in the input file is applied on top of the already running configuration.
This command does not flush the config DB before loading the new configuration (i.e., If the configuration present in the input file is same as the current running configuration, nothing happens)
If the config present in the input file is not present in running configuration, it will be added.
If the config present in the input file differs (when key matches) from that of the running configuration, it will be modified as per the new values for those keys.

When user specifies the optional argument "-y" or "--yes", this command forces the loading without prompting the user for confirmation.
If the argument is not specified, it prompts the user to confirm whether user really wants to load this configuration file.

- Usage:

```
config load [-y|--yes] [<filename>]
```

- Example:

```
admin@sonic:~$ sudo config load
Load config from the file /etc/sonic/config_db.json? [y/N]: y
Running command: /usr/local/bin/sonic-cfggen -j /etc/sonic/config_db.json --write-to-db
```

Loading configuration from minigraph (XML) file

config load_minigraph

This command is used to load the configuration from /etc/sonic/minigraph.xml.
When users do not want to use configuration from config_db.json, they can copy the minigraph.xml configuration file to the device and load it using this command.
This command restarts various services running in the device and it takes some time to complete the command.

NOTE: If the user had logged in using SSH, users might get disconnected and some configuration failures might happen which might be hard to recover. Users need to reconnect their SSH sessions after configuring the management IP address. It is recommended to execute this command from console port
NOTE: Management interface IP address and default route (or specific route) may require reconfiguration in case if those parameters are not part of the minigraph.xml.

When user specifies the optional argument "-y" or "--yes", this command forces the loading without prompting the user for confirmation.
If the argument is not specified, it prompts the user to confirm whether user really wants to load this configuration file.

When user specifies the optional argument "-n" or "--no-service-restart", this command loads the configuration without restarting dependent services
running on the device. One use case for this option is during boot time when config-setup service loads minigraph configuration and there is no services
running on the device.

- Usage:

```
config load_minigraph [-y|--yes] [-n|--no-service-restart]
```

- Example:

```
admin@sonic:~$ sudo config load_minigraph
Reload config from minigraph? [y/N]: y
Running command: /usr/local/bin/sonic-cfggen -j /etc/sonic/config_db.json --write-to-db
```

Reloading Configuration

config reload

This command is used to clear current configuration and import new configurationn from the input file or from /etc/sonic/config_db.json.
This command shall stop all services before clearing the configuration and it then restarts those services.

This command restarts various services running in the device and it takes some time to complete the command.
NOTE: If the user had logged in using SSH, users **might get disconnected** depending upon the new management IP address. Users need to reconnect their SSH sessions.
In general, it is recommended to execute this command from console port after disconnecting all SSH

sessions to the device.
When users to do “config reload” the newly loaded config may have management IP address, or it may not have management IP address.
If mgmtIP is there in the newly loaded config file, that mgmtIP might be same as previously configured value or it might be different.
This difference in mgmtIP address values results in following possible behaviours.

Case1: Previously configured mgmtIP is same as newly loaded mgmtIP. The SSH session may not be affected at all, but it’s possible that there will be a brief interruption in the SSH session. But, assuming the client’s timeout value isn’t on the order of a couple of seconds, the session would most likely just resume again as soon as the interface is reconfigured and up with the same IP.
Case2: Previously configured mgmtIP is different from newly loaded mgmtIP. Users will lose their SSH connections.
Case3: Newly loaded config does not have any mgmtIP. Users will lose their SSH connections.

NOTE: Management interface IP address and default route (or specific route) may require reconfiguration in case if those parameters are not part of the minigraph.xml.

When user specifies the optional argument "-y" or "--yes", this command forces the loading without prompting the user for confirmation.
If the argument is not specified, it prompts the user to confirm whether user really wants to load this configuration file.

When user specifies the optional argument "-n" or "--no-service-restart", this command clear and loads the configuration without restarting dependent services
running on the device. One use case for this option is during boot time when config-setup service loads existing old configuration and there is no services
running on the device.

When user specifies the optional argument "-f" or "--force", this command ignores the system sanity checks. By default a list of sanity checks are performed and if one of the checks fail, the command will not execute. The sanity checks include ensuring the system status is not starting, all the essential services are up and swss is in ready state.

- Usage:

```
config reload [-y|--yes] [-l|--load-sysinfo] [<filename>] [-n|--no-service-restart] [-f|--force]
```

- Example:

```
admin@sonic:~$ sudo config reload
Clear current config and reload config from the file /etc/sonic/config_db.json? [y/N]: y
Running command: systemctl stop dhcp_relay
Running command: systemctl stop swss
Running command: systemctl stop snmp
Warning: Stopping snmp.service, but it can still be activated by:
  snmp.timer
Running command: systemctl stop lldp
Running command: systemctl stop pmon
Running command: systemctl stop bgp
Running command: systemctl stop teamd
Running command: /usr/local/bin/sonic-cfggen -H -k Force10-Z9100-C32 --write-to-db
Running command: /usr/local/bin/sonic-cfggen -j /etc/sonic/config_db.json --write-to-db
Running command: systemctl restart hostname-config
Running command: systemctl restart interfaces-config
Timeout, server 10.11.162.42 not responding.
```

When some sanity checks fail below error messages can be seen

```
admin@sonic:~$ sudo config reload -y
System is not up. Retry later or use -f to avoid system checks


admin@sonic:~$ sudo config reload -y
Relevant services are not up. Retry later or use -f to avoid system checks


admin@sonic:~$ sudo config reload -y
SwSS container is not ready. Retry later or use -f to avoid system checks
```

Loading Management Configuration

config load_mgmt_config

This command is used to reconfigure hostname and mgmt interface based on device description file. This command either uses the optional file specified as arguement or looks for the file "/etc/sonic/device_desc.xml".
If the file does not exist or if the file does not have valid fields for "hostname" and "ManagementAddress", it fails.

When user specifies the optional argument "-y" or "--yes", this command forces the loading without prompting the user for confirmation.
If the argument is not specified, it prompts the user to confirm whether user really wants to load this configuration file.

- Usage:

```
config load_mgmt_config [-y|--yes] [<filename>]
```

- Example:

```
admin@sonic:~$ sudo config load_mgmt_config
Reload config from minigraph? [y/N]: y
Running command: /usr/local/bin/sonic-cfggen -M /etc/sonic/device_desc.xml --write-to-db
```

Saving Configuration to a File for Persistence

config save

This command is to save the config DB configuration into the user-specified filename or into the default /etc/sonic/config_db.json. This saves the configuration into the disk which is available even after reboots.
Saved file can be transferred to remote machines for debugging. If users wants to load the configuration from this new file at any point of time, they can use "config load" command and provide this newly generated file as input. If users wants this newly generated file to be used during reboot, they need to copy this file to /etc/sonic/config_db.json.

- Usage:

```
config save [-y|--yes] [<filename>]
```

- Example (Save configuration to /etc/sonic/config_db.json):

```
admin@sonic:~$ sudo config save -y
```

- Example (Save configuration to a specified file):

```
admin@sonic:~$ sudo config save -y /etc/sonic/config2.json
```

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Loopback Interfaces

Loopback Config commands

This sub-section explains how to create and delete loopback interfaces.

config interface loopback

This command is used to add or delete loopback interfaces.
It is recommended to use loopback names in the format "Loopbackxxx", where "xxx" is number of 1 to 3 digits. Ex: "Loopback11".

- Usage:

```
config loopback (add | del) <loopback_name>
```

- Example (Create the loopback with name "Loopback11"):

```
admin@sonic:~$ sudo config loopback add Loopback11
```

VRF Configuration

VRF show commands

show vrf

This command displays all vrfs configured on the system along with interface binding to the vrf.
If vrf-name is also provided as part of the command, if the vrf is created it will display all interfaces binding to the vrf, if vrf is not created nothing will be displayed.

- Usage:

```
show vrf [<vrf_name>]
```

- Example:

```
admin@sonic:~$ show vrf
VRF        Interfaces
-------    ------------
default    Vlan20
Vrf-red    Vlan100
           Loopback11
           Eth0.100
Vrf-blue   Loopback100
           Loopback102
           Ethernet0.10
           PortChannel101
```

VRF config commands

**config vrf add **

This command creates vrf in SONiC system with provided vrf-name.

- Usage:

```
config vrf add <vrf-name>
```

Note: vrf-name should always start with keyword "Vrf"

config vrf del

This command deletes vrf with name vrf-name.

- Usage:

```
config vrf del <vrf-name>
```

Management VRF

Management VRF Show commands

show mgmt-vrf

This command displays whether the management VRF is enabled or disabled. It also displays the details about the the links (eth0, mgmt, lo-m) that are related to management VRF.

- Usage:

```
show mgmt-vrf
```

- Example:

```
admin@sonic:~$ show mgmt-vrf

ManagementVRF : Enabled

Management VRF interfaces in Linux:
348: mgmt: <NOARP,MASTER,UP,LOWER_UP> mtu 65536 qdisc noqueue state UP mode DEFAULT group default qlen 10(
    link/ether f2:2a:d9:bc:e8:f0 brd ff:ff:ff:ff:ff:ff
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq master mgmt state UP mode DEFAULT group defau
    link/ether 4c:76:25:f4:f9:f3 brd ff:ff:ff:ff:ff:ff
350: lo-m: <BROADCAST,NOARP,UP,LOWER_UP> mtu 1500 qdisc noqueue master mgmt state UNKNOWN mode DEFAULT gro
    link/ether b2:4c:c6:f3:e9:92 brd ff:ff:ff:ff:ff:ff

NOTE: The management interface "eth0" shows the "master" as "mgmt" since it is part of management VRF.
```

show mgmt-vrf routes

This command displays the routes that are present in the routing table 5000 that is meant for management VRF.

- Usage:

```
show mgmt-vrf routes
```

- Example:

```
admin@sonic:~$ show mgmt-vrf routes

Routes in Management VRF Routing Table:
default via 10.16.210.254 dev eth0 metric 201
broadcast 10.16.210.0 dev eth0 proto kernel scope link src 10.16.210.75
10.16.210.0/24 dev eth0 proto kernel scope link src 10.16.210.75
local 10.16.210.75 dev eth0 proto kernel scope host src 10.16.210.75
broadcast 10.16.210.255 dev eth0 proto kernel scope link src 10.16.210.75
broadcast 127.0.0.0 dev lo-m proto kernel scope link src 127.0.0.1
127.0.0.0/8 dev lo-m proto kernel scope link src 127.0.0.1
local 127.0.0.1 dev lo-m proto kernel scope host src 127.0.0.1
broadcast 127.255.255.255 dev lo-m proto kernel scope link src 127.0.0.1
```

show management_interface address

This command displays the IP address(es) configured for the management interface "eth0" and the management network default gateway.

- Usage:

```
show management_interface address
```

- Example:

```
admin@sonic:~$ show management_interface address
Management IP address = 10.16.210.75/24
Management NetWork Default Gateway = 10.16.210.254
Management IP address = FC00:2::32/64
Management Network Default Gateway = fc00:2::1
```

show snmpagentaddress

This command displays the configured SNMP agent IP addresses.

- Usage:

```
show snmpagentaddress
```

- Example:

```
admin@sonic:~$ show snmpagentaddress
ListenIP      ListenPort  ListenVrf
----------  ------------  -----------
1.2.3.4              787  mgmt
```

show snmptrap

This command displays the configured SNMP Trap server IP addresses.

- Usage:

```
show snmptrap
```

- Example:

```
admin@sonic:~$ show snmptrap
  Version  TrapReceiverIP      Port  VRF    Community
---------  ----------------  ------  -----  -----------
        2  31.31.31.31          456  mgmt   public
```

Management VRF Config commands

config vrf add mgmt

This command enables the management VRF in the system. This command restarts the "interfaces-config" service which in turn regenerates the /etc/network/interfaces file and restarts the "networking" service. This creates a new interface and l3mdev CGROUP with the name as "mgmt" and enslaves the management interface "eth0" into this master interface "mgmt". Note that the VRFName "mgmt" (or "management") is reserved for management VRF. i.e. Data VRFs should not use these reserved VRF names.

- Usage:

```
config vrf add mgmt
```

- Example:

```
admin@sonic:~$ sudo config vrf add mgmt
```

config vrf del mgmt

This command disables the management VRF in the system. This command restarts the "interfaces-config" service which in turn regenerates the /etc/network/interfaces file and restarts the "networking" service. This deletes the interface "mgmt" and deletes the l3mdev CGROUP named "mgmt" and puts back the management interface "eth0" into the default VRF. Note that the VRFName "mgmt" (or "management") is reserved for management VRF. i.e. Data VRFs should not use these reserved VRF names.

- Usage:

```
config vrf del mgmt
```

- Example:

```
admin@sonic:~$ sudo config vrf del mgmt
```

config snmpagentaddress add

This command adds the SNMP agent IP address on which the SNMP agent is expected to listen. When SNMP agent is expected to work as part of management VRF, users should specify the optional vrf_name parameter as "mgmt". This configuration goes into snmpd.conf that is used by SNMP agent. SNMP service is restarted to make this configuration effective in SNMP agent.

- Usage:

```
config snmpagentaddress add [-p <port_num>] [-v <vrf_name>] agentip
```

- Example:

```
 admin@sonic:~$ sudo config snmpagentaddress add -v mgmt -p 123 21.22.13.14

Note: For this example, configuration goes into /etc/snmp/snmpd.conf inside snmp docker as follows. When "-v

 agentAddress 21.22.13.14:123%mgmt
```

config snmpagentaddress del

This command deletes the SNMP agent IP address on which the SNMP agent is expected to listen. When users had added the agent IP as part of "mgmt" VRF, users should specify the optional vrf_name parameter as "mgmt" while deleting as well. This configuration is removed from snmpd.conf that is used by SNMP agent. SNMP service is restarted to make this configuration effective in SNMP agent.

- Usage:

```
config snmpagentaddress del [-p <port_num>] [-v <vrf_name>] agentip
```

- Example:

```
admin@sonic:~$ sudo config snmpagentaddress del -v mgmt -p 123 21.22.13.14
```

config snmptrap modify

This command modifies the SNMP trap server IP address to which the SNMP agent is expected to send the traps. Users can configure one server IP addrss for each SNMP version to send the traps. When SNMP agent is expected to send traps as part of management VRF, users should specify the optional vrf_name parameter as "mgmt". This configuration goes into snmpd.conf that is used by SNMP agent. SNMP service is restarted to make this configuration effective in SNMP agent.

- Usage:

```
config snmptrap modify <snmp_version> [-p <port_num>] [-v <vrf_name>] [-c <community>] trapserverip
```

- Example:

```
admin@sonic:~$ sudo config snmptrap modify 2 -p 456 -v mgmt 21.21.21.21

For this example, configuration goes into /etc/snmp/snmpd.conf inside snmp docker as follows. When "-v" par

trap2sink 31.31.31.31:456%mgmt public
```

config snmptrap del

This command deletes the SNMP Trap server IP address to which SNMP agent is expected to send TRAPs. When users had added the trap server IP as part of "mgmt" VRF, users should specify the optional vrf_name parameter as "mgmt" while deleting as well. This configuration is removed from snmpd.conf that is used by SNMP agent. SNMP service is restarted to make this configuration effective in SNMP agent.

- Usage:

```
config snmptrap del [-p <port_num>] [-v <vrf_name>] [-c <community>] trapserverip
```

- Example:

```
admin@sonic:~$ sudo config snmptrap del -v mgmt -p 123 21.22.13.14
```

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Muxcable

Muxcable Show commands

show muxcable status

This command displays all the status of either all the ports which are connected to muxcable or any individual port selected by the user. The resultant table or json output will show the current status of muxcable on the port (auto/active) and also the health of the muxcable.

- Usage:

```
show muxcable status [OPTIONS] [PORT]
```

While displaying the muxcable status, users can configure the following fields

- PORT optional - Port name should be a valid port
- --json optional - -- option to display the result in json format. By default output will be in tabular format.

With no optional argument, all the ports muxcable status will be displayed in tabular form, or user can pass --json option to display in json format

- Example:

```
admin@sonic:~$ show muxcable status
PORT        STATUS    HEALTH
----------  --------  --------
Ethernet32  active    HEALTHY
Ethernet0   auto      HEALTHY


admin@sonic:~$ show muxcable status --json
```

```
{
    "MUX_CABLE": {
          "Ethernet32": {
              "STATUS": "active",
              "HEALTH": "HEALTHY"
          },
          "Ethernet0": {
              "STATUS": "auto",
              "HEALTH": "HEALTHY"
          }
     }
}
```


```
admin@sonic:~$ show muxcable status Ethernet0
PORT       STATUS    HEALTH
---------  --------  --------
Ethernet0  auto      HEALTHY
```

```
admin@sonic:~$ show muxcable status Ethernet0 --json
```


```
{
     "MUX_CABLE": {
         "Ethernet0": {
              "STATUS": "auto",
              "HEALTH": "HEALTHY"
          }
     }
}
```


show muxcable config

This command displays all the configurations of either all the ports which are connected to muxcable or any individual port selected by the user. The resultant table or json output will show the current configurations of muxcable on the port(active/standby) and also the ipv4 and ipv6 address of the port as well as peer TOR ip address with the hostname.

- Usage:

```
show muxcable config [OPTIONS] [PORT]
```

With no optional argument, all the ports muxcable configuration will be displayed in tabular form While displaying the muxcable configuration, users can configure the following fields

- PORT optional - Port name should be a valid port

- --json optional - option to display the result in json format. By default output will be in tabular format.
- Example:

```
admin@sonic:~$ show muxcable config
SWITCH_NAME    PEER_TOR
-------------  ----------
sonic          10.1.1.1
port       state    ipv4      ipv6
---------  -------  --------  --------
Ethernet0  active  10.1.1.1  fc00::75


admin@sonic:~$ show muxcable config --json


{
        "MUX_CABLE": {
            "PEER_TOR": "10.1.1.1",
            "PORTS": {
                "Ethernet0": {
                    "STATE": "active",
                    "SERVER": {
                        "IPv4": "10.1.1.1",
                        "IPv6": "fc00::75"
                     }
                 }
             }
         }
 }


admin@sonic:~$ show muxcable config Ethernet0
SWITCH_NAME    PEER_TOR
-------------  ----------
sonic          10.1.1.1
port       state    ipv4      ipv6
---------  -------  --------  --------
Ethernet0  active  10.1.1.1  fc00::75


admin@sonic:~$ show muxcable config Ethernet0 --json
```

```
{
    "MUX_CABLE": {
        "PORTS": {
            "Ethernet0": {
                "STATE": "active",
                "SERVER": {
                    "IPv4": "10.1.1.1",
                    "IPv6": "fc00::75"
                }
            }
        }
    }
}
```

show muxcable ber-info

This command displays the ber(Bit error rate) of the port user provides on the target user provides. The target provided as an integer corresponds to actual target as.
0 -> local
1 -> tor 1
2 -> tor 2
3 -> nic

- Usage:

```
Usage: show muxcable ber-info [OPTIONS] PORT TARGET
```

- PORT required - Port number should be a valid port
- TARGET required - the actual target to get the ber info of.
- Example:

```
admin@sonic:~$ show muxcable ber-info 1 1
Lane1    Lane2
-------  -------
0       0
```

show muxcable ber-info

This command displays the eye info in mv(milli volts) of the port user provides on the target user provides. The target provided as an integer corresponds to actual target as.
0 -> local
1 -> tor 1
2 -> tor 2
3 -> nic

- Usage:

```
Usage: show muxcable eye-info [OPTIONS] PORT TARGET
```

- PORT required - Port number should be a valid port
- TARGET required - the actual target to get the eye info of.
- Example:

```
admin@sonic:~$ show muxcable ber-info 1 1
Lane1    Lane2
-------  -------
632      622
```

Muxcable Config commands

config muxcable mode

This command is used for setting the configuration of a muxcable Port/all ports to be active or auto. The user has to enter a port number or else all to make the muxcable config operation on all the ports. Depending on the status of the muxcable port state the resultant output could be OK or INPROGRESS . OK would imply no change on the state, INPROGRESS would mean the toggle is happening in the background.

- Usage:

```
config muxcable mode [OPTIONS] <operation_status> <port_name>
```

While configuring the muxcable, users needs to configure the following fields for the operation

- <auto/active> operation_state, permitted operation to be configured which can only be auto or active
- PORT optional - Port name should be a valid port
- --json optional - option to display the result in json format. By default output will be in tabular format.
- Example:

```
admin@sonic:~$ sudo config muxcable  mode active Ethernet0
port       state
---------  -------
Ethernet0  OK


admin@sonic:~$ sudo config muxcable  mode --json active Ethernet0
```

```
    {
        "Ethernet0": "OK"
    }
```

```
admin@sonic:~$ sudo config muxcable  mode active all
port        state
----------  ----------
Ethernet0   OK
Ethernet32  INPROGRESS
```

```
admin@sonic:~$ sudo config muxcable  mode active all --json
```

```
    {
         "Ethernet32": "INPROGRESS",
         "Ethernet0": "OK"
    }
```

config muxcable prbs enable/disable

This command is used for setting the configuration and enable/diable of prbs on a port user provides. While enabling in addition to port the user also needs to provides the target, prbs mode and lane map on which the user intends to run prbs on. The target reflects where the enable/dsiable will happen.

- Usage:

```
config muxcable prbs enable [OPTIONS] PORT TARGET MODE_VALUE LANE_MAP
config muxcable prbs disable [OPTIONS] PORT TARGET
```

While configuring the muxcable, users needs to configure the following fields for the operation

- PORT required - Port number should be a valid port
- TARGET required - the actual target to run the prbs on
  0 -> local side,
  1 -> TOR 1
  2 -> TOR 2
  3 -> NIC
- MODE_VALUE required - the mode/type for configuring the PRBS mode.
  0x00 = PRBS 9, 0x01 = PRBS 15, 0x02 = PRBS 23, 0x03 = PRBS 31
- LANE_MAP required - an integer representing the lane_map to be run PRBS on
  0bit for lane 0, 1bit for lane1 and so on.
  for example 3 -> 0b'0011 , means running on lane0 and lane1

- Example:

```
admin@sonic:~$ sudo config muxcable prbs enable 1 1 3 3
PRBS config sucessful
admin@sonic:~$  sudo config muxcable prbs disable 1 0
PRBS disable sucessful
```

config muxcable loopback enable/disable

This command is used for setting the configuration and enable/disable of loopback on a port user provides. While enabling in addition to port the user also needs to provides the target and lane map on which the user intends to run loopback on. The target reflects where the enable/dsiable will happen.

- Usage:

```
config muxcable loopback enable [OPTIONS] PORT TARGET LANE_MAP
config muxcable loopback disable [OPTIONS] PORT TARGET
```

While configuring the muxcable, users needs to configure the following fields for the operation

- PORT required - Port number should be a valid port
- TARGET required - the actual target to run the loopback on
  0 -> local side,
  1 -> TOR 1
  2 -> TOR 2
  3 -> NIC
- LANE_MAP required - an integer representing the lane_map to be run loopback on
  0bit for lane 0, 1bit for lane1 and so on.
  for example 3 -> 0b'0011 , means running on lane0 and lane1
- Example:

```
admin@sonic:~$ sudo config muxcable loopback enable 1 1 3
loopback config sucessful
admin@sonic:~$  sudo config muxcable loopback disable 1 0
loopback disable sucessfull
```

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Mirroring

Mirroring Show commands

show mirror_session

This command displays all the mirror sessions that are configured.

- Usage:

```
show mirror_session
```

- Example:

```
admin@sonic:~$ show mirror_session
ERSPAN Sessions
Name       Status    SRC IP     DST IP    GRE    DSCP    TTL    Queue    Policer    Monitor Port    SRC Port
------     --------  --------   --------  -----  ------  -----  -------  ---------  --------------  --------
everflow0  active    10.1.0.32  10.0.0.7

SPAN Sessions
Name    Status    DST Port    SRC Port    Direction    Queue    Policer
------  --------  ----------  ----------  -----------  -------  ---------
port0   active    Ethernet10  Ethernet20  rx
```

Mirroring Config commands

config mirror_session

This command is used to add or remove mirroring sessions. Mirror session is identified by "session_name".
This command supports configuring both SPAN/ERSPAN sessions.
In SPAN user can configure mirroring of list of source ports/LAG to destination port in ingress/egress/both directions.
In ERSPAN user can configure mirroring of list of source ports/LAG to a destination IP.
Both SPAN/ERSPAN support ACL based mirroring and can be used in ACL configurations.

While adding a new ERSPAN session, users need to configure the following fields that are used while forwarding the mirrored packets.

1. source IP address,
2. destination IP address,
3. DSCP (QoS) value with which mirrored packets are forwarded
4. TTL value
5. optional - GRE Type in case if user wants to send the packet via GRE tunnel. GRE type could be anything; it could also be left as empty; by default, it is 0x8949.
6. optional - Queue in which packets shall be sent out of the device. Valid values 0 to 7 for most of the devices. Users need to know their device and the number of queues supported in that device.
7. optional - Policer which will be used to control the rate at which frames are mirrored.

8. optional - List of source ports which can have both Ethernet and LAG ports.
9. optional - Direction - Mirror session direction when configured along with Source port. (Supported rx/tx/both. default direction is both)

- Usage:

```
config mirror_session erspan add <session_name> <src_ip> <dst_ip> <dscp> <ttl> [gre_type] [queue] [policer <
```

The following command is also supported to be backward compatible.
This command will be deprecated in future releases.

```
config mirror_session add <session_name> <src_ip> <dst_ip> <dscp> <ttl> [gre_type] [queue]
```

- Example:

```
admin@sonic:~$ sudo config mirror_session add mrr_legacy 1.2.3.4 20.21.22.23 8 100 0x6558 0
admin@sonic:~$ show mirror_session
Name         Status    SRC IP     DST IP       GRE     DSCP    TTL    Queue    Policer    Monitor Port    SF
---------    --------  --------   -----------  ------  ------  -----  -------  ---------  --------------  --
mrr_legacy   inactive  1.2.3.4    20.21.22.23  0x6558  8       100    0


admin@sonic:~$ sudo config mirror_session erspan add mrr_abcd 1.2.3.4 20.21.22.23 8 100 0x6558 0
admin@sonic:~$ show mirror_session
Name       Status    SRC IP     DST IP       GRE     DSCP    TTL    Queue    Policer    Monitor Port    SRC
---------  --------  --------   -----------  ------  ------  -----  -------  ---------  --------------  ----
mrr_abcd   inactive  1.2.3.4    20.21.22.23  0x6558  8       100    0
admin@sonic:~$

admin@sonic:~$ sudo config mirror_session erspan add mrr_port 1.2.3.4 20.21.22.23 8 100 0x6558 0 Ethernet10
admin@sonic:~$ show mirror_session
Name       Status    SRC IP     DST IP       GRE     DSCP    TTL    Queue    Policer    Monitor Port    SRC
---------  --------  --------   -----------  ------  ------  -----  -------  ---------  --------------  ----
mrr_port   inactive  1.2.3.4    20.21.22.23  0x6558  8       100    0                                   Ethe
admin@sonic:~$
```

While adding a new SPAN session, users need to configure the following fields that are used while forwarding the mirrored packets.

1. destination port,
2. optional - List of source ports- List of source ports which can have both Ethernet and LAG ports.
3. optional - Direction - Mirror session direction when configured along with Source port. (Supported rx/tx/both. default direction is both)
4. optional - Queue in which packets shall be sent out of the device. Valid values 0 to 7 for most of the devices. Users need to know their device and the number of queues supported in that device.
5. optional - Policer which will be used to control the rate at which frames are mirrored.

- Usage:

```
config mirror_session span add <session_name> <dst_port> [source-port-list] [direction] [queue] [policer <pc
```

- Example:

```
admin@sonic:~$ sudo config mirror_session span add port0 Ethernet10 Ethernet4,Ethernet8
admin@sonic:~$ show mirror_session
Name    Status    DST Port    SRC Port             Direction      Queue    Policer
------  --------  ----------  -------------------  -----------    -------  -------
port0   active    Ethernet10  Ethernet4,Ethernet8  both
admin@sonic:~$
```

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NAT

NAT Show commands

show nat config

This command displays the NAT configuration.

- Usage:

```
show nat config [static | pool | bindings | globalvalues | zones]
```

With no optional arguments, the whole NAT configuration is displayed.

- Example:

```
admin@sonic:~$ show nat config static

Nat Type  IP Protocol Global IP      Global L4 Port  Local IP       Local L4 Port  Twice-Nat Id
--------  ----------- ------------   --------------  -------------  -------------  ------------
dnat      all         65.55.45.5     ---             10.0.0.1       ---            ---
dnat      all         65.55.45.6     ---             10.0.0.2       ---            ---
dnat      tcp         65.55.45.7     2000            20.0.0.1       4500           1
snat      tcp         20.0.0.2       4000            65.55.45.8     1030           1

admin@sonic:~$ show nat config pool

Pool Name      Global IP Range             Global L4 Port Range
------------   -------------------------   --------------------
Pool1          65.55.45.5                  1024-65535
Pool2          65.55.45.6-65.55.45.8       ---
Pool3          65.55.45.10-65.55.45.15     500-1000

admin@sonic:~$ show nat config bindings

Binding Name   Pool Name      Access-List    Nat Type  Twice-Nat Id
------------   ------------   ------------   --------  ------------
Bind1          Pool1          ---            snat      ---
Bind2          Pool2          1              snat      1
Bind3          Pool3          2              snat      --

admin@sonic:~$ show nat config globalvalues

Admin Mode     : enabled
Global Timeout : 600 secs
TCP Timeout    : 86400 secs
UDP Timeout    : 300 secs

admin@sonic:~$ show nat config zones

Port       Zone
----       ----
Ethernet2  0
Vlan100    1
```

show nat statistics

This command displays the NAT translation statistics for each entry.

- Usage:

```
show nat statistics
```

- Example:

```
admin@sonic:~$ show nat statistics

Protocol Source           Destination          Packets          Bytes
-------- ---------        --------------       -------------    -------------
all      10.0.0.1         ---                            802          1009280
all      10.0.0.2         ---                             23             5590
tcp      20.0.0.1:4500    ---                            110            12460
udp      20.0.0.1:4000    ---                           1156           789028
tcp      20.0.0.1:6000    ---                             30            34800
tcp      20.0.0.1:5000    65.55.42.1:2000                128           110204
tcp      20.0.0.1:5500    65.55.42.1:2000                  8             3806
```

show nat translations

This command displays the NAT translation entries.

- Usage:

```
show nat translations [count]
```

Giving the optional count argument displays only the details about the number of translation entries.

- Example:

```
admin@sonic:~$ show nat translations

Static NAT Entries        ..... 4
Static NAPT Entries       ..... 2
Dynamic NAT Entries       ..... 0
Dynamic NAPT Entries      ..... 4
Static Twice NAT Entries  ..... 0
Static Twice NAPT Entries ..... 4
Dynamic Twice NAT Entries  ..... 0
Dynamic Twice NAPT Entries ..... 0
Total SNAT/SNAPT Entries   ..... 9
Total DNAT/DNAPT Entries   ..... 9
Total Entries              ..... 14

Protocol Source           Destination       Translated Source  Translated Destination
-------- ---------        --------------    -----------------  ----------------------
all      10.0.0.1         ---               65.55.42.2         ---
all      ---              65.55.42.2        ---                10.0.0.1
all      10.0.0.2         ---               65.55.42.3         ---
all      ---              65.55.42.3        ---                10.0.0.2
tcp      20.0.0.1:4500    ---               65.55.42.1:2000    ---
tcp      ---              65.55.42.1:2000   ---                20.0.0.1:4500
udp      20.0.0.1:4000    ---               65.55.42.1:1030    ---
udp      ---              65.55.42.1:1030   ---                20.0.0.1:4000
tcp      20.0.0.1:6000    ---               65.55.42.1:1024    ---
tcp      ---              65.55.42.1:1024   ---                20.0.0.1:6000
tcp      20.0.0.1:5000    65.55.42.1:2000   65.55.42.1:1025    20.0.0.1:4500
tcp      20.0.0.1:4500    65.55.42.1:1025   65.55.42.1:2000    20.0.0.1:5000
tcp      20.0.0.1:5500    65.55.42.1:2000   65.55.42.1:1026    20.0.0.1:4500
tcp      20.0.0.1:4500    65.55.42.1:1026   65.55.42.1:2000    20.0.0.1:5500

admin@sonic:~$ show nat translations count

Static NAT Entries        ..... 4
Static NAPT Entries       ..... 2
Dynamic NAT Entries       ..... 0
Dynamic NAPT Entries      ..... 4
Static Twice NAT Entries  ..... 0
Static Twice NAPT Entries ..... 4
Dynamic Twice NAT Entries  ..... 0
Dynamic Twice NAPT Entries ..... 0
Total SNAT/SNAPT Entries   ..... 9
Total DNAT/DNAPT Entries   ..... 9
Total Entries              ..... 14
```

NAT Config commands

config nat add static

This command is used to add a static NAT or NAPT entry.
When configuring the Static NAT entry, user has to specify the following fields with 'basic' keyword.

1. Global IP address,
2. Local IP address,
3. NAT type (snat / dnat) to be applied on the Global IP address. Default value is dnat. This is optinoal argument.
4. Twice NAT Id. This is optional argument used in case of twice nat configuration.

When configuring the Static NAPT entry, user has to specify the following fields.

1. IP protocol type (tcp / udp)
2. Global IP address + Port
3. Local IP address + Port
4. NAT type (snat / dnat) to be applied on the Global IP address + Port. Default value is dnat. This is optional argument.
5. Twicw NAT Id. This is optional argument used in case of twice nat configuration.

- Usage:

```
config nat add static {{basic (global-ip) (local-ip)} | {{tcp | udp} (global-ip) (global-port) (local-ip) (l
```

To delete a static NAT or NAPT entry, use the command below. Giving the all argument deletes all the configured static NAT and NAPT entries.

```
config nat remove static {{basic (global-ip) (local-ip)} | {{tcp | udp} (global-ip) (global-port) (local-ip) (loc
```

- Example:

```
admin@sonic:~$ sudo config nat add static basic 65.55.45.1 12.12.12.14 -nat_type dnat
admin@sonic:~$ sudo config nat add static tcp 65.55.45.2 100 12.12.12.15 200 -nat_type dnat

admin@sonic:~$ show nat translations

Static NAT Entries        ..... 2
Static NAPT Entries       ..... 2
Dynamic NAT Entries       ..... 0
Dynamic NAPT Entries      ..... 0
Static Twice NAT Entries  ..... 0
Static Twice NAPT Entries ..... 0
Dynamic Twice NAT Entries  ..... 0
Dynamic Twice NAPT Entries ..... 0
Total SNAT/SNAPT Entries   ..... 2
Total DNAT/DNAPT Entries   ..... 2
Total Entries              ..... 4

Protocol Source           Destination       Translated Source  Translated Destination
-------- ---------        --------------    -----------------  ----------------------
all      12.12.12.14      ---               65.55.42.1         ---
all      ---              65.55.42.1        ---                12.12.12.14
tcp      12.12.12.15:200  ---               65.55.42.2:100     ---
tcp      ---              65.55.42.2:100    ---                12.12.12.15:200
```

config nat add pool

This command is used to create a NAT pool used for dynamic Source NAT or NAPT translations. Pool can be configured in one of the following combinations.

1. Global IP address range (or)
2. Global IP address + L4 port range (or)
3. Global IP address range + L4 port range.

- Usage:

```
config nat add pool (pool-name) (global-ip-range) (global-port-range)
```

To delete a NAT pool, use the command. Pool cannot be removed if it is referenced by a NAT binding. Giving the pools argument removes all the configured pools.

```
config nat remove {pool (pool-name) | pools}
```

- Example:

```
admin@sonic:~$ sudo config nat add pool pool1 65.55.45.2-65.55.45.10
admin@sonic:~$ sudo config nat add pool pool2 65.55.45.3 100-1024

admin@sonic:~$ show nat config pool

Pool Name    Global IP Range         Global Port Range
-----------  ----------------------  ------------------
pool1        65.55.45.2-65.55.45.10  ---
pool2        65.55.45.3              100-1024
```

config nat add binding

This command is used to create a NAT binding between a pool and an ACL. The following fields are needed for configuring the binding.

1. ACL is an optional argument. If ACL argument is not given, the NAT binding is applicable to match all traffic.
2. NAT type is an optional argument. Only DNAT type is supoprted for binding.
3. Twice NAT Id is an optional argument. This Id is used to form a twice nat grouping with the static NAT/NAPT entry configured with the same Id.

- Usage:

```
config nat add binding (binding-name) [(pool-name)] [(acl-name)] [-nat_type {snat | dnat}] [-twice_nat_id (\
```

To delete a NAT binding, use the command below. Giving the bindings argument removes all the configured bindings.

```
config nat remove {binding (binding-name) | bindings}
```

- Example:

```
admin@sonic:~$ sudo config nat add binding bind1 pool1 acl1
admin@sonic:~$ sudo config nat add binding bind2 pool2

admin@sonic:~$ show nat config bindings

Binding Name    Pool Name    Access-List    Nat Type    Twice-NAT Id
--------------  -----------  -------------  ----------  --------------
bind1           pool1        acl1           snat        ---
bind2           pool2                       snat        ---
```

config nat add interface

This command is used to configure NAT zone on an L3 interface. Default value of NAT zone on an L3 interface is 0. Valid range of zone values is 0-3.

- Usage:

```
config nat add interface (interface-name) -nat_zone (value)
```

To reset the NAT zone on an interface, use the command below. Giving the interfaces argument resets the NAT zone on all the L3 interfaces to 0.

```
config nat remove {interface (interface-name) | interfaces}
```

- Example:

```
admin@sonic:~$ sudo config nat add interface Ethernet28 -nat_zone 1

admin@sonic:~$ show nat config zones

Port           Zone
-----------  ------
Ethernet0         0
Ethernet28        1
Ethernet22        0
Vlan2091          0
```

config nat set

This command is used to set the NAT timeout values. Different timeout values can be configured for the NAT entry timeout, NAPT TCP entry timeout, NAPT UDP entry timeout.
Range for Global NAT entry timeout is 300 sec to 432000 sec, default value is 600 sec.
Range for TCP NAT/NAPT entry timeout is 300 sec to 432000 sec, default value is 86400 sec.
Range for UDP NAT/NAPT entry timeout is 120 sec to 600 sec, default value is 300 sec.

- Usage:

```
config nat set {tcp-timeout (value) | timeout (value) | udp-timeout (value)}
```

To reset the timeout values to the default values, use the command

```
config nat reset {tcp-timeout | timeout | udp-timeout}
```

- Example:

```
admin@sonic:~$ sudo config nat add set tcp-timeout 3600

admin@sonic:~$ show nat config globalvalues

Admin Mode     : enabled
Global Timeout : 600 secs
TCP Timeout    : 600 secs
UDP Timeout    : 300 secs
```

config nat feature

This command is used to enable or disable the NAT feature.

- Usage:

```
config nat feature {enable | disable}
```

- Example:

```
admin@sonic:~$ sudo config nat feature enable
admin@sonic:~$ sudo config nat feature disable
```

NAT Clear commands

sonic-clear nat translations

This command is used to clear the dynamic NAT and NAPT translation entries.

- Usage:

```
sonic-clear nat translations
```

sonic-clear nat statistics

This command is used to clear the statistics of all the NAT and NAPT entries.

- Usage:

```
sonic-clear nat statistics
```

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NTP

NTP show commands

show ntp

This command displays a list of NTP peers known to the server as well as a summary of their state.

- Usage:

```
show ntp
```

- Example:

```
admin@sonic:~$ sudo config ntp add 172.28.145.251
MGMT_VRF_CONFIG is not present.
   remote           refid      st t when poll reach   delay   offset  jitter
==============================================================================
*172.28.145.251  LOCAL(0)         6 u   59   64  377    0.136  -63445. 144.447

NTP SERVER :
    172.28.145.251
Source Interface : unspecified
```

NTP config commands

This sub-section of commands is used to add or remove the configured NTP servers and NTP source interface or ip.

config ntp add

This command is used to add a NTP server address. The address can be IP address or domain address. Note that only one NTP server address can be added in the device. So, if you repeat this command, it will overwrite the previous configuration.

- Usage:

```
sudo config ntp add <server-addr>
```

- Example:

```
admin@sonic:~$ sudo config ntp add 9.9.9.9
NTP server 9.9.9.9 added to configuration
Restarting ntp-config service...
```

```
admin@sonic:~$ sudo config ntp add ntp.ntsc.ac.cn
NTP server ntp.ntsc.ac.cn added to configuration
Restarting ntp-config service...
```

config ntp del

This command is used to delete a configured NTP server address.

- Usage:

```
sudo config ntp del <address>
```

- Example:

```
admin@sonic:~$ sudo config ntp del 9.9.9.9
9.9.9.9 has been removed from ntp source
Restarting ntp-config service...
```

config ntp add_src

This command is used to add a NTP source. The source can be an interface or ip address. Interface can be eth0, Vlan, PortChannel, Ethernet and Loopback. If you want to specify a source interface, the interface must be configured with an ip address. If you want to specify a source IP, the IP must be configured in the device. Note that only one NTP source can be added in the device. So, if you repeat this command, it will overwrite the previous configuration.

- Usage

```
sudo config ntp add_src <src>
```

- Example

```
admin@sonic:~$ sudo config ntp add_src 172.28.145.251
172.28.145.250 has been configured as ntp source
Restarting ntp-config service...


admin@sonic:~$ sudo config ntp add_src eth0
eth0 has been configured as ntp source
Restarting ntp-config service...
```

config ntp del_src

This command is to delete a configured NTP source.

- Usage

```
sudo config ntp del_src <src>
```

- Example

```
admin@sonic:~$ sudo config ntp del_src 172.28.145.250
172.28.145.250 has been removed from ntp source
Restarting ntp-config service...
```

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PFC Watchdog Commands

config pfcwd action

Run this command to configure the PFC-deadlock recovery action

- Usage:

```
config pfcwd action <drop | forward>
```

- Examples:

```
admin@sonic:~$ sudo config pfcwd action forward
```

config pfcwd precision

Run this command to configure the PFC-deadlock detection precision

- Usage:

```
config pfcwd detect-precision
```

- Examples:

```
admin@sonic:~$ sudo config pfcwd detect-precision -d 100
```

config pfcwd set

Run this command to configure the detection times and recovery time of the PFC watchdog for different priority groups.

- Usage:

```
config pfcwd set <priority-group> [-d <detection_time>] [-r <restoration_time>]
config pfcwd start <interface_name> <pg-map>
```

- Examples:

```
admin@sonic:~$ sudo config pfcwd set 1 -d 10 -r 100
admin@sonic:~$ sudo config pfcwd start Ethernet1 0-2
```

show pfcwd config

This command shows current PFC Watchdog configuration

- Usage:

```
show pfcwd config
```

- Examples:

```
admin@sonic:~/hhh$ show pfcwd config
Detect Precision: 10ms
Recovery Action: forward
  Queue    Detect Time    Recovery Time(ms)
-------  -------------  -------------------
    UC5             15                  150
```

show pfcwd stats

This command shows current PFC Watchdog statistics (storms detected, packets dropped, etc)

- Usage:

```
show pfcwd stats
```

- Examples:

```
admin@sonic:~/hhh$ show pfcwd stats -port Ethernet6
Interface    QUEUE    Count    Status
-----------  -------  -------  --------
Ethernet6      UC0        0
Ethernet6      UC1        0
Ethernet6      UC2        0
Ethernet6      UC3        0
Ethernet6      UC4        0
Ethernet6      UC5     2379  DETECTED
Ethernet6      UC6        0
Ethernet6      UC7        0
Ethernet6      UC8        0
Ethernet6      UC9        0
```

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Platform Component Firmware

Platform Component Firmware show commands

show platform firmware status

This command displays platform components firmware status information.

- Usage:

```
show platform firmware status
```

- Example:

```
admin@sonic:~$ sudo show platform firmware status
Chassis    Module    Component    Version                  Description
---------  --------  -----------  -----------------------  ------------------------------------
M2XXX      N/A       ONIE         2020.11-5.2.0022-9600    ONIE - Open Network Install Environme
                     SSD          0202-000                 SSD - Solid-State Drive
                     BIOS         0ACLH004_02.02.008_9600  BIOS - Basic Input/Output System
                     CPLD1        CPLD000120_REV0900       CPLD - Complex Programmable Logic Dev
                     CPLD2        CPLD000165_REV0500       CPLD - Complex Programmable Logic Dev
                     CPLD3        CPLD000166_REV0300       CPLD - Complex Programmable Logic Dev
                     CPLD4        CPLD000167_REV0100       CPLD - Complex Programmable Logic Dev
```

show platform firmware updates

This command displays platform components firmware updates information.

- Usage:

```
show platform firmware updates [-i|--image]
```

- Options:
  - *-i|--image*: show updates using current/next SONiC image

    Valid values:
    - current
    - next

    Default:
    - current
- Example:

```
admin@sonic:~$ sudo show platform firmware updates
Chassis    Module    Component    Firmware                                    Version (Current/A
---------  --------  -----------  ------------------------------------------  ------------------
M2XXX      N/A       ONIE         /usr/local/lib/firmware/onie.bin   2020.11-5.2.0022-9600 / 202
                     SSD          /usr/local/lib/firmware/ssd.bin    0202-000 / 0204-000
                     BIOS         /usr/local/lib/firmware/bios.bin   0ACLH004_02.02.008_9600 / 0
                     CPLD1        /usr/local/lib/firmware/cpld.mpfa  CPLD000120_REV0900 / CPLD00
                     CPLD2        /usr/local/lib/firmware/cpld.mpfa  CPLD000165_REV0500 / CPLD00
                     CPLD3        /usr/local/lib/firmware/cpld.mpfa  CPLD000166_REV0300 / CPLD00
                     CPLD4        /usr/local/lib/firmware/cpld.mpfa  CPLD000167_REV0100 / CPLD00
```

broadcom

- Note:
  - current/next values for *-i|--image* are taken from `sonic-installer list`

```
admin@sonic:~$ sudo sonic-installer list
Current: SONiC-OS-202012.0-fb89c28c9
Next: SONiC-OS-201911.0-2bec3004e
Available:
SONiC-OS-202012.0-fb89c28c9
SONiC-OS-201911.0-2bec3004e
```

show platform firmware version

This command displays platform components firmware utility version.

- Usage:

```
show platform firmware version
```

- Example:

```
admin@sonic:~$ show platform firmware version
fwutil version 2.0.0.0
```

Platform Component Firmware config commands

config platform firmware install

This command is used to install a platform component firmware.
Both modular and non modular chassis platforms are supported.

- Usage:

```
config platform firmware install chassis component <component_name> fw <fw_path> [-y|--yes]
config platform firmware install module <module_name> component <component_name> fw <fw_path> [-
```

- Options:
  - *-y|--yes*: automatic yes to prompts. Assume "yes" as answer to all prompts and run non-interactively
- Example:

```
admin@sonic:~$ sudo config platform firmware install chassis component BIOS fw /usr/local/lib/fi
Warning: Immediate cold reboot is required to complete BIOS firmware update.
New firmware will be installed, continue? [y/N]: y
Installing firmware:
    /usr/local/lib/firmware/chassis1/bios.bin
```

- Note:
  - <fw_path> can be absolute path or URL

config platform firmware update

This command is used to update a platform component firmware from current/next SONiC image.
Both modular and non modular chassis platforms are supported.

FW update requires `platform_components.json` to be created and placed at:
sonic-buildimage/device/<platform_name>/<onie_platform>/platform_components.json

Example:

1. Non modular chassis platform

```
{
    "chassis": {
        "Chassis1": {
            "component": {
                "BIOS": {
                    "firmware": "/usr/local/lib/firmware/<platform_name>/<onie_platform>/chassis
                    "version": "<bios_version>"
                },
                "CPLD": {
                    "firmware": "/usr/local/lib/firmware/<platform_name>/<onie_platform>/chassis
                    "version": "<cpld_version>"
                },
                "FPGA": {
                    "firmware": "/usr/local/lib/firmware/<platform_name>/<onie_platform>/chassis
                    "version": "<fpga_version>"
                }
            }
        }
    }
}
```

2. Modular chassis platform

```
{
    "chassis": {
        "Chassis1": {
            "component": {
                "BIOS": {
                    "firmware": "/usr/local/lib/firmware/<platform_name>/<onie_platform>/chassis
                    "version": "<bios_version>"
                },
                "CPLD": {
                    "firmware": "/usr/local/lib/firmware/<platform_name>/<onie_platform>/chassis
                    "version": "<cpld_version>"
                },
                "FPGA": {
                    "firmware": "/usr/local/lib/firmware/<platform_name>/<onie_platform>/chassis
                    "version": "<fpga_version>"
                }
            }
        }
    },
    "module": {
        "Module1": {
            "component": {
                "CPLD": {
                    "firmware": "/usr/local/lib/firmware/<platform_name>/<onie_platform>/module1
                    "version": "<cpld_version>"
                },
                "FPGA": {
                    "firmware": "/usr/local/lib/firmware/<platform_name>/<onie_platform>/module1
                    "version": "<fpga_version>"
                }
            }
        }
    }
}
```


- Usage:

```
config platform firmware update chassis component <component_name> fw [-y|--yes] [-f|--force] [-
config platform firmware update module <module_name> component <component_name> fw [-y|--yes] [-
```

- Options:
  - *-y|--yes*: automatic yes to prompts. Assume "yes" as answer to all prompts and run non-interactively
  - *-f|--force*: update FW regardless the current version
  - *-i|--image*: update FW using current/next SONiC image
    Valid values:
    - current

    - next

  Default:

    - current

- Example:

```
admin@sonic:~$ sudo config platform firmware update chassis component BIOS fw
Warning: Immediate cold reboot is required to complete BIOS firmware update.
New firmware will be installed, continue? [y/N]: y
Updating firmware:
    /usr/local/lib/firmware/broadcom/x86_64-micas_m2-w6520-24dc8qc-r0/chassis1/bios.bin

admin@sonic:~$ sudo config platform firmware update module Module1 component BIOS fw
Warning: Immediate cold reboot is required to complete BIOS firmware update.
New firmware will be installed, continue? [y/N]: y
Updating firmware:
    /usr/local/lib/firmware//broadcom/x86_64-micas_m2-w6520-24dc8qc-r0/module1/bios.bin
```

- Note:
  - FW update will be disabled if component definition is not provided (e.g., 'BIOS': { })
  - FW version will be read from image if `version` field is not provided
  - current/next values for *-i|--image* are taken from `sonic-installer list`

```
admin@sonic:~$ sudo sonic-installer list
Current: SONiC-OS-202012.0-fb89c28c9
Next: SONiC-OS-201911.0-2bec3004e
Available:
SONiC-OS-202012.0-fb89c28c9
SONiC-OS-201911.0-2bec3004e
```

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PortChannels

PortChannel Show commands

show interfaces portchannel

This command displays all the port channels that are configured in the device and its current status.

- Usage:

```
show interfaces portchannel
```

- Example:

```
admin@sonic:~$ show interfaces portchannel
Flags: A - active, I - inactive, Up - up, Dw - Down, N/A - not available, S - selected, D - deselected
  No.  Team Dev       Protocol     Ports
-----  -------------  -----------  --------------------------
   24  PortChannel24  LACP(A)(Up)  Ethernet28(S) Ethernet24(S)
   48  PortChannel48  LACP(A)(Up)  Ethernet52(S) Ethernet48(S)
   40  PortChannel40  LACP(A)(Up)  Ethernet44(S) Ethernet40(S)
    0  PortChannel0   LACP(A)(Up)  Ethernet0(S) Ethernet4(S)
    8  PortChannel8   LACP(A)(Up)  Ethernet8(S) Ethernet12(S)
```

PortChannel Config commands

This sub-section explains how to configure the portchannel and its member ports.

config portchannel

This command is used to add or delete the portchannel.
It is recommended to use portchannel names in the format "PortChannelxxxx", where "xxxx" is number of 1 to 4 digits. Ex: "PortChannel0002".

NOTE: If users specify any other name like "pc99", command will succeed, but such names are not supported. Such names are not printed properly in the "show interface portchannel" command. It is recommended not to use such names.

When any port is already member of any other portchannel and if user tries to add the same port in some other portchannel (without deleting it from the current portchannel), the command fails internally. But, it does not print any error message. In such cases, remove the member from current portchannel and then add it to new portchannel.

Command takes two optional arguements given below.

1. min-links - minimum number of links required to bring up the portchannel
2. fallback - true/false. LACP fallback feature can be enabled / disabled. When it is set to true, only one member port will be selected as active per portchannel during fallback mode. Refer https://github.com/Azure/SONiC/blob/master/doc/lag/LACP Fallback Feature for SONiC_v0.5.md for more details about fallback feature.

A port channel can be deleted only if it does not have any members or the members are already deleted. When a user tries to delete a port channel and the port channel still has one or more members that exist, the deletion of port channel is blocked.

- Usage:

```
config portchannel (add | del) <portchannel_name> [--min-links <num_min_links>] [--fallback (true | false)]
```

- Example (Create the portchannel with name "PortChannel0011"):

```
admin@sonic:~$ sudo config portchannel add PortChannel0011
```

config portchannel lacp-update

This command update portchannel.

- Usage:

```
config portchannel lacp-update --help
update lacp

Options:
  -?, -h, --help  Show this message and exit.

Commands:
  fallback   update lacp fallback
  fast-rate  update lacp fast-rate
  min-links  update lacp min-links
```

- Example:

```
admin@sonic:~$ sudo config portchannel lacp-update fallback PortChannel20 true
```

config portchannel member

This command adds or deletes a member port to/from the already created portchannel.

- Usage:

```
config portchannel member (add | del) <portchannel_name> <member_portname>
```

- Example (Add interface Ethernet4 as member of the portchannel "PortChannel0011"):

```
admin@sonic:~$ sudo config portchannel member add PortChannel0011 Ethernet4
```

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PBH

This section explains the various show commands and configuration commands available for users.

PBH show commands

This subsection explains how to display PBH configuration and statistics.

show pbh table

This command displays PBH table configuration.

- Usage:

```
show pbh table
```

- Example:

```
admin@sonic:~$ show pbh table
NAME       INTERFACE        DESCRIPTION
---------  ---------------  ---------------
pbh_table  Ethernet0        NVGRE and VxLAN
           Ethernet4
           PortChannel0001
           PortChannel0002
```

show pbh rule

This command displays PBH rule configuration.

- Usage:

```
show pbh rule
```

- Example:

```
admin@sonic:~$ show pbh rule
TABLE      RULE    PRIORITY    MATCH                                 HASH           ACTION
---------  ------  ----------  ------------------------------------  -------------  ------------
pbh_table  nvgre   2           ether_type:        0x0800             inner_v6_hash  SET_ECMP_HAS
                               ip_protocol:       0x2f
                               gre_key:           0x2500/0xffffff00
                               inner_ether_type:  0x86dd
pbh_table  vxlan   1           ether_type:        0x0800             inner_v4_hash  SET_LAG_HASH
                               ip_protocol:       0x11
                               l4_dst_port:       0x12b5
                               inner_ether_type:  0x0800
```

show pbh hash

This command displays PBH hash configuration.

- Usage:

```
show pbh hash
```

- Example:

```
admin@sonic:~$ show pbh hash
NAME           HASH FIELD
-------------  -----------------
inner_v4_hash  inner_ip_proto
               inner_l4_dst_port
               inner_l4_src_port
               inner_dst_ipv4
               inner_src_ipv4
inner_v6_hash  inner_ip_proto
               inner_l4_dst_port
               inner_l4_src_port
               inner_dst_ipv6
               inner_src_ipv6
```

show pbh hash-field

This command displays PBH hash field configuration.

- Usage:

```
show pbh hash-field
```

- Example:

```
admin@sonic:~$ show pbh hash-field
NAME                FIELD                HASH       SEQUENCE    SYMMETRIC
------------------  -----------------  ---------  ----------  -----------
inner_ip_proto      INNER_IP_PROTOCOL  N/A        1           No
inner_l4_dst_port   INNER_L4_DST_PORT  N/A        2           Yes
inner_l4_src_port   INNER_L4_SRC_PORT  N/A        2           Yes
inner_dst_ipv4      INNER_DST_IPV4     255.0.0.0  3           Yes
inner_src_ipv4      INNER_SRC_IPV4     0.0.0.255  3           Yes
inner_dst_ipv6      INNER_DST_IPV6     ffff::     4           Yes
inner_src_ipv6      INNER_SRC_IPV6     ::ffff     4           Yes
```

- Note:
  - *SYMMETRIC* is an artificial column and is only used to indicate fields symmetry

show pbh statistics

This command displays PBH statistics.

- Usage:

```
show pbh statistics
```

- Example:

```
admin@sonic:~$ show pbh statistics
TABLE      RULE    RX PACKETS COUNT    RX BYTES COUNT
---------  ------  ------------------  ----------------
pbh_table  nvgre   0                   0
pbh_table  vxlan   0                   0
```

- Note:
  - *RX PACKETS COUNT* and *RX BYTES COUNT* can be cleared by user:

```
admin@sonic:~$ sonic-clear pbh statistics
```

PBH config commands

This subsection explains how to configure PBH.

config pbh table

This command is used to manage PBH table objects.
It supports add/update/remove operations.

- Usage:

```
config pbh table add <table_name> --interface-list <interface_list> --description <description>
config pbh table update <table_name> [ --interface-list <interface_list> ] [ --description <desc
config pbh table delete <table_name>
```

- Parameters:
  - *table_name*: the name of the PBH table
  - *interface_list*: interfaces to which PBH table is applied
  - *description*: the description of the PBH table
- Examples:

```
config pbh table add 'pbh_table' \
--interface-list 'Ethernet0,Ethernet4,PortChannel0001,PortChannel0002' \
--description 'NVGRE and VxLAN'
config pbh table update 'pbh_table' \
--interface-list 'Ethernet0'
config pbh table delete 'pbh_table'
```

config pbh rule

This command is used to manage PBH rule objects.
It supports add/update/remove operations.

- Usage:

```
config pbh rule add <table_name> <rule_name> --priority <priority> \
[ --gre-key <gre_key> ] [ --ether-type <ether_type> ] [ --ip-protocol <ip_protocol> ] \
[ --ipv6-next-header <ipv6_next_header> ] [ --l4-dst-port <l4_dst_port> ] [ --inner-ether-type <
--hash <hash> [ --packet-action <packet_action> ] [ --flow-counter <flow_counter> ]
config pbh rule update <table_name> <rule_name> [ --priority <priority> ] \
[ --gre-key <gre_key> ] [ --ether-type <ether_type> ] [ --ip-protocol <ip_protocol> ] \
[ --ipv6-next-header <ipv6_next_header> ] [ --l4-dst-port <l4_dst_port> ] [ --inner-ether-type <
[ --hash <hash> ] [ --packet-action <packet_action> ] [ --flow-counter <flow_counter> ]
config pbh rule delete <table_name> <rule_name>
```

- Parameters:
  - *table_name*: the name of the PBH table
  - *rule_name*: the name of the PBH rule
  - *priority*: the priority of the PBH rule
  - *gre_key*: packet match for the PBH rule: GRE key (value/mask)
  - *ether_type*: packet match for the PBH rule: EtherType (IANA Ethertypes)
  - *ip_protocol*: packet match for the PBH rule: IP protocol (IANA Protocol Numbers)
  - *ipv6_next_header*: packet match for the PBH rule: IPv6 Next header (IANA Protocol Numbers)
  - *l4_dst_port*: packet match for the PBH rule: L4 destination port
  - *inner_ether_type*: packet match for the PBH rule: inner EtherType (IANA Ethertypes)
  - *hash*: *hash* object to apply with the PBH rule
  - *packet_action*: packet action for the PBH rule

    Valid values:
    - SET_ECMP_HASH
    - SET_LAG_HASH

    Default:
    - SET_ECMP_HASH

- *flow_counter*: packet/byte counter for the PBH rule

  Valid values:

  - DISABLED
  - ENABLED

  Default:

  - DISABLED

- Examples:

```
config pbh rule add 'pbh_table' 'nvgre' \
--priority '2' \
--ether-type '0x0800' \
--ip-protocol '0x2f' \
--gre-key '0x2500/0xffffff00' \
--inner-ether-type '0x86dd' \
--hash 'inner_v6_hash' \
--packet-action 'SET_ECMP_HASH' \
--flow-counter 'DISABLED'
config pbh rule update 'pbh_table' 'nvgre' \
--flow-counter 'ENABLED'
config pbh rule delete 'pbh_table' 'nvgre'
```

config pbh hash

This command is used to manage PBH hash objects.
It supports add/update/remove operations.

- Usage:

```
config pbh hash add <hash_name> --hash-field-list <hash_field_list>
config pbh hash update <hash_name> [ --hash-field-list <hash_field_list> ]
config pbh hash delete <hash_name>
```

- Parameters:
  - *hash_name*: the name of the PBH hash
  - *hash_field_list*: list of *hash-field* objects to apply with the PBH hash
- Examples:

```
config pbh hash add 'inner_v6_hash' \
--hash-field-list 'inner_ip_proto,inner_l4_dst_port,inner_l4_src_port,inner_dst_ipv6,inner_src_i
config pbh hash update 'inner_v6_hash' \
--hash-field-list 'inner_ip_proto'
config pbh hash delete 'inner_v6_hash'
```

config pbh hash-field

This command is used to manage PBH hash field objects.
It supports add/update/remove operations.

- Usage:

```
config pbh hash-field add <hash_field_name> \
--hash-field <hash_field> [ --ip-mask <ip_mask> ] --sequence-id <sequence_id>
config pbh hash-field update <hash_field_name> \
[ --hash-field <hash_field> ] [ --ip-mask <ip_mask> ] [ --sequence-id <sequence_id> ]
config pbh hash-field delete <hash_field_name>
```

- Parameters:
  - *hash_field_name*: the name of the PBH hash field
  - *hash_field*: native hash field for the PBH hash field
    Valid values:
    - INNER_IP_PROTOCOL
    - INNER_L4_DST_PORT
    - INNER_L4_SRC_PORT
    - INNER_DST_IPV4
    - INNER_SRC_IPV4
    - INNER_DST_IPV6
    - INNER_SRC_IPV6
  - *ip_mask*: IPv4/IPv6 address mask for the PBH hash field
    Valid only: *hash_field* is:
    - INNER_DST_IPV4
    - INNER_SRC_IPV4
    - INNER_DST_IPV6
    - INNER_SRC_IPV6
  - *sequence_id*: the order in which fields are hashed
- Examples:

```
config pbh hash-field add 'inner_dst_ipv6' \
--hash-field 'INNER_DST_IPV6' \
--ip-mask 'ffff::' \
--sequence-id '4'
config pbh hash-field update 'inner_dst_ipv6' \
--ip-mask 'ffff:ffff::'
config pbh hash-field delete 'inner_dst_ipv6'
```

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QoS

QoS Show commands

PFC

show pfc counters

This command displays the details of Rx & Tx priority-flow-control (pfc) for all ports. This command can be used to clear the counters using -c option.

- Usage:

```
show pfc counters
```

- Example:

```
admin@sonic:~$ show pfc counters
   Port Rx    PFC0    PFC1    PFC2    PFC3    PFC4    PFC5    PFC6    PFC7
 -----------  ------  ------  ------  ------  ------  ------  ------  ------
 Ethernet0       0       0       0       0       0       0       0       0
 Ethernet4       0       0       0       0       0       0       0       0
 Ethernet8       0       0       0       0       0       0       0       0
Ethernet12       0       0       0       0       0       0       0       0

   Port Tx    PFC0    PFC1    PFC2    PFC3    PFC4    PFC5    PFC6    PFC7
 -----------  ------  ------  ------  ------  ------  ------  ------  ------
 Ethernet0       0       0       0       0       0       0       0       0
 Ethernet4       0       0       0       0       0       0       0       0
 Ethernet8       0       0       0       0       0       0       0       0
Ethernet12       0       0       0       0       0       0       0       0

...
```

- NOTE: PFC counters can be cleared by the user with the following command:

```
admin@sonic:~$ sonic-clear pfccounters
```

show pfc asymmetric

This command displays the status of asymmetric PFC for all interfaces or a given interface.

- Usage:

```
show pfc asymmetric [<interface>]
```

- Example:

```
admin@sonic:~$ show pfc asymmetric

Interface    Asymmetric
-----------  ------------
Ethernet0    off
Ethernet2    off
Ethernet4    off
Ethernet6    off
Ethernet8    off
Ethernet10   off
Ethernet12   off
Ethernet14   off

admin@sonic:~$ show pfc asymmetric Ethernet0

Interface    Asymmetric
-----------  ------------
Ethernet0    off
```

show pfc priority

This command displays the lossless priorities for all interfaces or a given interface.

- Usage:

```
show pfc priority [<interface>]
```

- Example:

```
admin@sonic:~$ show pfc priority

Interface    Lossless priorities
-----------  ---------------------
Ethernet0    3,4
Ethernet2    3,4
Ethernet8    3,4
Ethernet10   3,4
Ethernet16   3,4

admin@sonic:~$ show pfc priority Ethernet0

Interface    Lossless priorities
-----------  ---------------------
Ethernet0    3,4
```

Queue And Priority-Group

This sub-section explains the following queue parameters that can be displayed using "show queue" command.

1. queue counters
2. queue watermark
3. priority-group watermark
4. queue persistent-watermark

show queue counters

This command displays packet and byte counters for all queues of all ports or one specific-port given as arguement.
This command can be used to clear the counters for all queues of all ports. Note that port specific clear is not supported.

- Usage:

```
show queue counters [<interface_name>]
```

- Example:

```
admin@sonic:~$ show queue counters
      Port    TxQ    Counter/pkts    Counter/bytes    Drop/pkts    Drop/bytes
----------  -----  --------------  ---------------  -----------  ------------
Ethernet1    UC0               0                0            0             0
Ethernet1    UC1               0                0            0             0
Ethernet1    UC2               0                0            0             0
Ethernet1    UC3               0                0            0             0
Ethernet1    UC4               0                0            0             0
Ethernet1    UC5               0                0            0             0
Ethernet1    UC6               0                0            0             0
Ethernet1    UC7               0                0            0             0
Ethernet1    UC8               0                0            0             0
Ethernet1    UC9               0                0            0             0
Ethernet1   MC10               0                0            0             0
Ethernet1   MC11               0                0            0             0
Ethernet1   MC12               0                0            0             0
Ethernet1   MC13               0                0            0             0
Ethernet1   MC14               0                0            0             0
Ethernet1   MC15               0                0            0             0
Ethernet1   MC16               0                0            0             0
Ethernet1   MC17               0                0            0             0
Ethernet1   MC18               0                0            0             0
Ethernet1   MC19               0                0            0             0

...

      Port    TxQ    Counter/pkts    Counter/bytes    Drop/pkts    Drop/bytes
----------  -----  --------------  ---------------  -----------  ------------
Ethernet55    UC0               0                0            0             0
Ethernet55    UC1               0                0            0             0
Ethernet55    UC2               0                0            0             0
Ethernet55    UC3               0                0            0             0
Ethernet55    UC4               0                0            0             0
Ethernet55    UC5               0                0            0             0
Ethernet55    UC6               0                0            0             0
Ethernet55    UC7               0                0            0             0
Ethernet55    UC8               0                0            0             0
Ethernet55    UC9               0                0            0             0
Ethernet55   MC10               0                0            0             0
Ethernet55   MC11               0                0            0             0
Ethernet55   MC12               0                0            0             0
Ethernet55   MC13               0                0            0             0
Ethernet55   MC14               0                0            0             0
Ethernet55   MC15               0                0            0             0
Ethernet55   MC16               0                0            0             0
Ethernet55   MC17               0                0            0             0
Ethernet55   MC18               0                0            0             0
Ethernet55   MC19               0                0            0             0

...
```

```
admin@sonic:~$ show queue counters Ethernet2
    Port    TxQ    Counter/pkts    Counter/bytes    Drop/pkts    Drop/bytes
---------  -----  --------------  ---------------  -----------  ------------
Ethernet2    UC0               0                0            0             0
Ethernet2    UC1               0                0            0             0
Ethernet2    UC2               0                0            0             0
Ethernet2    UC3               0                0            0             0
Ethernet2    UC4               0                0            0             0
Ethernet2    UC5               0                0            0             0
Ethernet2    UC6               0                0            0             0
Ethernet2    UC7               0                0            0             0
Ethernet2    UC8               0                0            0             0
Ethernet2    UC9               0                0            0             0
Ethernet2   MC10               0                0            0             0
Ethernet2   MC11               0                0            0             0
Ethernet2   MC12               0                0            0             0
Ethernet2   MC13               0                0            0             0
Ethernet2   MC14               0                0            0             0
Ethernet2   MC15               0                0            0             0
Ethernet2   MC16               0                0            0             0
Ethernet2   MC17               0                0            0             0
Ethernet2   MC18               0                0            0             0
Ethernet2   MC19               0                0            0             0
```

Optionally, you can specify an interface name in order to display only that particular interface

- Example:

```
admin@sonic:~$ show queue counters Ethernet51
```

- NOTE: Queue counters can be cleared by the user with the following command:

```
admin@sonic:~$ sonic-clear queuecounters
```

show queue watermark

This command displays the user watermark for the queues (Egress shared pool occupancy per queue) for either the unicast queues or multicast queues for all ports

- Usage:

```
show queue watermark (multicast | unicast)
```

- Example:

```
admin@sonic:~$ show queue watermark unicast
Egress shared pool occupancy per unicast queue:
       Port    UC0    UC1    UC2    UC3    UC4    UC5    UC6    UC7
-----------  -----  -----  -----  -----  -----  -----  -----  -----
  Ethernet0      0      0      0      0      0      0      0      0
  Ethernet4      0      0      0      0      0      0      0      0
  Ethernet8      0      0      0      0      0      0      0      0
  Ethernet12     0      0      0      0      0      0      0      0

admin@sonic:~$ show queue watermark multicast (Egress shared pool occupancy per multicast queue)
```

show priority-group

This command displays:

1. The user watermark or persistent-watermark for the Ingress "headroom" or "shared pool occupancy" per priority-group for all ports.
2. Dropped packets per priority-group for all ports

- Usage:

```
show priority-group (watermark | persistent-watermark) (headroom | shared)
show priority-group drop counters
```

- Example:

```
admin@sonic:~$ show priority-group watermark shared
Ingress shared pool occupancy per PG:
       Port    PG0    PG1    PG2    PG3    PG4    PG5    PG6    PG7
-----------  -----  -----  -----  -----  -----  -----  -----  -----
  Ethernet0      0      0      0      0      0      0      0      0
  Ethernet4      0      0      0      0      0      0      0      0
  Ethernet8      0      0      0      0      0      0      0      0
  Ethernet12     0      0      0      0      0      0      0      0
```

- Example (Ingress headroom per PG):

```
admin@sonic:~$ show priority-group watermark headroom
```

- Example (Ingress shared pool occupancy per PG):

```
admin@sonic:~$ show priority-group persistent-watermark shared
```

- Example (Ingress headroom per PG):

```
admin@sonic:~$ show priority-group persistent-watermark headroom
```

- Example (Ingress dropped packets per PG):

```
admin@sonic:~$ show priority-group drop counters
Ingress PG dropped packets:
      Port    PG0    PG1    PG2    PG3    PG4    PG5    PG6    PG7
-----------  -----  -----  -----  -----  -----  -----  -----  -----
  Ethernet0      0      0      0      0      0      0      0      0
  Ethernet4      0      0      0      0      0      0      0      0
  Ethernet8      0      0      0      0      0      0      0      0
 Ethernet12      0      0      0      0      0      0      0      0
```

In addition to user watermark("show queue|priority-group watermark ..."), a persistent watermark is available.
It hold values independently of user watermark. This way user can use "user watermark" for debugging, clear it, etc, but the "persistent watermark" will not be affected.

show queue persistent-watermark

This command displays the user persistet-watermark for the queues (Egress shared pool occupancy per queue) for either the unicast queues or multicast queues for all ports

- Usage:

```
show queue persistent-watermark (unicast | multicast)
```

- Example:

```
admin@sonic:~$ show queue persistent-watermark unicast
Egress shared pool occupancy per unicast queue:
       Port    UC0    UC1    UC2    UC3    UC4    UC5    UC6    UC7
-----------  -----  -----  -----  -----  -----  -----  -----  -----
  Ethernet0    N/A    N/A    N/A    N/A    N/A    N/A    N/A    N/A
  Ethernet4    N/A    N/A    N/A    N/A    N/A    N/A    N/A    N/A
  Ethernet8    N/A    N/A    N/A    N/A    N/A    N/A    N/A    N/A
 Ethernet12    N/A    N/A    N/A    N/A    N/A    N/A    N/A    N/A
```

- Example (Egress shared pool occupancy per multicast queue):

```
admin@sonic:~$ show queue persistent-watermark multicast
```

- NOTE: "user watermark", "persistent watermark" and "ingress dropped packets" can be cleared by user:

```
admin@sonic:~$ sonic-clear queue persistent-watermark unicast

admin@sonic:~$ sonic-clear queue persistent-watermark multicast

admin@sonic:~$ sonic-clear priority-group persistent-watermark shared

admin@sonic:~$ sonic-clear priority-group persistent-watermark headroom

admin@sonic:~$ sonic-clear priority-group drop counters
```

show queue schedule

This command is used to view the scheduling policy of the output queue of ports.

- Usage:

```
show queue schedule [<interface_name>]
```

- Parameters:

```
parameters: Interface name.
```

- Example:

```
admin@sonic:~$ show queue schedule
Port       TxQ    Mode      Weight
---------  -----  ------  --------
Ethernet1  UC0    WRR            1
Ethernet1  UC1    WRR            1
Ethernet1  UC2    WRR            1
Ethernet1  UC3    WRR            1
Ethernet1  UC4    WRR            1
Ethernet1  UC5    WRR            1
Ethernet1  UC6    WRR            1
Ethernet1  UC7    WRR            1

...

Port        TxQ    Mode      Weight
----------  -----  ------  --------
Ethernet48  UC0    WRR            1
Ethernet48  UC1    WRR            1
Ethernet48  UC2    WRR            1
Ethernet48  UC3    WRR            1
Ethernet48  UC4    WRR            1
Ethernet48  UC5    WRR            1
Ethernet48  UC6    WRR            1
Ethernet48  UC7    WRR            1

...


admin@sonic:~$ show queue schedule Ethernet1
Port       TxQ    Mode      Weight
---------  -----  ------  --------
Ethernet1  UC0    WRR            1
Ethernet1  UC1    WRR            1
Ethernet1  UC2    WRR            1
Ethernet1  UC3    WRR            1
Ethernet1  UC4    WRR            1
Ethernet1  UC5    WRR            1
Ethernet1  UC6    WRR            1
Ethernet1  UC7    WRR            1
```

Buffer Pool

This sub-section explains the following buffer pool parameters that can be displayed using "show buffer_pool" command.

1. buffer pool watermark
2. buffer pool persistent-watermark

show buffer_pool watermark

This command displays the user watermark for all the buffer pools

- Usage:

```
show buffer_pool watermark
```

- Example:

```
admin@sonic:~$ show buffer_pool watermark
Shared pool maximum occupancy:
                 Pool    Bytes
--------------------  -------
ingress_lossless_pool        0
           lossy_pool     2464
```

show buffer_pool persistent-watermark

This command displays the user persistent-watermark for all the buffer pools

- Usage:

```
show buffer_pool persistent-watermark
```

- Example:

```
admin@sonic:~$ show buffer_pool persistent-watermark
Shared pool maximum occupancy:
                 Pool    Bytes
--------------------  -------
ingress_lossless_pool        0
           lossy_pool     2464
```

QOS MAP

show qos map

This command is used to view the packet priority mapping.

- Usage:

```
show qos map <tc-to-pg | pfc-to-queue | dot1p-to-tc | dscp-to-tc | tc-to-queue | tc-to-dscp | tc-to-dot1p>
```

- Example:

```
admin@sonic:~$ show qos map tc-to-pg
TC_TO_PG_MAP: tc-pg
------------------------------
  tc    pg
----  ----
  0     1
  1     1
  2     1
  3     1
  4     1
  5     1
  6     1
  7     1

Num of maps: 1



admin@sonic:~$ show qos map pfc-to-queue
PFC_TO_QUEUE_MAP: default
------------------------------
  pfc    queue
-----  -------
    0        0
    1        1
    2        2
    3        3
    4        4
    5        5
    6        6
    7        7

Num of maps: 1


admin@sonic:~$ show qos map dot1p-to-tc
DOT1P_TO_TC_MAP: default
------------------------------
  dot1p    tc
-------  ----
      0     0
      1     1
      2     2
      3     3
      4     4
      5     5
      6     6
      7     7

Num of maps: 1
```

```
admin@sonic:~$ show qos map dscp-to-tc
DSCP_TO_TC_MAP: default
------------------------------
  dscp    tc
------  ----
    0     0
    1     0
    2     0
    3     0
    4     0
    5     0
    6     0
    7     0
    8     1
    9     1
   10     1
   11     1
   12     1
   13     1
   14     1
   15     1
   16     2
   17     2
   18     2
   19     2
   20     2
   21     2
   22     2
   23     2
   24     3
   25     3
   26     3
   27     3
   28     3
   29     3
   30     3
   31     3
   32     4
   33     4
   34     4
   35     4
   36     4
   37     4
   38     4
   39     4
   40     5
   41     5
   42     5
   43     5
   44     5
   45     5
```

```
   46     5
   47     5
   48     6
   49     6
   50     6
   51     6
   52     6
   53     6
   54     6
   55     6
   56     7
   57     7
   58     7
   59     7
   60     7
   61     7
   62     7
   63     7

Num of maps: 1


admin@sonic:~$ show qos map tc-to-queue
TC_TO_QUEUE_MAP: default
------------------------------
  tc    queue
----  -------
  0        0
  1        1
  2        2
  3        3
  4        4
  5        5
  6        6
  7        7

Num of maps: 1
```

```
admin@sonic:~$ show qos map tc-to-dscp
TC_TO_DSCP_MAP: tc-dscp
------------------------------
  tc    dscp
----  ------
  0       1
  1       1
  2       1
  3       1
  4       1
  5       1
  6       1
  7       1

Num of maps: 1


admin@sonic:~$ show qos map tc-to-dot1p
TC_TO_DOT1P_MAP: tc-dot1p
------------------------------
  tc    dot1p
----  -------
  0        1
  1        1
  2        1
  3        1
  4        1
  5        1
  6        1
  7        1

Num of maps: 1
```

show interface qos map

This command is used to view the priority mapping of packets applied to interface.

- Usage:

```
show interface qos map apply <interface_name> [<tc-to-pg | pfc-to-queue | dot1p-to-tc | dscp-to-tc | tc-to-c
```

- Example:

```
admin@sonic:~$ show interfaces qos map apply Ethernet5
Port       Map               Profile
---------  ----------------  ---------
Ethernet5  dot1p_to_tc_map   default
           dscp_to_tc_map    default
           pfc_to_queue_map  default
           tc_to_queue_map   default


admin@sonic:~$ show interfaces qos map apply Ethernet5 dscp-to-tc
Port       Map             Profile
---------  --------------  ---------
Ethernet5  dscp_to_tc_map  default
```

show interface qos interface-rate-limit

This command is used to view the rate limiting of interface.

- Usage:

```
show interfaces qos interface-rate-limit [<interface_name>]
```

- Example:

```
admin@sonic:~$ show interfaces qos interface-rate-limit
Port        pir        pbs
----------  ---------  -----
Ethernet1   200000000  2000
Ethernet2
Ethernet3
Ethernet4
Ethernet5
Ethernet6
Ethernet7
Ethernet8
Ethernet9
Ethernet10
Ethernet11
Ethernet12
Ethernet13
Ethernet14
Ethernet15
Ethernet16
Ethernet17
Ethernet18
Ethernet19
Ethernet20
Ethernet21
Ethernet22
Ethernet23
Ethernet24
Ethernet25  100000000  1500
Ethernet26
Ethernet27
Ethernet28
Ethernet29
Ethernet30
Ethernet31
Ethernet32
Ethernet33
Ethernet34
Ethernet35
Ethernet36
Ethernet37
Ethernet38
Ethernet39
Ethernet40
Ethernet41
Ethernet42
Ethernet43
Ethernet44
Ethernet45
Ethernet46
Ethernet47
Ethernet48
```

```
Ethernet49
Ethernet53
Ethernet57
Ethernet61
Ethernet65
Ethernet69
Ethernet73
Ethernet77


admin@sonic:~$ show interfaces qos interface-rate-limit Ethernet1
Port       pir        pbs
---------  ---------  -----
Ethernet1  200000000  2000
```

show interface qos queue-rate-limit

This command is used to view the queue rate limiting on interface.

- Usage:

```
show interfaces qos queue-rate-limit <interface_name> [<queue-id>]
```

- Example:

```
admin@sonic:~$ show interfaces qos queue-rate-limit Ethernet1
Port       queue-id    cir        cbs    pir        pbs
---------  ----------  ---------  -----  ---------  -----
Ethernet1  0           200000000  2000   300000000  3000
Ethernet1  1
Ethernet1  2
Ethernet1  3
Ethernet1  4
Ethernet1  5
Ethernet1  6
Ethernet1  7


admin@sonic:~$ show interfaces qos queue-rate-limit Ethernet1 0
Port       queue-id    cir        cbs    pir        pbs
---------  ----------  ---------  -----  ---------  -----
Ethernet1  0           200000000  2000   300000000  3000
```

show interface trust-mode

This command is used to view the trust mode of interface.

- Usage:

```
show interfaces trust-mode [<interface_name>]
```

- Example:

```
admin@sonic:~$ show interfaces trust-mode
      Port    trust-mode
----------  ------------
 Ethernet1         dot1p
 Ethernet2          dscp
 Ethernet3          dscp
 Ethernet4          dscp
 Ethernet5          dscp
 Ethernet6          dscp
 Ethernet7          dscp
 Ethernet8          dscp
 Ethernet9          dscp
Ethernet10          dscp
Ethernet11          dscp
Ethernet12          dscp
Ethernet13          dscp
Ethernet14          dscp
Ethernet15          dscp
Ethernet16          dscp
Ethernet17          dscp
Ethernet18          dscp
Ethernet19          dscp
Ethernet20          dscp
Ethernet21          dscp
Ethernet22          dscp
Ethernet23          dscp
Ethernet24          dscp
Ethernet25          dscp
Ethernet26          dscp
Ethernet27          dscp
Ethernet28          dscp
Ethernet29          dscp
Ethernet30          dscp
Ethernet31          dscp
Ethernet32          dscp
Ethernet33          dscp
Ethernet34          dscp
Ethernet35          dscp
Ethernet36          dscp
Ethernet37          dscp
Ethernet38          dscp
Ethernet39          dscp
Ethernet40          dscp
Ethernet41          dscp
Ethernet42          dscp
Ethernet43          dscp
Ethernet44          dscp
Ethernet45          dscp
Ethernet46          dscp
Ethernet47          dscp
Ethernet48          dscp
```

```
Ethernet49          dscp
Ethernet53          dscp
Ethernet57          dscp
Ethernet61          dscp
Ethernet65          dscp
Ethernet69          dscp
Ethernet73          dscp
Ethernet77          dscp


admin@sonic:~$ show interfaces trust-mode Ethernet5
     Port    trust-mode
---------  ------------
Ethernet5          dscp



admin@sonic:~$ sudo config qos map add tc-to-queue tc-queue 0-3 2
admin@sonic:~$ show qos map tc-to-queue
TC_TO_QUEUE_MAP: default
------------------------------
  tc    queue
----  -------
  0        0
  1        1
  2        2
  3        3
  4        4
  5        5
  6        6
  7        7

TC_TO_QUEUE_MAP: tc-queue
------------------------------
  tc    queue
----  -------
  0        2
  1        2
  2        2
  3        2

Num of maps: 2
```

ACL QOS

show qos acl commands

See ACL show commands.

Go Back To Beginning of the document or Beginning of acl show commands or Beginning of this section

QoS config commands

config qos clear

This command is used to clear all the QoS configuration from all the following QOS Tables in ConfigDB.

1. TC_TO_PRIORITY_GROUP_MAP,
2. MAP_PFC_PRIORITY_TO_QUEUE,
3. TC_TO_QUEUE_MAP,
4. DSCP_TO_TC_MAP,
5. MPLS_TC_TO_TC_MAP,
6. SCHEDULER,
7. PFC_PRIORITY_TO_PRIORITY_GROUP_MAP,
8. PORT_QOS_MAP,
9. WRED_PROFILE,
10. QUEUE,
11. CABLE_LENGTH,
12. BUFFER_POOL,
13. BUFFER_PROFILE,
14. BUFFER_PG,
15. BUFFER_QUEUE

- Usage:

```
config qos clear
```

- Example:

```
admin@sonic:~$ sudo config qos clear
```

config qos reload

This command is used to reload the QoS configuration.
QoS configuration has got two sets of configurations.

1. Generic QOS Configuration - This gives complete list of all possible QOS configuration. Its given in the file /usr/share/sonic/templates/qos_config.j2 in the device.
   Reference: https://github.com/Azure/sonic-

buildimage/blob/master/files/build_templates/qos_config.j2
Users have flexibility to have platform specific qos configuration by placing the qos_config.j2 file at /usr/share/sonic/device///.
If users want to modify any of this loaded QOS configuration, they can modify this file in the device and then issue the "config qos reload" command.

2. Platform specific buffer configuration. Every platform has got platform specific and topology specific (T0 or T1 or T2) buffer configuration at /usr/share/sonic/device///buffers_defaults_tx.j2
In addition to platform specific configuration file, a generic configuration file is also present at /usr/share/sonic/templates/buffers_config.j2.
Reference: https://github.com/Azure/sonic-buildimage/blob/master/files/build_templates/buffers_config.j2
Users can either modify the platform specific configuration file, or the generic configuration file and then issue this "config qos reload" command.

These configuration files are already loaded in the device as part of the reboot process. In case if users wants to modify any of these configurations, they need to modify the appropriate QOS tables and fields in these files and then use this reload command.
This command uses those modified buffers.json.j2 file & qos.json.j2 file and reloads the new QOS configuration.
If users have not made any changes in these configuration files, this command need not be executed.

Some of the example QOS configurations that users can modify are given below.

1. TC_TO_PRIORITY_GROUP_MAP
2. MAP_PFC_PRIORITY_TO_QUEUE
3. TC_TO_QUEUE_MAP
4. DSCP_TO_TC_MAP
5. MPLS_TC_TO_TC_MAP
6. SCHEDULER
7. PFC_PRIORITY_TO_PRIORITY_GROUP_MAP
8. PORT_QOS_MAP
9. WRED_PROFILE
10. CABLE_LENGTH
11. BUFFER_QUEUE

- Usage:

```
config qos reload
```

- Example:

```
admin@sonic:~$ sudo config qos reload
Running command: /usr/local/bin/sonic-cfggen -d -t /usr/share/sonic/device/x86_64-micas_m2-w6510-48gt4v-r0/M
Running command: /usr/local/bin/sonic-cfggen -d -t /usr/share/sonic/device/x86_64-micas_m2-w6510-48gt4v-r0/M
Running command: /usr/local/bin/sonic-cfggen -j /tmp/buffers.json --write-to-db
Running command: /usr/local/bin/sonic-cfggen -j /tmp/qos.json --write-to-db

In this example, it uses the buffers.json.j2 file and qos.json.j2 file from platform specific folders.
When there are no changes in the platform specific configutation files, they internally use the file "/usr/s
```

config interface qos schedule

This command is used to configure the scheduling policy for the output queue of a port.

- Usage:

```
sudo config interface qos schedule <interface_name> sp


sudo config interface qos schedule <interface_name> wrr <tx0> <tx1> <tx2> <tx3> <tx4> <tx5> <tx6> <tx7>


sudo config interface qos schedule <interface_name> dwrr <tx0> <tx1> <tx2> <tx3> <tx4> <tx5> <tx6> <tx7>
```

- Parameters:
  - interface_name: interface name.
  - tx0 tx1 tx2 tx3 tx4 tx5 tx6 tx7: indicates the weight assigned to the corresponding scheduling algorithm.
  - sp: Strict-Priority scheduling.
  - wrr: Weighted Round Robin scheduling.
  - dwrr: Dificit Round Robin scheduling.
- Example:

```
admin@sonic:~$ sudo config interface qos schedule Ethernet1 sp
admin@sonic:~$ show queue schedule Ethernet1
Port       TxQ    Mode      Weight
---------  -----  ------  --------
Ethernet1  UC0    SP             0
Ethernet1  UC1    SP             0
Ethernet1  UC2    SP             0
Ethernet1  UC3    SP             0
Ethernet1  UC4    SP             0
Ethernet1  UC5    SP             0
Ethernet1  UC6    SP             0
Ethernet1  UC7    SP             0
```

```
admin@sonic:~$ sudo config interface qos schedule Ethernet2 wrr 0 0 0 0 1 2 3 4
admin@sonic:~$ show queue schedule Ethernet2
Port       TxQ    Mode      Weight
---------  -----  ------  --------
Ethernet2  UC0    SP             0
Ethernet2  UC1    SP             0
Ethernet2  UC2    SP             0
Ethernet2  UC3    SP             0
Ethernet2  UC4    WRR            1
Ethernet2  UC5    WRR            2
Ethernet2  UC6    WRR            3
Ethernet2  UC7    WRR            4
admin@sonic:~$ sudo config interface qos schedule Ethernet3 wrr 1 2 3 4 5 6 7 8
admin@sonic:~$ show queue schedule Ethernet3
Port       TxQ    Mode      Weight
---------  -----  ------  --------
Ethernet3  UC0    WRR            1
Ethernet3  UC1    WRR            2
Ethernet3  UC2    WRR            3
Ethernet3  UC3    WRR            4
Ethernet3  UC4    WRR            5
Ethernet3  UC5    WRR            6
Ethernet3  UC6    WRR            7
Ethernet3  UC7    WRR            8
```

```
admin@sonic:~$ sudo config interface qos schedule Ethernet4 dwrr 1 2 3 4 5 6 7 8
admin@sonic:~$ show queue schedule Ethernet4
Port       TxQ    Mode      Weight
---------  -----  ------  --------
Ethernet4  UC0    DWRR           1
Ethernet4  UC1    DWRR           2
Ethernet4  UC2    DWRR           3
Ethernet4  UC3    DWRR           4
Ethernet4  UC4    DWRR           5
Ethernet4  UC5    DWRR           6
Ethernet4  UC6    DWRR           7
Ethernet4  UC7    DWRR           8

admin@sonic:~$ sudo config interface qos schedule Ethernet5 dwrr 5 6 7 8 0 0 0 0
admin@sonic:~$ show queue schedule Ethernet5
Port       TxQ    Mode      Weight
---------  -----  ------  --------
Ethernet5  UC0    DWRR           5
Ethernet5  UC1    DWRR           6
Ethernet5  UC2    DWRR           7
Ethernet5  UC3    DWRR           8
Ethernet5  UC4    SP             0
Ethernet5  UC5    SP             0
Ethernet5  UC6    SP             0
Ethernet5  UC7    SP             0
```

config interface qos schedule default

This command is used to restore the scheduling policy and weight of the port output queue to the default settings.

- Usage:

```
sudo config interface qos schedule <interface_name> wrr 1 1 1 1 1 1 1 1
```

- Example:

```
admin@sonic:~$ show queue schedule Ethernet1
Port       TxQ    Mode      Weight
---------  -----  ------  --------
Ethernet1  UC0    SP             0
Ethernet1  UC1    SP             0
Ethernet1  UC2    SP             0
Ethernet1  UC3    SP             0
Ethernet1  UC4    DWRR           1
Ethernet1  UC5    DWRR           2
Ethernet1  UC6    DWRR           3
Ethernet1  UC7    DWRR           4

admin@sonic:~$ sudo config interface qos schedule Ethernet1 wrr 1 1 1 1 1 1 1 1
admin@sonic:~$ show queue schedule Ethernet1
Port       TxQ    Mode      Weight
---------  -----  ------  --------
Ethernet1  UC0    WRR            1
Ethernet1  UC1    WRR            1
Ethernet1  UC2    WRR            1
Ethernet1  UC3    WRR            1
Ethernet1  UC4    WRR            1
Ethernet1  UC5    WRR            1
Ethernet1  UC6    WRR            1
Ethernet1  UC7    WRR            1
```

config qos map add

This command is used to configure qos map.

- Usage:

```
sudo config qos map add tc-to-pg <tc_to_pg_name> <tc_value> <pg_value>


sudo config qos map add pfc-to-queue <pfc_to_queue_name> <pfc_value> <queue_value>


sudo config qos map add dot1p-to-tc <dot1p_to_tc_name> <dot1p_value> <tc_value>


sudo config qos map add dscp-to-tc <dscp_to_tc_name> <dscp_value> <tc_value>


sudo config qos map add tc-to-dot1p <tc_to_dot1p_name> <tc_value> <dot1p_value>


sudo config qos map add tc-to-dscp <tc_to_dscp_name> <tc_value> <dscp_value>
```

```
sudo config qos map add tc-to-queue <tc_to_queue_name> <tc_value> <queue_value>
```

- Example:

```
admin@sonic:~$ sudo config qos map add tc-to-pg tc-pg 0-7 1
admin@sonic:~$ show qos map tc-to-pg
TC_TO_PG_MAP: tc-pg
------------------------------
  tc    pg
----  ----
  0     1
  1     1
  2     1
  3     1
  4     1
  5     1
  6     1
  7     1

Num of maps: 1
```

```
admin@sonic:~$ sudo config qos map add pfc-to-queue pfc-queue 0-7 5
admin@sonic:~$ show qos map pfc-to-queue
PFC_TO_QUEUE_MAP: default
------------------------------
  pfc    queue
-----  -------
    0        0
    1        1
    2        2
    3        3
    4        4
    5        5
    6        6
    7        7

PFC_TO_QUEUE_MAP: pfc-queue
------------------------------
  pfc    queue
-----  -------
    0        5
    1        5
    2        5
    3        5
    4        5
    5        5
    6        5
    7        5

Num of maps: 2
```

```
admin@sonic:~$ sudo config qos map add dot1p-to-tc dot1p-tc 0-5 3
admin@sonic:~$ show qos map dot1p-to-tc
DOT1P_TO_TC_MAP: default
------------------------------
  dot1p    tc
-------  ----
      0     0
      1     1
      2     2
      3     3
      4     4
      5     5
      6     6
      7     7

DOT1P_TO_TC_MAP: dot1p-tc
------------------------------
  dot1p    tc
-------  ----
      0     3
      1     3
      2     3
      3     3
      4     3
      5     3

Num of maps: 2
```

```
admin@sonic:~$ sudo config qos map add dscp-to-tc dscp-tc 5 2
admin@sonic:~$ sudo config qos map add dscp-to-tc dscp-tc 15 3
admin@sonic:~$ sudo config qos map add dscp-to-tc dscp-tc 28 5
admin@sonic:~$ show qos map dscp-to-tc
DSCP_TO_TC_MAP: default
------------------------------
  dscp    tc
------  ----
     0     0
     1     0
     2     0
     3     0
     4     0
     5     0
     6     0
     7     0
     8     1
     9     1
    10     1
    11     1
    12     1
    13     1
    14     1
    15     1
    16     2
    17     2
    18     2
    19     2
    20     2
    21     2
    22     2
    23     2
    24     3
    25     3
    26     3
    27     3
    28     3
    29     3
    30     3
    31     3
    32     4
    33     4
    34     4
    35     4
    36     4
    37     4
    38     4
    39     4
    40     5
    41     5
    42     5
```

```
    43     5
    44     5
    45     5
    46     5
    47     5
    48     6
    49     6
    50     6
    51     6
    52     6
    53     6
    54     6
    55     6
    56     7
    57     7
    58     7
    59     7
    60     7
    61     7
    62     7
    63     7

DSCP_TO_TC_MAP: dscp-tc
------------------------------
  dscp    tc
------  ----
     5     2
    15     3
    28     5

Num of maps: 2


admin@sonic:~$ sudo config qos map add tc-to-dscp tc-dscp 0-5 2
admin@sonic:~$ show qos map tc-to-dscp
TC_TO_DSCP_MAP: tc-dscp
------------------------------
  tc    dscp
----  ------
  0       2
  1       2
  2       2
  3       2
  4       2
  5       2

Num of maps: 1
```

```
admin@sonic:~$ sudo config qos map add tc-to-dot1p tc-dot1p 0-7 3
admin@sonic:~$ show qos map tc-to-dot1p
TC_TO_DOT1P_MAP: tc-dot1p
------------------------------
  tc    dot1p
----  -------
  0        3
  1        3
  2        3
  3        3
  4        3
  5        3
  6        3
  7        3

Num of maps: 1
```

config qos map delete

This command is used to delete qos map.

- Usage:

```
sudo config qos map delete tc-to-pg <tc_to_pg_name>


sudo config qos map delete pfc-to-queue <pfc_to_queue_name>


sudo config qos map delete dot1p-to-tc <dot1p_to_tc_name>


sudo config qos map delete dscp-to-tc <dscp_to_tc_name>


sudo config qos map delete tc-to-dot1p <tc_to_dot1p_name>


sudo config qos map delete tc-to-dscp <tc_to_dscp_name>


sudo config qos map delete tc-to-queue <tc_to_queue_name>
```

- Example:

```
admin@sonic:~$ show qos map tc-to-queue
TC_TO_QUEUE_MAP: default
------------------------------
  tc    queue
----  -------
  0        0
  1        1
  2        2
  3        3
  4        4
  5        5
  6        6
  7        7

TC_TO_QUEUE_MAP: tc-queue
------------------------------
  tc    queue
----  -------
  0        2
  1        2
  2        2
  3        2

Num of maps: 2
admin@sonic:~$ sudo config qos map delete tc-to-queue tc-queue
admin@sonic:~$ show qos map tc-to-queue
TC_TO_QUEUE_MAP: default
------------------------------
  tc    queue
----  -------
  0        0
  1        1
  2        2
  3        3
  4        4
  5        5
  6        6
  7        7

Num of maps: 1
```

```
admin@sonic:~$ show qos map pfc-to-queue
PFC_TO_QUEUE_MAP: default
------------------------------
  pfc    queue
-----  -------
    0        0
    1        1
    2        2
    3        3
    4        4
    5        5
    6        6
    7        7

PFC_TO_QUEUE_MAP: pfc-queue
------------------------------
  pfc    queue
-----  -------
    0        5
    1        5
    2        5
    3        5
    4        5
    5        5
    6        5
    7        5

Num of maps: 2
admin@sonic:~$ sudo config qos map delete pfc-to-queue pfc-queue
admin@sonic:~$ show qos map pfc-to-queue
PFC_TO_QUEUE_MAP: default
------------------------------
  pfc    queue
-----  -------
    0        0
    1        1
    2        2
    3        3
    4        4
    5        5
    6        6
    7        7

Num of maps: 1
```

config qos map apply

This command is used to apply qos map to interface.

- Usage:

```
sudo config qos map apply tc-to-pg <interface_name> <tc_to_pg_name>

sudo config qos map apply pfc-to-queue <interface_name> <pfc_to_queue_name>

sudo config qos map apply dot1p-to-tc <interface_name> <dot1p_to_tc_name>

sudo config qos map apply dscp-to-tc <interface_name> <dscp_to_tc_name>

sudo config qos map apply tc-to-dot1p <interface_name> <tc_to_dot1p_name>

sudo config qos map apply tc-to-dscp <interface_name> <tc_to_dscp_name>

sudo config qos map apply tc-to-queue <interface_name> <tc_to_queue_name>
```

- Example:

```
admin@sonic:~$ show interfaces qos map apply Ethernet2
Port       Map               Profile
---------  ----------------  ---------
Ethernet2  dot1p_to_tc_map   default
           dscp_to_tc_map    default
           pfc_to_queue_map  default
           tc_to_queue_map   default
admin@sonic:~$ sudo config qos map apply dscp-to-tc Ethernet2 dscp-tc
admin@sonic:~$ show interfaces qos map apply Ethernet2
Port       Map               Profile
---------  ----------------  ---------
Ethernet2  dot1p_to_tc_map   default
           dscp_to_tc_map    dscp-tc
           pfc_to_queue_map  default
           tc_to_queue_map   default
```

```
admin@sonic:~$ show interfaces qos map apply Ethernet5
Port       Map               Profile
---------  ----------------  ---------
Ethernet5  dot1p_to_tc_map   default
           dscp_to_tc_map    default
           pfc_to_queue_map  default
           tc_to_queue_map   default
admin@sonic:~$ sudo config qos map apply dot1p-to-tc Ethernet5 dot1p-tc
admin@sonic:~$ show interfaces qos map apply Ethernet5
Port       Map               Profile
---------  ----------------  ---------
Ethernet5  dot1p_to_tc_map   dot1p-tc
           dscp_to_tc_map    default
           pfc_to_queue_map  default
           tc_to_queue_map   default


admin@sonic:~$ sudo config qos map apply tc-to-dot1p Ethernet10 tc-dot1p
admin@sonic:~$ show interfaces qos map apply Ethernet10
Port        Map               Profile
----------  ----------------  ---------
Ethernet10  dot1p_to_tc_map   default
            dscp_to_tc_map    default
            pfc_to_queue_map  default
            tc_to_dot1p_map   tc-dot1p
            tc_to_queue_map   default
admin@sonic:~$ sudo config qos map apply tc-to-dot1p Ethernet10 default
admin@sonic:~$ show interfaces qos map apply Ethernet10
Port        Map               Profile
----------  ----------------  ---------
Ethernet10  dot1p_to_tc_map   default
            dscp_to_tc_map    default
            pfc_to_queue_map  default
            tc_to_queue_map   default
```

config interface qos interface-rate-limit

This command is used to configure port rate limiting.

- Usage:

```
sudo config interface qos interface-rate-limit <interface_name> -pir <pir_value> [-pbs <pbs_value>]
```

- Example:

```
admin@sonic:~$ sudo config interface qos interface-rate-limit Ethernet3 -pir 200000000 -pbs 2000
admin@sonic:~$ show interfaces qos interface-rate-limit
Port        pir        pbs
----------  ---------  -----
Ethernet1
Ethernet2
Ethernet3   200000000  2000
Ethernet4
Ethernet5
Ethernet6
Ethernet7
Ethernet8
Ethernet9
Ethernet10
Ethernet11
Ethernet12
Ethernet13
Ethernet14
Ethernet15
Ethernet16
Ethernet17
Ethernet18
Ethernet19
Ethernet20
Ethernet21
Ethernet22
Ethernet23
Ethernet24
Ethernet25
Ethernet26
Ethernet27
Ethernet28
Ethernet29
Ethernet30
Ethernet31
Ethernet32
Ethernet33
Ethernet34
Ethernet35
Ethernet36
Ethernet37
Ethernet38
Ethernet39
Ethernet40
Ethernet41
Ethernet42
Ethernet43
Ethernet44
Ethernet45
Ethernet46
Ethernet47
```

Ethernet48
Ethernet49
Ethernet53
Ethernet57
Ethernet61
Ethernet65
Ethernet69
Ethernet73
Ethernet77

```
admin@sonic:~$ sudo config interface qos interface-rate-limit Ethernet10 -pir 300000000
admin@sonic:~$ show interfaces qos interface-rate-limit
Port        pir        pbs
----------  ---------  -----
Ethernet1
Ethernet2
Ethernet3   200000000  2000
Ethernet4
Ethernet5
Ethernet6
Ethernet7
Ethernet8
Ethernet9
Ethernet10  300000000
Ethernet11
Ethernet12
Ethernet13
Ethernet14
Ethernet15
Ethernet16
Ethernet17
Ethernet18
Ethernet19
Ethernet20
Ethernet21
Ethernet22
Ethernet23
Ethernet24
Ethernet25
Ethernet26
Ethernet27
Ethernet28
Ethernet29
Ethernet30
Ethernet31
Ethernet32
Ethernet33
Ethernet34
Ethernet35
Ethernet36
Ethernet37
Ethernet38
Ethernet39
Ethernet40
Ethernet41
Ethernet42
Ethernet43
Ethernet44
Ethernet45
Ethernet46
Ethernet47
```

```
Ethernet48
Ethernet49
Ethernet53
Ethernet57
Ethernet61
Ethernet65
Ethernet69
Ethernet73
Ethernet77
```

config interface qos queue-rate-limit

This command is used to configure queue rate limiting on interface.

- Usage:

```
sudo config interface qos queue-rate-limit <interface_name> <queue_id> -cir <cir_value> [-cbs <cbs_value>] |
```

- Example:

```
admin@sonic:~$ sudo config interface qos queue-rate-limit Ethernet1 0 -cir 200000000
admin@sonic:~$ show interfaces qos queue-rate-limit Ethernet1
Port       queue-id    cir        cbs    pir    pbs
---------  ----------  ---------  -----  -----  -----
Ethernet1  0           200000000
Ethernet1  1
Ethernet1  2
Ethernet1  3
Ethernet1  4
Ethernet1  5
Ethernet1  6
Ethernet1  7
```

```
admin@sonic:~$ sudo config interface qos queue-rate-limit Ethernet1 2 -cir 200000000 -cbs 2000 -pir 30000000
admin@sonic:~$ show interfaces qos queue-rate-limit Ethernet1
Port       queue-id    cir        cbs    pir        pbs
---------  ----------  ---------  -----  ---------  -----
Ethernet1  0           200000000
Ethernet1  1
Ethernet1  2           200000000  2000   300000000  3000
Ethernet1  3
Ethernet1  4
Ethernet1  5
Ethernet1  6
Ethernet1  7
```

config interface qos queue-rate-limit

This command is used to configure the trust mode of interface.

- Usage:

```
sudo config interface trust-mode <interface_name> <dscp | dot1p>
```

- Example:

```
admin@sonic:~$ show interfaces trust-mode
      Port    trust-mode
----------  ------------
 Ethernet1         dot1p
 Ethernet2          dscp
 Ethernet3          dscp
 Ethernet4          dscp
 Ethernet5          dscp
 Ethernet6          dscp
 Ethernet7          dscp
 Ethernet8          dscp
 Ethernet9          dscp
Ethernet10          dscp
Ethernet11          dscp
Ethernet12          dscp
Ethernet13          dscp
Ethernet14          dscp
Ethernet15          dscp
Ethernet16          dscp
Ethernet17          dscp
Ethernet18          dscp
Ethernet19          dscp
Ethernet20          dscp
Ethernet21          dscp
Ethernet22          dscp
Ethernet23          dscp
Ethernet24          dscp
Ethernet25          dscp
Ethernet26          dscp
Ethernet27          dscp
Ethernet28          dscp
Ethernet29          dscp
Ethernet30          dscp
Ethernet31          dscp
Ethernet32          dscp
Ethernet33          dscp
Ethernet34          dscp
Ethernet35          dscp
Ethernet36          dscp
Ethernet37          dscp
Ethernet38          dscp
Ethernet39          dscp
Ethernet40          dscp
Ethernet41          dscp
Ethernet42          dscp
Ethernet43          dscp
Ethernet44          dscp
Ethernet45          dscp
Ethernet46          dscp
Ethernet47          dscp
Ethernet48          dscp
```

```
Ethernet49          dscp
Ethernet53          dscp
Ethernet57          dscp
Ethernet61          dscp
Ethernet65          dscp
Ethernet69          dscp
Ethernet73          dscp
Ethernet77          dscp
admin@sonic:~$ sudo config interface trust-mode Ethernet10 dot1p
admin@sonic:~$ show interfaces trust-mode
      Port    trust-mode
----------  ------------
 Ethernet1         dot1p
 Ethernet2          dscp
 Ethernet3          dscp
 Ethernet4          dscp
 Ethernet5          dscp
 Ethernet6          dscp
 Ethernet7          dscp
 Ethernet8          dscp
 Ethernet9          dscp
Ethernet10         dot1p
Ethernet11          dscp
Ethernet12          dscp
Ethernet13          dscp
Ethernet14          dscp
Ethernet15          dscp
Ethernet16          dscp
Ethernet17          dscp
Ethernet18          dscp
Ethernet19          dscp
Ethernet20          dscp
Ethernet21          dscp
Ethernet22          dscp
Ethernet23          dscp
Ethernet24          dscp
Ethernet25          dscp
Ethernet26          dscp
Ethernet27          dscp
Ethernet28          dscp
Ethernet29          dscp
Ethernet30          dscp
Ethernet31          dscp
Ethernet32          dscp
Ethernet33          dscp
Ethernet34          dscp
Ethernet35          dscp
Ethernet36          dscp
Ethernet37          dscp
Ethernet38          dscp
Ethernet39          dscp
```

```
Ethernet40          dscp
Ethernet41          dscp
Ethernet42          dscp
Ethernet43          dscp
Ethernet44          dscp
Ethernet45          dscp
Ethernet46          dscp
Ethernet47          dscp
Ethernet48          dscp
Ethernet49          dscp
Ethernet53          dscp
Ethernet57          dscp
Ethernet61          dscp
Ethernet65          dscp
Ethernet69          dscp
Ethernet73          dscp
Ethernet77          dscp


admin@sonic:~$ show interfaces trust-mode Ethernet1
     Port    trust-mode
---------  ------------
Ethernet1         dot1p
admin@sonic:~$ sudo config interface trust-mode Ethernet1 dscp
admin@sonic:~$ show interfaces trust-mode Ethernet1
     Port    trust-mode
---------  ------------
Ethernet1          dscp
```

config interface qos default

This command is used to restore the queue rate limiting of interface or the port rate limiting to the default value.

- Usage:

```
sudo config interface qos default interface-rate-limit <interface_name>


sudo config interface qos default queue-rate-limit <interface_name> <queue_id>
```

- Example:

```
admin@sonic:~$ show interfaces qos interface-rate-limit
Port        pir        pbs
----------  ---------  -----
Ethernet1
Ethernet2
Ethernet3   200000000  2000
Ethernet4
Ethernet5
Ethernet6
Ethernet7
Ethernet8
Ethernet9
Ethernet10  300000000
Ethernet11
Ethernet12
Ethernet13
Ethernet14
Ethernet15
Ethernet16
Ethernet17
Ethernet18
Ethernet19
Ethernet20
Ethernet21
Ethernet22
Ethernet23
Ethernet24
Ethernet25
Ethernet26
Ethernet27
Ethernet28
Ethernet29
Ethernet30
Ethernet31
Ethernet32
Ethernet33
Ethernet34
Ethernet35
Ethernet36
Ethernet37
Ethernet38
Ethernet39
Ethernet40
Ethernet41
Ethernet42
Ethernet43
Ethernet44
Ethernet45
Ethernet46
Ethernet47
Ethernet48
```

```
Ethernet49
Ethernet53
Ethernet57
Ethernet61
Ethernet65
Ethernet69
Ethernet73
Ethernet77
admin@sonic:~$ sudo config interface qos default interface-rate-limit Ethernet3
admin@sonic:~$ show interfaces qos interface-rate-limit
Port        pir        pbs
----------  ---------  -----
Ethernet1
Ethernet2
Ethernet3
Ethernet4
Ethernet5
Ethernet6
Ethernet7
Ethernet8
Ethernet9
Ethernet10  300000000
Ethernet11
Ethernet12
Ethernet13
Ethernet14
Ethernet15
Ethernet16
Ethernet17
Ethernet18
Ethernet19
Ethernet20
Ethernet21
Ethernet22
Ethernet23
Ethernet24
Ethernet25
Ethernet26
Ethernet27
Ethernet28
Ethernet29
Ethernet30
Ethernet31
Ethernet32
Ethernet33
Ethernet34
Ethernet35
Ethernet36
Ethernet37
Ethernet38
Ethernet39
```

```
Ethernet40
Ethernet41
Ethernet42
Ethernet43
Ethernet44
Ethernet45
Ethernet46
Ethernet47
Ethernet48
Ethernet49
Ethernet53
Ethernet57
Ethernet61
Ethernet65
Ethernet69
Ethernet73
Ethernet77


admin@sonic:~$ show interfaces qos queue-rate-limit Ethernet1
Port       queue-id    cir        cbs    pir        pbs
---------  ----------  ---------  -----  ---------  -----
Ethernet1  0           200000000
Ethernet1  1
Ethernet1  2           200000000  2000   300000000  3000
Ethernet1  3
Ethernet1  4
Ethernet1  5
Ethernet1  6
Ethernet1  7
admin@sonic:~$ sudo config interface qos default queue-rate-limit Ethernet1 2
admin@sonic:~$ show interfaces qos queue-rate-limit Ethernet1
Port       queue-id    cir        cbs    pir    pbs
---------  ----------  ---------  -----  -----  -----
Ethernet1  0           200000000
Ethernet1  1
Ethernet1  2
Ethernet1  3
Ethernet1  4
Ethernet1  5
Ethernet1  6
Ethernet1  7
```

config qos acl

This command is used to configure qos acl. See ACL config commands.

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QoS clear commands

clear queue counters

This command is used to clear the statistics of packets in the queue

- Usage:

```
sudo sonic-clear queuecounters
```

- Example:

```
admin@sonic:~$ show queue counters Ethernet50
      Port    TxQ    Counter/pkts    Counter/bytes    Drop/pkts    Drop/bytes
----------  -----  --------------  ---------------  -----------  ------------
Ethernet50    UC0             219            25035            0             0
Ethernet50    UC1               0                0            0             0
Ethernet50    UC2               0                0            0             0
Ethernet50    UC3               0                0            0             0
Ethernet50    UC4               0                0            0             0
Ethernet50    UC5               0                0            0             0
Ethernet50    UC6               0                0            0             0
Ethernet50    UC7               0                0            0             0
Ethernet50    UC8               0                0            0             0
Ethernet50    UC9               0                0            0             0
Ethernet50   MC10               0                0            0             0
Ethernet50   MC11               0                0            0             0
Ethernet50   MC12               0                0            0             0
Ethernet50   MC13               0                0            0             0
Ethernet50   MC14               0                0            0             0
Ethernet50   MC15               0                0            0             0
Ethernet50   MC16               0                0            0             0
Ethernet50   MC17               0                0            0             0
Ethernet50   MC18               0                0            0             0
Ethernet50   MC19               0                0            0             0

admin@sonic:~$ sudo sonic-clear queuecounters

admin@sonic:~$ show queue counters Ethernet50
      Port    TxQ    Counter/pkts    Counter/bytes    Drop/pkts    Drop/bytes
----------  -----  --------------  ---------------  -----------  ------------
Ethernet50    UC0               0                0            0             0
Ethernet50    UC1               0                0            0             0
Ethernet50    UC2               0                0            0             0
Ethernet50    UC3               0                0            0             0
Ethernet50    UC4               0                0            0             0
Ethernet50    UC5               0                0            0             0
Ethernet50    UC6               0                0            0             0
Ethernet50    UC7               0                0            0             0
Ethernet50    UC8               0                0            0             0
Ethernet50    UC9               0                0            0             0
Ethernet50   MC10               0                0            0             0
Ethernet50   MC11               0                0            0             0
Ethernet50   MC12               0                0            0             0
Ethernet50   MC13               0                0            0             0
Ethernet50   MC14               0                0            0             0
Ethernet50   MC15               0                0            0             0
Ethernet50   MC16               0                0            0             0
Ethernet50   MC17               0                0            0             0
Ethernet50   MC18               0                0            0             0
Ethernet50   MC19               0                0            0             0
```

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sFlow

sFlow Show commands

show sflow

This command displays the global sFlow configuration that includes the admin state, collectors, the Agent ID and counter polling interval.

- Usage:

```
show sflow
```

- Example:

```
admin@sonic:~$ show sflow

sFlow Global Information:
sFlow Admin State:          up
sFlow Polling Interval:     default(20s)
sFlow AgentID:              default
Collectors configured:      2
  Name: 1                   IP addr: 172.168.1.3                                  UDP port: 6343   VRF: defaul
  Name: 2                   IP addr: 172.168.1.2                                  UDP port: 6343   VRF: defaul
```

show sflow interface

This command displays the per-interface sflow admin status and the sampling rate.

- Usage:

```
show sflow interface
```

- Example:

```
admin@sonic:~$ show sflow interface

sFlow interface configurations
+-------------+---------------+-----------------+------------------+
| Interface   | Admin State   |   Sampling Rate | Sampling Stage   |
+=============+===============+=================+==================+
| Ethernet1   | down          |           25000 | ingress          |
+-------------+---------------+-----------------+------------------+
| Ethernet2   | down          |           25000 | ingress          |
+-------------+---------------+-----------------+------------------+
| Ethernet3   | down          |           25000 | ingress          |
+-------------+---------------+-----------------+------------------+
| Ethernet4   | down          |           25000 | ingress          |
+-------------+---------------+-----------------+------------------+
| Ethernet5   | down          |           25000 | ingress          |
+-------------+---------------+-----------------+------------------+
| Ethernet6   | down          |           25000 | ingress          |
+-------------+---------------+-----------------+------------------+
...
+-------------+---------------+-----------------+------------------+
| Ethernet52  | down          |          100000 | ingress          |
+-------------+---------------+-----------------+------------------+
| Ethernet53  | down          |          100000 | ingress          |
+-------------+---------------+-----------------+------------------+
| Ethernet54  | down          |          100000 | ingress          |
+-------------+---------------+-----------------+------------------+
| Ethernet55  | down          |          100000 | ingress          |
+-------------+---------------+-----------------+------------------+
| Ethernet56  | down          |          100000 | ingress          |
+-------------+---------------+-----------------+------------------+
```

sFlow Config commands

config sflow collector add

This command is used to add a sFlow collector. Note that a maximum of 2 collectors is allowed.

- Usage:

```
config sflow collector add <collector-name> <ipv4-address | ipv6-address> [port <number>]
```

  - Parameters:
    - collector-name: unique name of the sFlow collector
    - ipv4-address : IP address of the collector in dotted decimal format for IPv4
    - ipv6-address : x: x: x: x::x format for IPv6 address of the collector (where :: notation specifies successive hexadecimal fields of zeros)

        - port (OPTIONAL): specifies the UDP port of the collector (the range is from 0 to 65535. The default is 6343.)
- Example:

```
admin@sonic:~$ sudo config sflow collector add collector_A 10.11.46.2
```

config sflow collector del

This command is used to delete a sFlow collector with the given name.

- Usage:

```
config sflow collector del <collector-name>
```

    - Parameters:
        - collector-name: unique name of the sFlow collector
- Example:

```
admin@sonic:~$ sudo config sflow collector del collector_A
```

config sflow agent-id

This command is used to add/delete the sFlow agent-id. This setting is global (applicable to both collectors) and optional. Only a single agent-id is allowed. If agent-id is not specified (with this CLI), an appropriate IP that belongs to the switch is used as the agent-id based on some simple heuristics.

- Usage:

```
config sflow agent-id <add|del> <interface-name>
```

    - Parameters:
        - interface-name: specify the interface name whose ipv4 or ipv6 address will be used as the agent-id in sFlow datagrams.
- Example:

```
admin@sonic:~$ sudo config sflow agent-id add lo
```

config sflow

Globally, sFlow is disabled by default. When sFlow is enabled globally, the sflow deamon is started and sampling will start on all interfaces which have sFlow enabled at the interface level (see “config sflow interface…”). When sflow is disabled globally, sampling is stopped on all relevant interfaces and sflow daemon is stopped.

- Usage:

```
config sflow <enable|disable>
```

- Example:

```
admin@sonic:~$ sudo config sflow enable
```

config sflow interface

Enable/disable sflow at an interface level. By default, sflow is enabled on all interfaces at the interface level. Use this command to explicitly disable sFlow for a specific interface. An interface is sampled if sflow is enabled globally as well as at the interface level. Note that this configuration deals only with sFlow flow samples and not counter samples.

- Usage:

```
config sflow interface <enable|disable> <interface-name|all>
```

    - Parameters:
        - interface-name: specify the interface for which sFlow flow samples have to be enabled/disabled. The “all” keyword is used as a convenience to enable/disable sflow at the interface level for all the interfaces.
- Example:

```
admin@sonic:~$ sudo config sflow interface disable Ethernet40
```

config sflow interface sample-rate

Configure the sample-rate for a specific interface.

The default sample rate for any interface is (ifSpeed / 1e6) where ifSpeed is in bits/sec. So, the default sample rate based on interface speed is:

```
1-in-1000 for a 1G link
1-in-10,000 for a 10G link
1-in-40,000 for a 40G link
1-in-50,000 for a 50G link
1-in-100,000 for a 100G link
```

It is recommended not to change the defaults. This CLI is to be used only in case of exceptions (e.g., to set the sample-rate to the nearest power-of-2 if there are hardware restrictions in using the defaults)

- Usage:

```
config sflow interface sample-rate <interface-name> <value>
```

    - Parameters:
        - interface-name: specify the interface for which the sampling rate value is to be set
        - value: value is the average number of packets skipped before the sample is taken. "The sampling rate specifies random sampling probability as the ratio of packets observed to samples generated. For example a sampling rate of 256 specifies that, on average, 1 sample will be generated for every 256 packets observed." Valid range 256:8388608.
- Example:

```
admin@sonic:~$ sudo config sflow interface sample-rate Ethernet32 1000
```

config sflow polling-interval

This command is used to set the counter polling interval. Default is 20 seconds.

- Usage:

```
config sflow polling-interval <value>
```

    - Parameters:
        - value: 0-300 seconds. Set polling-interval to 0 to disable counter polling
- Example:

```
admin@sonic:~$ sudo config sflow polling-interval 30
```

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SNMP

SNMP Show commands

show runningconfiguration snmp

This command displays the global SNMP configuration that includes the location, contact, community, and user settings.

- Usage:

```
show runningconfiguration snmp
```

- Example:

```
admin@sonic:~$ show runningconfiguration snmp
Status
--------
enable


Location
------------
Emerald City


SNMP_CONTACT    SNMP_CONTACT_EMAIL
--------------  --------------------
joe             joe@contoso.com


View      Type     OID
------    ------   -----
testview  include  1.3.6.1.2.1


Community String       Community Type       Source          View
------------------     ----------------     --------        ------
Jack                   RW                   172.31.240.48   testview1


User    Permission Type    Type    Auth Type    Auth Password    Encryption Type    Encryption Password    \
------  -----------------  ------  -----------  ---------------  -----------------  ---------------------  -
Travis  RO                 Priv    SHA          TravisAuthPass   AES                TravisEncryptPass      t
```

show runningconfiguration snmp location

This command displays the SNMP location setting.

- Usage:

```
show runningconfiguration snmp location
```

- Example:

```
admin@sonic:~$ show runningconfiguration snmp location
Location
------------
Emerald City
```

show runningconfiguration snmp contact

This command displays the SNMP contact setting.

- Usage:

```
show runningconfiguration snmp contact
```

- Example:

```
admin@sonic:~$ show runningconfiguration snmp contact
Contact    Contact Email
---------  ---------------
joe        joe@contoso.com
```

show runningconfiguration snmp view

This command displays the SNMP view setting.

- Usage:

```
show runningconfiguration snmp view
```

- Example:

```
admin@sonic:~$ show runningconfiguration snmp view
View      Type      OID
------    ------    -----
testview1 included  1.3.6.1.2.1
```

show runningconfiguration snmp community

This command display the SNMP community settings.

- Usage:

```
show runningconfiguration snmp community
```

- Example:

```
admin@sonic:~$ show runningconfiguration snmp community
Community String        Community Type        Source        View
------------------      ----------------      --------      ------
testcom1                RO
testcom2                RO                    172.31.240.48 testview1
```

show runningconfiguration snmp user

This command display the SNMP user settings.

- Usage:

```
show runningconfiguration snmp user
```

- Example:

```
admin@sonic:~$ show runningconfiguration snmp user
User    Permission Type    Type    Auth Type    Auth Password    Encryption Type    Encryption Password    \
------  -----------------  ------  -----------  ---------------  -----------------  ---------------------  -
Travis  RO                 Priv    SHA          TravisAuthPass   AES                TravisEncryptPass
Joe     RO                 Priv    SHA          TravisAuthPass   AES                TravisEncryptPass      t
```

SNMP Config commands

This sub-section explains how to configure SNMP.

config snmp enable/disable

This command is used to enable or disable the SNMP service.

- Usage:

```
config snmp enable
```

- Example:

```
admin@sonic:~$ sudo config snmp enable
Restarting SNMP service...
```

config snmp location add/del/modify

This command is used to add, delete, or modify the SNMP location.

- Usage:

```
config snmp location (add | del | modify) <location>
```

- Example (Add new SNMP location "Emerald City" if it does not already exist):

```
admin@sonic:~$ sudo config snmp location add Emerald City
SNMP Location Emerald City has been added to configuration
Restarting SNMP service...
```

- Example (Delete SNMP location "Emerald City" if it already exists):

```
admin@sonic:~$ sudo config snmp location del Emerald City
SNMP Location Emerald City removed from configuration
Restarting SNMP service...
```

- Example (Modify SNMP location "Emerald City" to "Redmond"):

```
admin@sonic:~$ sudo config snmp location modify Redmond
SNMP location Redmond modified in configuration
Restarting SNMP service...
```

config snmp contact add/del/modify

This command is used to add, delete, or modify the SNMP contact.

- Usage:

```
config snmp contact add <contact> <contact_email>
```

- Example:

```
admin@sonic:~$ sudo config snmp contact add joe joe@contoso.com
Contact name joe and contact email joe@contoso.com have been added to configuration
Restarting SNMP service...
```

- Usage:

```
config snmp contact del <contact>
```

- Example:

```
admin@sonic:~$ sudo config snmp contact del joe
SNMP contact joe removed from configuration
Restarting SNMP service...
```

- Usage:

```
config snmp contact modify <contact> <contact_email>
```

- Example:

```
admin@sonic:~$ sudo config snmp contact modify test test@contoso.com
SNMP contact test and contact email test@contoso.com updated
Restarting SNMP service...
```

config snmp view add/del

This command is used to add, delete, or modify the SNMP view.

- Usage:

```
config snmp view add <viewname> <viewtype> <viewoid>
```

- Example:

```
admin@sonic:~$ sudo config snmp view add testview1 include 1.3.6.1.2.1
Restarting SNMP service...
```

- Usage:

```
config snmp view del <viewname> <viewtype> <viewoid>
```

- Example:

```
admin@sonic:~$ sudo config snmp view del testview1 include 1.3.6.1.2.1
Restarting SNMP service...
```

config snmp community add/del/modify

This command is used to add, delete, or modify the SNMP community.

- Usage:

```
config snmp community add <community> (RO | RW) [-s | --source] [-v | --view]
```

- Example:

```
admin@sonic:~$ sudo config snmp community add testcomm ro -s 172.31.240.48 -v testview1
SNMP community testcomm added to configuration
Restarting SNMP service...
```

- Usage:

```
config snmp community del <community>
```

- Example:

```
admin@sonic:~$ sudo config snmp community del testcomm
SNMP community testcomm removed from configuration
Restarting SNMP service...
```

- Usage:

```
config snmp community modify <community> (RO | RW) [-s | --source] [-v | --view]
```

- Example:

```
admin@sonic:~$ sudo config snmp community modify testcomm rw -s 172.31.240.48 -v testview2
Restarting SNMP service...
```

config snmp user add/del

This command is used to add or delete the SNMP user for SNMPv3.

- Usage:

```
config snmp user add <user> (noAuthNoPriv | AuthNoPriv | Priv) (RO | RW) [[(MD5 | SHA) <auth_password>] [(DE
```

- Example:

```
admin@sonic:~$ sudo config snmp user add testuser1 noauthnopriv ro
SNMP user testuser1 added to configuration
Restarting SNMP service...
```

- Example:

```
admin@sonic:~$ sudo config snmp user add testuser2 authnopriv ro sha testuser2_auth_pass
SNMP user testuser2 added to configuration
Restarting SNMP service...
```

- Example:

```
admin@sonic:~$ sudo config snmp user add testuser3 priv rw md5 testuser3_auth_pass aes testuser3_encrypt_pas
SNMP user testuser3 added to configuration
Restarting SNMP service...
```

- Usage:

```
config snmp user del <user>
```

- Example:

```
admin@sonic:~$ sudo config snmp user del testuser1
SNMP user testuser1 removed from configuration
Restarting SNMP service...
```

Telemetry

Telemetry Show commands

show telemetry gnmi

This command displays the gnmi server configuration.

- Usage:

```
show telemetry gnmi
```

- Example:

```
admin@sonic:~$ show telemetry gnmi
status     enable
port       8090
auth_type  none
log_level  2  Location
```

show telemetry certs

This command displays the certs of telemetry.

- Usage:

```
show telemetry certs
```

- Example:

```
admin@sonic:~$ show telemetry certs
server_crt  /etc/sonic/certs/target.crt
server_key  /etc/sonic/certs/target.key
ca_crt      /etc/sonic/certs/ca.crt
```

Telemetry Config commands

config telemetry gnmi status enable/disable

This command is used to enable or disable telemetry.

- Usage:

```
config telemetry gnmi status (enable | disable)
```

- Example:

```
admin@sonic:~$ sudo config telemetry gnmi status enable
Restarting telemetry service...
```

config telemetry gnmi port-num

This command is used to set the port of gnmi server.

- Usage:

```
config telemetry gnmi port-num <portnum>
```

- Example:

```
admin@sonic:~$ sudo config telemetry gnmi port-num 8090
Restarting telemetry service...
```

config telemetry gnmi auth-type

This command is used to set the auth type of gnmi server.

- Usage:

```
config telemetry gnmi auth-type (cert | none | password )
```

- Example:

```
admin@sonic:~$ sudo config telemetry gnmi auth-type cert
Restarting telemetry service...
```

config telemetry gnmi log-level

This command is used to config gnmi server log output level.

- Usage:

```
config telemetry gnmi log-level <loglevel>
```

- Example:

```
admin@sonic:~$ sudo config telemetry gnmi log-level 5
Restarting telemetry service...
```

config telemetry certs

This command is used to config telemetry's x509 certs.

- Usage:

```
config telemetry telemetry certs <server_crt> <server_key> <ca_crt>
```

- Example:

```
admin@sonic:~$ sudo config telemetry certs /etc/sonic/certs/target.crt /etc/sonic/certs/target.key /etc/soni
Restarting telemetry service...
```

REST

REST Show commands

show rest-server default

This command displays the rest server configuration.

- Usage:

```
show rest-server default
```

- Example:

```
admin@sonic:~$ show rest-server default
status      enable
port        443
auth_type   none
log_level   2
server_crt  /etc/sonic/certs/target.crt
server_key  /etc/sonic/certs/target.key
ca_crt      /etc/sonic/certs/ca.crt
```

REST Config commands

config rest-server default status enable/disable

This command is used to enable or disable rest server.

- Usage:

```
config rest-server default status (enable | disable)
```

- Example:

```
admin@sonic:~$ sudo config rest-server default status enable
Restarting mgmt-framework service...
```

config rest-server default port

This command is used to config port of rest server.

- Usage:

```
config rest-server default port <portnum>
```

- Example:

```
admin@sonic:~$ sudo config rest-server default port 11443
Restarting mgmt-framework service...
```

config rest-server default client-auth

This command is used to config auth type of rest server.

- Usage:

```
config rest-server default client-auth (cert | none | user)
```

- Example:

```
admin@sonic:~$ sudo config rest-server default client-auth cert
Restarting mgmt-framework service...
```

config rest-server default log-level

This command is used to config rest server log output level.

- Usage:

```
config rest-server default log-level <loglevel>
```

- Example:

```
admin@sonic:~$ sudo config rest-server default log-level 5
Restarting mgmt-framework service...
```

config rest-server default reset port

This command is used to config reset port of rest server.

- Usage:

```
config rest-server default reset port
```

- Example:

```
admin@sonic:~$ sudo config rest-server default reset port
Restarting mgmt-framework service...
```

config rest-server default certs

This command is used to config rest server's x509 certs.

- Usage:

```
config rest-server default certs <server_crt> <server_key> <ca_crt>
```

- Example:

```
admin@sonic:~$ sudo config rest-server default certs /etc/sonic/certs/target.crt /etc/sonic/certs/target.key
Restarting mgmt-framework service...
```

Startup & Running Configuration

Startup Configuration

show startupconfiguration bgp

This command is used to display the startup configuration for the BGP module.

- Usage:

```
show startupconfiguration bgp
```

- Example:

```
admin@sonic:~$ show startupconfiguration bgp
Routing-Stack is: quagga
!
! ========== Managed by sonic-cfggen DO NOT edit manually! ====================
! generated by templates/quagga/bgpd.conf.j2 with config DB data
! file: bgpd.conf
!
!
hostname T1-2
password zebra
log syslog informational
log facility local4
! enable password !
!
! bgp multiple-instance
!
route-map FROM_BGP_SPEAKER_V4 permit 10
!
route-map TO_BGP_SPEAKER_V4 deny 10
!
router bgp 65000
  bgp log-neighbor-changes
  bgp bestpath as-path multipath-relax
  no bgp default ipv4-unicast
  bgp graceful-restart restart-time 180

<Only the partial output is shown here. In actual command, more configuration information will be displayed>
```

Running Configuration

This sub-section explains the show commands for displaying the running configuration for the following modules.

1. bgp
2. interfaces
3. ntp
4. snmp
5. all
6. acl
7. ports
8. syslog

show runningconfiguration all

This command displays the entire running configuration.

- Usage:

```
show runningconfiguration all
```

- Example:

```
admin@sonic:~$ show runningconfiguration all
```

show runningconfiguration bgp

This command displays the running configuration of the BGP module.

- Usage:

```
show runningconfiguration bgp
```

- Example:

```
admin@sonic:~$ show runningconfiguration bgp
```

show runningconfiguration interfaces

This command displays the running configuration for the "interfaces".

- Usage:

```
show runningconfiguration interfaces
```

- Example:

```
admin@sonic:~$ show runningconfiguration interfaces
```

show runningconfiguration ntp

This command displays the running configuration of the ntp module.

- Usage:

```
show runningconfiguration ntp
```

- Example:

```
admin@sonic:~$ show runningconfiguration ntp
NTP Servers
-------------
1.1.1.1
2.2.2.2
```

show runningconfiguration syslog

This command displays the running configuration of the syslog module.

- Usage:

```
show runningconfiguration syslog
```

- Example:

```
admin@sonic:~$ show runningconfiguration syslog
syslog server    port
---------------  ------
172.31.240.48    514
```

show runningconfiguration snmp

This command displays the running configuration of the snmp module.

- Usage:

```
show runningconfiguration snmp
```

- Example:

```
admin@sonic:~$ show runningconfiguration snmp
```

show runningconfiguration acl

This command displays the running configuration of the acls

- Usage:

```
show runningconfiguration acl
```

- Example:

```
admin@sonic:~$ show runningconfiguration acl
```

show runningconfiguration ports

This command displays the running configuration of the ports

- Usage:

```
show runningconfiguration ports [<portname>]
```

- Examples:

```
admin@sonic:~$ show runningconfiguration ports
```

```
admin@sonic:~$ show runningconfiguration ports Ethernet0
```

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Static routing

Static routing Config Commands

This sub-section explains of commands is used to add or remove the static route.

config route add

This command is used to add a static route. Note that prefix /nexthop vrf`s and interface name are optional.

- Usage:

```
config route add prefix [vrf <vrf name>] <A.B.C.D/M> nexthop <[vrf <vrf name>] <A.B.C.D>>|<dev <interface na
```

- Example:

```
admin@sonic:~$ config route add prefix 2.2.3.4/32 nexthop 30.0.0.9
```

It also supports ECMP, and adding a new nexthop to the existing prefix will complement it and not overwrite them.

- Example:

```
admin@sonic:~$ sudo config route add prefix 2.2.3.4/32 nexthop vrf Vrf-RED 30.0.0.9
admin@sonic:~$ sudo config route add prefix 2.2.3.4/32 nexthop vrf Vrf-BLUE 30.0.0.10
```

config route del

This command is used to remove a static route. Note that prefix /nexthop vrf`s and interface name are optional.

- Usage:

```
config route del prefix [vrf <vrf name>] <A.B.C.D/M> nexthop <[vrf <vrf name>] <A.B.C.D>>|<dev <interface na
```

- Example:

```
admin@sonic:~$ sudo config route del prefix 2.2.3.4/32 nexthop vrf Vrf-RED 30.0.0.9
admin@sonic:~$ sudo config route del prefix 2.2.3.4/32 nexthop vrf Vrf-BLUE 30.0.0.10
```

This sub-section explains of command is used to show current routes.

show ip route

- Usage:

```
show ip route
```

- Example:

```
admin@sonic:~$ show ip route
Codes: K - kernel route, C - connected, S - static, R - RIP,
       O - OSPF, I - IS-IS, B - BGP, E - EIGRP, N - NHRP,
       T - Table, v - VNC, V - VNC-Direct, A - Babel, D - SHARP,
       F - PBR, f - OpenFabric,
       > - selected route, * - FIB route, q - queued, r - rejected, b - backup

S>* 0.0.0.0/0 [200/0] via 192.168.111.3, eth0, weight 1, 3d03h58m
S>  1.2.3.4/32 [1/0] via 30.0.0.7, weight 1, 00:00:06
C>* 10.0.0.18/31 is directly connected, Ethernet36, 3d03h57m
C>* 10.0.0.20/31 is directly connected, Ethernet40, 3d03h57m
```

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Subinterfaces

Subinterfaces Show Commands

show subinterfaces status

This command displays all the subinterfaces that are configured on the device and its current status.

- Usage:

```
show subinterfaces status
```

- Example:

```
admin@sonic:~$ show subinterfaces status
Sub port interface    Speed    MTU    Vlan    Admin                Type
------------------  -------  -----  ------  -------  -------------------
     Eth64.10          100G   9100    100       up  dot1q-encapsulation
     Ethernet0.100     100G   9100    100       up  dot1q-encapsulation
```

Subinterfaces Config Commands

This sub-section explains how to configure subinterfaces.

config subinterface

- Usage:

```
config subinterface (add | del) <subinterface_name> [vlan <1-4094>]
```

- Example (Create the subinterfces with name "Ethernet0.100"):

```
admin@sonic:~$ sudo config subinterface add Ethernet0.100
```

- Example (Create the subinterfces with name "Eth64.100"):

```
admin@sonic:~$ sudo config subinterface add Eth64.100 100
```

- Example (Delete the subinterfces with name "Ethernet0.100"):

```
admin@sonic:~$ sudo config subinterface del Ethernet0.100
```

- Example (Delete the subinterfces with name "Eth64.100"):

```
admin@sonic:~$ sudo config subinterface del Eth64.100 100
```

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SSH

SSH Show commands

show ssh config

This command displays the global SSH configuration.

- Usage:

```
show ssh config
```

- Example:

```
admin@sonic:~$ show ssh config
sshd status: enable
sshd port: 22
sshd banner: None
```

SSh Config Commands

This sub-section explains how to configure SSH.

config ssh enable/disbale

This command is used to enable or disable ssh service.

- Usage:

```
config ssh enable
```

- Example:

```
admin@sonic:~$ sudo config ssh enable
Restarting sshd-config service...
```

config ssh port set

This command is used to config port of ssh.

- Usage:

```
config ssh port set <portnum>
```

- Example:

```
admin@sonic:~$ sudo config ssh port set 10022
Restarting sshd-config service...
```

config ssh port unset

This command is used to unset port of ssh.

- Usage:

```
config ssh port unset
```

- Example:

```
admin@sonic:~$ sudo config ssh port unset
Restarting sshd-config service...
```

config ssh banner

This command is used to config banner.

- Usage:

```
config ssh banner <path>
```

- Example:

```
admin@sonic:~$ sudo config ssh banner /etc/sonic/banner
Restarting sshd-config service...
```

Syslog

Syslog Config Commands

This sub-section of commands is used to add or remove the configured syslog servers.

config syslog add

This command is used to add a SYSLOG server to the syslog server list. Note that more that one syslog server can be added in the device.

- Usage:

```
config syslog add <syslog_ip_address> [<syslog_ip_address>]
```

- Example:

```
admin@sonic:~$ sudo config syslog add 1.1.1.1
Syslog server 1.1.1.1 added to configuration
Restarting rsyslog-config service...
```

config syslog delete

This command is used to delete the syslog server configured.

- Usage:

```
config syslog del <syslog_ip_address>
```

- Example:

```
admin@sonic:~$ sudo config syslog del 1.1.1.1
Syslog server 1.1.1.1 removed from configuration
Restarting rsyslog-config service...
```

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System State

Processes

This command is used to determine the CPU utilization. It also lists the active processes along with their corresponding process ID and other relevant parameters.

This sub-section explains the various "processes" specific data that includes the following.

1. cpu Show processes CPU info
2. memory Show processes memory info
3. summary Show processes info

“show processes” commands provide a wrapper over linux’s “top” command. “show process cpu” sorts the processes being displayed by cpu-utilization, whereas “show process memory” does it attending to processes’ memory-utilization.

show processes cpu

This command displays the current CPU usage by process. This command uses linux's "top -bn 1 -o %CPU" command to display the output.

- Usage:

```
show processes cpu
```

TIP: Users can pipe the output to "head" to display only the "n" number of lines (e.g., `show processes cpu | head -n 10` *)*

- Example:

```
admin@sonic:~$ show processes cpu
top - 23:50:08 up  1:18,  1 user,  load average: 0.25, 0.29, 0.25
Tasks: 161 total,   1 running, 160 sleeping,   0 stopped,   0 zombie
%Cpu(s):  3.8 us,  1.0 sy,  0.0 ni, 95.1 id,  0.1 wa,  0.0 hi,  0.0 si,  0.0 st
KiB Mem:   8181216 total,  1161060 used,  7020156 free,   105656 buffers
KiB Swap:        0 total,        0 used,        0 free.   557560 cached Mem

  PID USER      PR  NI    VIRT    RES    SHR S  %CPU %MEM     TIME+ COMMAND
 2047 root      20   0  683772 109288  39652 S  23.8  1.3   7:44.79 syncd
 1351 root      20   0   43360   5616   2844 S  11.9  0.1   1:41.56 redis-server
10093 root      20   0   21944   2476   2088 R   5.9  0.0   0:00.03 top
    1 root      20   0   28992   5508   3236 S   0.0  0.1   0:06.42 systemd
    2 root      20   0       0      0      0 S   0.0  0.0   0:00.00 kthreadd
    3 root      20   0       0      0      0 S   0.0  0.0   0:00.56 ksoftirqd/0
    5 root       0 -20       0      0      0 S   0.0  0.0   0:00.00 kworker/0:0H
...
```

TIP: Advanced users can view individual processes using variations of the `ps` command (e.g., `ps -ax | grep <process name>`)

show processes memory

This command displays the current memory usage by processes. This command uses linux's "top -bn 1 -o %MEM" command to display the output.

- Usage:

```
show processes memory
```

NOTE that pipe option can be used using " | head -n" to display only the "n" number of lines

- Example:

```
admin@sonic:~$ show processes memory
top - 23:41:24 up 7 days, 39 min,  2 users,  load average: 1.21, 1.19, 1.18
Tasks: 191 total,   2 running, 189 sleeping,   0 stopped,   0 zombie
%Cpu(s):  2.8 us, 20.7 sy,  0.0 ni, 76.3 id,  0.0 wa,  0.0 hi,  0.2 si,  0.0 st
KiB Mem :  8162264 total,  5720412 free,   945516 used,  1496336 buff/cache
KiB Swap:        0 total,        0 free,        0 used.  6855632 avail Mem

  PID USER      PR  NI    VIRT    RES    SHR S  %CPU %MEM     TIME+ COMMAND
18051 root      20   0  851540 274784   8344 S   0.0  3.4   0:02.77 syncd
17760 root      20   0 1293428 259212  58732 S   5.9  3.2  96:46.22 syncd
  508 root      20   0  725364  76244  38220 S   0.0  0.9   4:54.49 dockerd
30853 root      20   0   96348  56824   7880 S   0.0  0.7   0:00.98 show
17266 root      20   0  509876  49772  30640 S   0.0  0.6   0:06.36 docker
24891 admin     20   0  515864  49560  30644 S   0.0  0.6   0:05.54 docker
17643 admin     20   0  575668  49428  30628 S   0.0  0.6   0:06.29 docker
23885 admin     20   0  369552  49344  30840 S   0.0  0.6   0:05.57 docker
18055 root      20   0  509076  49260  30296 S   0.0  0.6   0:06.36 docker
17268 root      20   0  371120  49052  30372 S   0.0  0.6   0:06.45 docker
 1227 root      20   0  443284  48640  30100 S   0.0  0.6   0:41.91 docker
23785 admin     20   0  443796  48552  30128 S   0.0  0.6   0:05.58 docker
17820 admin     20   0  435088  48144  29480 S   0.0  0.6   0:06.33 docker
  506 root      20   0 1151040  43140  23964 S   0.0  0.5   8:51.08 containerd
18437 root      20   0   84852  26388   7380 S   0.0  0.3  65:59.76 python3.6
```

show processes summary

This command displays the current summary information about all the processes

- Usage:

```
show processes summary
```

- Example:

```
admin@sonic:~$ show processes summary
PID  PPID CMD                         %MEM %CPU
1       0 /sbin/init                    0.0  0.0
2       0 [kthreadd]                    0.0  0.0
3       2 [ksoftirqd/0]                 0.0  0.0
5       2 [kworker/0:0H]                0.0  0.0
...
```

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Services & Memory & Storage

These commands are used to know the services that are running and the memory that is utilized currently.

show services

This command displays the state of all the SONiC processes running inside a docker container. This helps to identify the status of SONiC's critical processes.

- Usage:

```
show services
```

- Example:

```
admin@sonic:~$ show services
dhcp_relay      docker
---------------------------
UID        PID  PPID  C STIME TTY          TIME CMD
root         1     0  0 05:26 ?        00:00:12 /usr/bin/python /usr/bin/supervi
root        24     1  0 05:26 ?        00:00:00 /usr/sbin/rsyslogd -n

nat     docker
---------------------------
USER       PID PPID  C STIME TTY          TIME CMD
root         1    0  0 05:26 ?        00:00:12 /usr/bin/python /usr/bin/supervisord
root        18    1  0 05:26 ?        00:00:00 /usr/sbin/rsyslogd -n
root        23    1  0 05:26 ?        00:00:01 /usr/bin/natmgrd
root        34    1  0 05:26 ?        00:00:00 /usr/bin/natsyncd

snmp    docker
---------------------------
UID        PID  PPID  C STIME TTY          TIME CMD
root         1     0  0 05:26 ?        00:00:16 /usr/bin/python /usr/bin/supervi
root        24     1  0 05:26 ?        00:00:02 /usr/sbin/rsyslogd -n
Debian-+    29     1  0 05:26 ?        00:00:04 /usr/sbin/snmpd -f -LS4d -u Debi
root        31     1  1 05:26 ?        00:15:10 python3.6 -m sonic_ax_impl

syncd   docker
---------------------------
UID        PID  PPID  C STIME TTY          TIME CMD
root         1     0  0 05:26 ?        00:00:13 /usr/bin/python /usr/bin/supervi
root        12     1  0 05:26 ?        00:00:00 /usr/sbin/rsyslogd -n
root        17     1  0 05:26 ?        00:00:00 /usr/bin/dsserve /usr/bin/syncd
root        27    17 22 05:26 ?        04:09:30 /usr/bin/syncd --diag -p /usr/sh
root        51    27  0 05:26 ?        00:00:01 /usr/bin/syncd --diag -p /usr/sh

swss    docker
---------------------------
UID        PID  PPID  C STIME TTY          TIME CMD
root         1     0  0 05:26 ?        00:00:29 /usr/bin/python /usr/bin/supervi
root        25     1  0 05:26 ?        00:00:00 /usr/sbin/rsyslogd -n
root        30     1  0 05:26 ?        00:00:13 /usr/bin/orchagent -d /var/log/s
root        42     1  1 05:26 ?        00:12:40 /usr/bin/portsyncd -p /usr/share
root        45     1  0 05:26 ?        00:00:00 /usr/bin/intfsyncd
root        48     1  0 05:26 ?        00:00:03 /usr/bin/neighsyncd
root        59     1  0 05:26 ?        00:00:01 /usr/bin/vlanmgrd
root        92     1  0 05:26 ?        00:00:01 /usr/bin/intfmgrd
root      3606     1  0 23:36 ?        00:00:00 bash -c /usr/bin/arp_update; sle
root      3621  3606  0 23:36 ?        00:00:00 sleep 300

...
```

show system-memory

This command displays the system-wide memory utilization information – just a wrapper over linux native “free” command

- Usage:

```
show system-memory
```

- Example:

```
admin@sonic:~$ show system-memory
Command: free -m -h
             total       used       free     shared    buffers     cached
Mem:          3.9G       2.0G       1.8G        33M       324M       791M
-/+ buffers/cache:       951M       2.9G
Swap:           0B         0B         0B
```

show system-storage

This command displays storage usage of the device.

- Usage:

```
show system-storage
```

- Example:

```
admin@sonic:~$ show system-storage
Filesystem      Size  Used Avail Use% Mounted on
udev            3.9G     0  3.9G   0% /dev
tmpfs           785M   15M  770M   2% /run
root-overlay     32G  6.1G   24G  21% /
/dev/sda3        32G  6.1G   24G  21% /host
/dev/loop1      3.9G  335M  3.4G   9% /var/log
tmpfs           3.9G     0  3.9G   0% /dev/shm
tmpfs           5.0M     0  5.0M   0% /run/lock
tmpfs           4.0M     0  4.0M   0% /sys/fs/cgroup
overlay          32G  6.1G   24G  21% /var/lib/docker/overlay2/7286b36addf78df670ebe51207156d4f62c7e948258ec
...
admin@sonic:~$
```

show mmu

This command displays virtual address to the physical address translation status of the Memory Management Unit (MMU).

- Usage:

```
show mmu
```

- Example:

```
admin@sonic:~$ show mmu
Pool: ingress_lossless_pool
----  --------
xoff  4194112
type  ingress
mode  dynamic
size  10875072
----  --------

Pool: egress_lossless_pool
----  --------
type  egress
mode  static
size  15982720
----  --------

Pool: egress_lossy_pool
----  -------
type  egress
mode  dynamic
size  9243812
----  -------

Profile: egress_lossy_profile
----------  -------------------------------
dynamic_th  3
pool        [BUFFER_POOL|egress_lossy_pool]
size        1518
----------  -------------------------------

Profile: pg_lossless_100000_300m_profile
----------  ----------------------------------
xon_offset  2288
dynamic_th  -3
xon         2288
xoff        268736
pool        [BUFFER_POOL|ingress_lossless_pool]
size        1248
----------  ----------------------------------

Profile: egress_lossless_profile
---------  ---------------------------------
static_th  3995680
pool       [BUFFER_POOL|egress_lossless_pool]
size       1518
---------  ---------------------------------

Profile: pg_lossless_100000_40m_profile
----------  ----------------------------------
xon_offset  2288
dynamic_th  -3
```

```
xon          2288
xoff         177632
pool         [BUFFER_POOL|ingress_lossless_pool]
size         1248
----------   ----------------------------------

Profile: ingress_lossy_profile
----------   ----------------------------------
dynamic_th   3
pool         [BUFFER_POOL|ingress_lossless_pool]
size         0
----------   ----------------------------------

Profile: pg_lossless_40000_40m_profile
----------   ----------------------------------
xon_offset   2288
dynamic_th   -3
xon          2288
xoff         71552
pool         [BUFFER_POOL|ingress_lossless_pool]
size         1248
----------   ----------------------------------
```

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System-Health

These commands are used to monitor the system current running services and hardware state.

show system-health summary

This command displays the current status of 'Services' and 'Hardware' under monitoring.
If any of the elements under each of these two sections is 'Not OK' a proper message will appear under the relevant section.

- Usage:

```
show system-health summary
```

- Example:

```
admin@sonic:~$ show system-health summary
System status summary

System status LED  red
Services:
  Status: Not OK
  Not Running: 'telemetry', 'sflowmgrd'
Hardware:
  Status: OK


admin@sonic:~$ show system-health summary
System status summary

System status LED  green
Services:
  Status: OK
Hardware:
  Status: OK
```

show system-health monitor-list

This command displays a list of all current 'Services' and 'Hardware' being monitored, their status and type.

- Usage:

  ```
  show system-health monitor-list
  ```

- Example:

```
admin@sonic:~$ show system-health monitor-list
System services and devices monitor list

Name            Status    Type
--------------  --------  ----------
telemetry       Not OK    Process
orchagent       Not OK    Process
neighsyncd      OK        Process
vrfmgrd         OK        Process
dialout_client  OK        Process
zebra           OK        Process
rsyslog         OK        Process
snmpd           OK        Process
redis_server    OK        Process
intfmgrd        OK        Process
vxlanmgrd       OK        Process
lldpd_monitor   OK        Process
portsyncd       OK        Process
var-log         OK        Filesystem
lldpmgrd        OK        Process
syncd           OK        Process
sonic           OK        System
buffermgrd      OK        Process
portmgrd        OK        Process
staticd         OK        Process
bgpd            OK        Process
lldp_syncd      OK        Process
bgpcfgd         OK        Process
snmp_subagent   OK        Process
root-overlay    OK        Filesystem
fpmsyncd        OK        Process
sflowmgrd       OK        Process
vlanmgrd        OK        Process
nbrmgrd         OK        Process
PSU 2           OK        PSU
psu_1_fan_1     OK        Fan
psu_2_fan_1     OK        Fan
fan11           OK        Fan
fan10           OK        Fan
fan12           OK        Fan
ASIC            OK        ASIC
fan1            OK        Fan
PSU 1           OK        PSU
fan3            OK        Fan
fan2            OK        Fan
fan5            OK        Fan
fan4            OK        Fan
fan7            OK        Fan
fan6            OK        Fan
```

```
fan9            OK          Fan
fan8            OK          Fan
```

show system-health detail

This command displays the current status of 'Services' and 'Hardware' under monitoring.
If any of the elements under each of these two sections is 'Not OK' a proper message will appear under the relevant section.
In addition, displays a list of all current 'Services' and 'Hardware' being monitored and a list of ignored elements.

- Usage:

```
show system-health detail
```

- Example:

```
admin@sonic:~$ show system-health detail
System status summary

System status LED  red
Services:
  Status: Not OK
  Not Running: 'telemetry', 'orchagent'
Hardware:
  Status: OK

System services and devices monitor list

Name             Status    Type
---------------  --------  ----------
telemetry        Not OK    Process
orchagent        Not OK    Process
neighsyncd       OK        Process
vrfmgrd          OK        Process
dialout_client   OK        Process
zebra            OK        Process
rsyslog          OK        Process
snmpd            OK        Process
redis_server     OK        Process
intfmgrd         OK        Process
vxlanmgrd        OK        Process
lldpd_monitor    OK        Process
portsyncd        OK        Process
var-log          OK        Filesystem
lldpmgrd         OK        Process
syncd            OK        Process
sonic            OK        System
buffermgrd       OK        Process
portmgrd         OK        Process
staticd          OK        Process
bgpd             OK        Process
lldp_syncd       OK        Process
bgpcfgd          OK        Process
snmp_subagent    OK        Process
root-overlay     OK        Filesystem
fpmsyncd         OK        Process
sflowmgrd        OK        Process
vlanmgrd         OK        Process
nbrmgrd          OK        Process
PSU 2            OK        PSU
psu_1_fan_1      OK        Fan
psu_2_fan_1      OK        Fan
fan11            OK        Fan
fan10            OK        Fan
fan12            OK        Fan
ASIC             OK        ASIC
fan1             OK        Fan
```

```
PSU 1           OK        PSU
fan3            OK        Fan
fan2            OK        Fan
fan5            OK        Fan
fan4            OK        Fan
fan7            OK        Fan
fan6            OK        Fan
fan9            OK        Fan
fan8            OK        Fan

System services and devices ignore list

Name         Status    Type
-----------  --------  ------
psu.voltage  Ignored   Device
```

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VLAN & FDB

VLAN

VLAN show commands

show vlan brief

This command displays brief information about all the vlans configured in the device. It displays the vlan ID, IP address (if configured for the vlan), list of vlan member ports, whether the port is tagged or in untagged mode, the DHCP Helper Address, and the proxy ARP status

- Usage:

```
show vlan brief
```

- Example:

```
admin@sonic:~$ show vlan brief

+-----------+--------------+-----------+----------------+-----------------------+-------------+
|   VLAN ID | IP Address   | Ports     | Port Tagging   | DHCP Helper Address   | Proxy ARP   |
+===========+==============+===========+================+=======================+=============+
|       100 | 1.1.2.2/16   | Ethernet0 | tagged         | 192.0.0.1             | disabled    |
|           |              | Ethernet4 | tagged         | 192.0.0.2             |             |
|           |              |           |                | 192.0.0.3             |             |
+-----------+--------------+-----------+----------------+-----------------------+-------------+
```

show vlan config

This command displays all the vlan configuration.

- Usage:

```
show vlan config
```

- Example:

```
admin@sonic:~$ show vlan config
Name       VID  Member     Mode
-------  -----  ---------  ------
Vlan100    100  Ethernet0  tagged
Vlan100    100  Ethernet4  tagged
```

VLAN Config commands

This sub-section explains how to configure the vlan and its member ports.

config vlan add/del

This command is used to add or delete the vlan.

- Usage:

```
config vlan (add | del) <vlan_id>
```

- Example (Create the VLAN "Vlan100" if it does not already exist):

```
admin@sonic:~$ sudo config vlan add 100
```

config vlan member add/del

This command is to add or delete a member port into the already created vlan.

- Usage:

```
config vlan member add/del [-u|--untagged] <vlan_id> <member_portname>
```

NOTE: Adding the -u or --untagged flag will set the member in "untagged" mode

- Example:

```
admin@sonic:~$ sudo config vlan member add 100 Ethernet0
This command will add Ethernet0 as member of the vlan 100

admin@sonic:~$ sudo config vlan member add 100 Ethernet4
This command will add Ethernet4 as member of the vlan 100.
```

config proxy_arp enabled/disabled

This command is used to enable or disable proxy ARP for a VLAN interface

- Usage:

```
config vlan proxy_arp <vlan_id> enabled/disabled
```

- Example:

```
admin@sonic:~$ sudo config vlan proxy_arp 1000 enabled
This command will enable proxy ARP for the interface 'Vlan1000'
```

config mac

This command is used to configure mac for a VLAN interface

- Usage:

```
config vlan mac <vlan_id> <mac address | default>
```

- Example:

```
admin@sonic:~$ sudo config vlan mac 100 00:77:cc:12:34:
admin@sonic:~$ sudo config vlan mac 100 default
```

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FDB

FDB show commands

show mac

This command displays the MAC (FDB) entries either in full or partial as given below.

1. show mac - displays the full table
2. show mac -v - displays the MACs learnt on the particular VLAN ID.
3. show mac -p - displays the MACs learnt on the particular port.

4. show mac -a - display the MACs that match a specific mac-address
5. show mac -t - display the MACs that match a specific type (static/dynamic)
6. show mac -c - display the count of MAC addresses

To show the default MAC address aging time on the switch.

- Usage:

```
show mac [-v <vlan_id>] [-p <port_name>] [-a <mac_address>] [-t <type>] [-c]
```

- Example:

```
admin@sonic:~$ show mac
No.    Vlan  MacAddress         Port           Type
-----  ------  -----------------  -----------  -------
  1    1000  E2:8C:56:85:4A:CD  Ethernet192    Dynamic
  2    1000  A0:1B:5E:47:C9:76  Ethernet192    Dynamic
  3    1000  AA:54:EF:2C:EE:30  Ethernet192    Dynamic
  4    1000  A4:3F:F2:17:A3:FC  Ethernet192    Dynamic
  5    1000  0C:FC:01:72:29:91  Ethernet192    Dynamic
  6    1000  48:6D:01:7E:C9:FD  Ethernet192    Dynamic
  7    1000  1C:6B:7E:34:5F:A6  Ethernet192    Dynamic
  8    1000  EE:81:D9:7B:93:A9  Ethernet192    Dynamic
  9    1000  CC:F8:8D:BB:85:E2  Ethernet192    Dynamic
 10    1000  0A:52:B3:9C:FB:6C  Ethernet192    Dynamic
 11    1000  C6:E2:72:02:D1:23  Ethernet192    Dynamic
 12    1000  8A:C9:5C:25:E9:28  Ethernet192    Dynamic
 13    1000  5E:CD:34:E4:94:18  Ethernet192    Dynamic
 14    1000  7E:49:1F:B5:91:B5  Ethernet192    Dynamic
 15    1000  AE:DD:67:F3:09:5A  Ethernet192    Dynamic
 16    1000  DC:2F:D1:08:4B:DE  Ethernet192    Dynamic
 17    1000  50:96:23:AD:F1:65  Ethernet192    Static
 18    1000  C6:C9:5E:AE:24:42  Ethernet192    Static
Total number of entries 18
```

Optionally, you can specify a VLAN ID or interface name or type or mac-address in order to display only that particular entries

- Examples:

```
admin@sonic:~$ show mac -v 1000
No.    Vlan  MacAddress         Port           Type
-----  ------  -----------------  -----------  -------
  1    1000  E2:8C:56:85:4A:CD  Ethernet192    Dynamic
  2    1000  A0:1B:5E:47:C9:76  Ethernet192    Dynamic
  3    1000  AA:54:EF:2C:EE:30  Ethernet192    Dynamic
  4    1000  A4:3F:F2:17:A3:FC  Ethernet192    Dynamic
  5    1000  0C:FC:01:72:29:91  Ethernet192    Dynamic
  6    1000  48:6D:01:7E:C9:FD  Ethernet192    Dynamic
  7    1000  1C:6B:7E:34:5F:A6  Ethernet192    Dynamic
  8    1000  EE:81:D9:7B:93:A9  Ethernet192    Dynamic
  9    1000  CC:F8:8D:BB:85:E2  Ethernet192    Dynamic
 10    1000  0A:52:B3:9C:FB:6C  Ethernet192    Dynamic
 11    1000  C6:E2:72:02:D1:23  Ethernet192    Dynamic
 12    1000  8A:C9:5C:25:E9:28  Ethernet192    Dynamic
 13    1000  5E:CD:34:E4:94:18  Ethernet192    Dynamic
 14    1000  7E:49:1F:B5:91:B5  Ethernet192    Dynamic
 15    1000  AE:DD:67:F3:09:5A  Ethernet192    Dynamic
 16    1000  DC:2F:D1:08:4B:DE  Ethernet192    Dynamic
 17    1000  50:96:23:AD:F1:65  Ethernet192    Static
 18    1000  C6:C9:5E:AE:24:42  Ethernet192    Static
Total number of entries 18


admin@sonic:~$ show mac -p Ethernet192
No.    Vlan  MacAddress         Port           Type
-----  ------  -----------------  -----------  -------
  1    1000  E2:8C:56:85:4A:CD  Ethernet192    Dynamic
  2    1000  A0:1B:5E:47:C9:76  Ethernet192    Dynamic
  3    1000  AA:54:EF:2C:EE:30  Ethernet192    Dynamic
  4    1000  A4:3F:F2:17:A3:FC  Ethernet192    Dynamic
  5    1000  0C:FC:01:72:29:91  Ethernet192    Dynamic
  6    1000  48:6D:01:7E:C9:FD  Ethernet192    Dynamic
  7    1000  1C:6B:7E:34:5F:A6  Ethernet192    Dynamic
  8    1000  EE:81:D9:7B:93:A9  Ethernet192    Dynamic
  9    1000  CC:F8:8D:BB:85:E2  Ethernet192    Dynamic
 10    1000  0A:52:B3:9C:FB:6C  Ethernet192    Dynamic
 11    1000  C6:E2:72:02:D1:23  Ethernet192    Dynamic
 12    1000  8A:C9:5C:25:E9:28  Ethernet192    Dynamic
 13    1000  5E:CD:34:E4:94:18  Ethernet192    Dynamic
 14    1000  7E:49:1F:B5:91:B5  Ethernet192    Dynamic
 15    1000  AE:DD:67:F3:09:5A  Ethernet192    Dynamic
 16    1000  DC:2F:D1:08:4B:DE  Ethernet192    Dynamic
 17    1000  50:96:23:AD:F1:65  Ethernet192    Static
 18    1000  C6:C9:5E:AE:24:42  Ethernet192    Static
Total number of entries 18
```

```
admin@sonic:~$ show mac -a E2:8C:56:85:4A:CD
No.    Vlan  MacAddress         Port           Type
-----  ------  -----------------  -----------  -------
  1    1000  E2:8C:56:85:4A:CD  Ethernet192    Dynamic
Total number of entries 1


admin@sonic:~$ show mac -t Static
No.    Vlan  MacAddress         Port           Type
-----  ------  -----------------  -----------  -------
  2    1000  50:96:23:AD:F1:65  Ethernet192    Static
  2    1000  C6:C9:5E:AE:24:42  Ethernet192    Static
Total number of entries 2


admin@sonic:~$ show mac -c
Total number of entries 18
```

show mac aging-time

This command displays the default mac aging time on the switch

```
admin@sonic:~$ show mac aging-time
Aging time for switch is 600 seconds
```

sonic-clear fdb all

Clear the FDB table

- Usage:

  ```
  sonic-clear fdb all
  ```

- Example:

  ```
  admin@sonic:~$ sonic-clear fdb all
  FDB entries are cleared.
  ```

FDB config commands

config mac (add | del) <mac_addr> (Versions >= 202111)

This command is used to add static fdb.

- Usage:

```
config mac --help
  config mac [OPTIONS] COMMAND [ARGS]...

mac-related configuration tasks

Options:
  -?, -h, --help  Show this message and exit.

Commands:
  add         add static FDB entry
  aging-time  config FDB aging-time
  del         remove static FDB entry
```

- Example:

```
admin@sonic:~$ sudo config mac add 1 00:11:11:11:11:11 Ethernet55
admin@sonic:~$ sudo config mac del 1 00:11:11:11:11:11
```

config mac aging-time (Versions >= 202111)

This command is used to set fdb ageing out time.

- Usage:

```
config mac --help
  config mac [OPTIONS] COMMAND [ARGS]...

mac-related configuration tasks

Options:
  -?, -h, --help  Show this message and exit.

Commands:
  aging-time  config FDB aging-time
```

- Example:

```
admin@sonic:~$ sudo config mac aging-time 300
```

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Monitor_link

Monitor_link show commands

show monitor-link all

This command displays the interfaces monitor link group configuration.

- Usage:

```
Show monitor-link

Options:
  -h, -?, --help  Show this message and exit.

Commands:
  all
```

- Example:

```
admin@sonic:~$ show monitor-link all
Monitor Link Group Configure
+------------+----------+------------+----------------+
|   group id | is_use   |   up_delay |   up_threshold |
+============+==========+============+================+
|          1 | true     |        100 |              1 |
+------------+----------+------------+----------------+
Monitor Link Ports Configure
+------------+-------------+----------+
|   group id | port name   | type     |
+============+=============+==========+
|          1 | Ethernet12  | uplink   |
+------------+-------------+----------+
|          1 | Ethernet13  | downlink |
+------------+-------------+----------+
```

Monitor_link config commands

config monitor-link group (Versions >= 202111)

This command is used to set monitor group.

- Usage:

```
config monitor-link group --help
set group

Options:
  -?, -h, --help  Show this message and exit.

Commands:
  add  add monitor link group
  del  del monitor link group
```

- Example:

```
admin@sonic:~$ sudo config monitor-link group add 1
admin@sonic:~$ sudo config monitor-link group del 1
```

config monitor-link (enable | disable) (Versions >= 202111)

This command is used to enable monitor group.

- Usage:

```
config monitor-link --help
MONITRO-LINK-related configuration tasks

Options:
  -h, -?, --help  Show this message and exit.

Commands:
  disable       disable group
  enable        enable group
```

- Example:

```
admin@sonic:~$ sudo config monitor-link disable 1
admin@sonic:~$ sudo config monitor-link enable 1
```

config monitor-link (uplink | downlink) (Versions >= 202111)

This command is used to set monitor uplink or downlink interface.

- Usage:

```
config monitor-link --help
MONITRO-LINK-related configuration tasks

Options:
  -h, -?, --help  Show this message and exit.

Commands:
  downlink      set group downlink interface
  uplink        set group uplink interface
```

- Example:

```
admin@sonic:~$ sudo config monitor-link uplink add 1 Ethernet12
admin@sonic:~$ sudo config monitor-link downlink add 1 Ethernet13
```

config monitor-link up-delay <grp_id> (Versions >= 202111)

This command is used to set monitor downlink interface up delay.

- Usage:

```
config monitor-link --help
MONITRO-LINK-related configuration tasks

Options:
  -h, -?, --help  Show this message and exit.

Commands:
  up-delay      set up-delay
```

- Example:

```
admin@sonic:~$ sudo config monitor-link up-delay 1 100
```

config monitor-link up-threshold <grp_id> <num_threshold> (Versions >= 202111)

This command is used to set monitor downlink interface up threshold.

- Usage:

```
config monitor-link --help
MONITRO-LINK-related configuration tasks

Options:
  -h, -?, --help  Show this message and exit.

Commands:
  up-threshold  set up-threshold
```

- Example:

```
admin@sonic:~$ sudo config monitor-link up-threshold 1 1
```

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Mclag

Mclag show commands

show mclag config

This command displays the Mclag configuration.

- Usage:

```
Show mclag config information

Options:
  -?, -h, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ show mclag config
domain id: 1
Local ip: 10.10.10.10
Peer ip: 20.20.20.20
Peer link:
Mclag interfaces: PortChannel30
Keepactive interval: 1
Session timeout: 15
```

show mclag summary

This command displays the Mclag summary.

- Usage:

```
Show mclag summary information

Options:
  -?, -h, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ show mclag summary
The MCLAG's keepalive is: OK
MCLAG info sync is: complete
Domain id: 1
Local Ip: 10.10.10.10
Peer Ip: 20.20.20.20
Peer Link Interface: PortChannel20
Keepalive time: 1
sesssion Timeout : 15
Peer Link Mac: 58:69:6c:fb:22:08
Role: Standby
MCLAG Interface: PortChannel30
Loglevel: NOTICE
```

Mclag config commands

config mclag (Versions >= 202111)

This command is used to set mclag.

- Usage:

```
config mclag --help
Usage: config mclag [OPTIONS] COMMAND [ARGS]...

Options:
  -?, -h, --help  Show this message and exit.

Commands:
  add                 Add MCLAG Domain
  del                 Delete MCLAG Domain
```

- Example:

```
admin@sonic:~$ sudo config mclag add 1 10.10.10.10 20.20.20.20 PortChannel20
admin@sonic:~$ sudo config mclag del 1
```

config mclag member (Versions >= 202111)

This command is used to set mclag interfaces.

- Usage:

```
config mclag --help
Usage: config mclag [OPTIONS] COMMAND [ARGS]...

Options:
  -?, -h, --help  Show this message and exit.

Commands:
  member
```

- Example:

```
admin@sonic:~$ sudo config mclag member add 1 PortChannel30
```

config mclag (keepalive-interval | session-timeout) (Versions >= 202111)

This command is used to set mclag keepalive time and session timeout.

- Usage:

```
config mclag --help
Usage: config mclag [OPTIONS] COMMAND [ARGS]...

Options:
  -?, -h, --help  Show this message and exit.

Commands:
  keepalive-interval  Configure MCLAG Keepalive timer value in secs
  session-timeout     Configure MCLAG Session timeout value in secs
```

- Example:

```
admin@sonic:~$ sudo config mclag session-timeout 1 30
admin@sonic:~$ sudo config mclag keepalive-interval 1 10
```

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VxLAN & Vnet

VxLAN

VxLAN show commands

show vxlan tunnel

This command displays brief information about all the vxlans configured in the device. It displays the vxlan tunnel name, source IP address, destination IP address (if configured), tunnel map name and mapping.

- Usage:

```
show vxlan tunnel
```

- Example:

```
admin@sonic:~$ show vxlan tunnel
vxlan tunnel name    source ip    destination ip    tunnel map name    tunnel map mapping(vni -> vlan)
-------------------  -----------  ----------------  -----------------  ---------------------------------
tunnel1              10.10.10.10
tunnel2              10.10.10.10  20.10.10.10       tmap1              1234 -> 100
tunnel3              10.10.10.10  30.10.10.10       tmap2              1235 -> 200
```

show vxlan name <vxlan_name>

This command displays <vlan_name> configuration.

- Usage:

```
show vxlan name <vxlan_name>
```

- Example:

```
admin@sonic:~$ show vxlan name tunnel3
vxlan tunnel name    source ip    destination ip    tunnel map name    tunnel map mapping(vni -> vlan)
-------------------  -----------  ----------------  -----------------  --------------------------------
tunnel3              10.10.10.10  30.10.10.10       tmap2              1235 -> 200
```

show vxlan interface

This command displays Vxlan VTEP Information

- Usage:

```
show vxlan interface
```

- Example:

```
admin@sonic:~$ show vxlan interface
VTEP Information:

      VTEP Name : vtep1, SIP  : 2.0.0.1
      NVO Name  : nvo,  VTEP : vtep1
      Source interface  : Loopback1
      Remote neigh learn: True
      Tunnel counting   : True, Period : 1000
      VNI counting      : True, Period : 1000
```

show vxlan vlanvnimap

This command displays VLAN VNI Mapping Information

- Usage:

```
show vxlan vlanvnimap
```

- Example:

```
admin@sonic:~$ show vxlan vlanvnimap
+--------+--------+
| VLAN   |    VNI |
+========+========+
| Vlan11 | 100011 |
+--------+--------+
| Vlan12 | 100012 |
+--------+--------+
Total count : 2
```

show vxlan vrfvnimap

This command displays VLAN VNI Mapping Information

- Usage:

```
show vxlan vrfvnimap
```

- Example:

```
admin@sonic:~$ show vxlan vrfvnimap
+-------+---------+
| VRF   |   VNI   |
+=======+=========+
| Vrf1  |  100011 |
+-------+---------+
Total count : 1
```

show vxlan remotevtep

This command displays All Remote VTEP Information

- Usage:

```
show vxlan remotevtep
```

- Example:

```
admin@sonic:~$ show vxlan remotevtep
+---------+---------+-------------------+--------------+
| SIP     | DIP     | Creation Source   | OperStatus   |
+=========+=========+===================+==============+
| 1.0.0.1 | 2.0.0.1 | EVPN              | oper_up      |
+---------+---------+-------------------+--------------+
Total count : 1
```

show vxlan remotemac [vtep-ip |all]

This command displays MACs pointing to the remote VTEP

- Usage:

```
show vxlan remotemac
```

- Example:

```
admin@sonic:~$ show vxlan remotemac all
+--------+-------------------+--------------+--------+---------+
| VLAN   | MAC               | RemoteVTEP   |    VNI | Type    |
+========+===================+==============+========+=========+
| Vlan11 | 00:00:00:12:30:10 | 2.0.0.1      | 100011 | dynamic |
+--------+-------------------+--------------+--------+---------+
Total count : 1

admin@sonic:~$ show vxlan remotemac 2.0.0.1
+--------+-------------------+--------------+--------+---------+
| VLAN   | MAC               | RemoteVTEP   |    VNI | Type    |
+========+===================+==============+========+=========+
| Vlan11 | 00:00:00:12:30:10 | 2.0.0.1      | 100011 | dynamic |
+--------+-------------------+--------------+--------+---------+
Total count : 1
```

show vxlan remotevni [vtep-ip |all]

This command displays Vlans extended to the remote VTEP

- Usage:

```
show vxlan remotevni
```

- Example:

```
admin@sonic:~$ show vxlan remotevni all
+--------+--------------+-----------+
| VLAN   | RemoteVTEP   |   VNI     |
+========+==============+===========+
| Vlan11 | 2.0.0.1      |    100011 |
+--------+--------------+-----------+
Total count : 1

admin@sonic:~$ show vxlan remotevni 2.0.0.1
+--------+--------------+-----------+
| VLAN   | RemoteVTEP   |   VNI     |
+========+==============+===========+
| Vlan11 | 2.0.0.1      |    100011 |
+--------+--------------+-----------+
Total count : 1
```

show vxlan tunnelcounters

This command displays VXLAN tunnel counters

- Usage:

```
show vxlan tunnelcounters
```

- Example:

```
admin@sonic:~$ show vxlan tunnelcounters
 Tunnel        RX_PKTS  RX_BYTES  RX_PPS   RX_BPS  TX_PKTS  TX_BYTES  TX_PPS   TX_BPS
------------  --------  --------  ------  -------  -------  --------  ------  -------
EVPN_2.0.0.1     1234   1512034    10/s   1.1KB/s    2234   2235235    23/s  2.2KB/s
EVPN_3.2.3.2     2344    162034    15/s   1.5KB/s     200     55235     2/s  0.2KB/s
```

show vxlan vnicounters

This command displays VXLAN vni counters

- Usage:

```
show vxlan tunnelcounters
```

- Example:

```
admin@sonic:~$ show vxlan vnicounters
 VNI      RX_PKTS  RX_BYTES  RX_PPS   RX_BPS  TX_PKTS  TX_BYTES  TX_PPS   TX_BPS
--------  --------  --------  ------  -------  -------  --------  ------  -------
 100010      1234   1512034    10/s   1.1KB/s     2234   2235235    23/s  2.2KB/s
```

show vxlan mac-capacity

This command displays the size of the dynamic MAC learning capability of VNI

- Usage:

```
show vxlan mac-capacity
```

- Example:

```
admin@sonic:~$ show vxlan mac-capacity
+--------+----------------+
| VNI    | mac-capacity   |
+========+================+
| 100011 |  100           |
+--------+----------------+
Total count : 1
```

show vxlan mac-capacity

This command displays filters MAC entries of VNI

- Usage:

```
show vxlan mac-filter
```

- Example:

```
admin@sonic:~$ show vxlan mac-filter
+---------+----------------------+
| VNI     | filter-mac           |
+=========+======================+
|  100011 | 00:00:00:00:00:22:22 |
+---------+----------------------+
Total count : 1
```

show vxlan storm-control

This command displays storm control entries of VNI

- Usage:

```
show vxlan storm-control [OPTIONS] [VNID]

"show vxlan storm-control <xx <xx : vni id>>

Options:
-?, -h, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ show vxlan storm-control
 VNI    Broadcast Control    Multicast Control    Unicast Control
------  -------------------  -------------------  -----------------
100011           10000  pps           10000  pps          1000  pps
100012              60    %              50    %         10000 kbps
admin@sonic:~$ show vxlan storm-control  100011
 VNI    Broadcast Control    Multicast Control    Unicast Control
------  -------------------  -------------------  -----------------
100011           10000  pps           10000  pps          1000  pps
```

VxLAN config commands

config vxlan add/del <vtep_name> <vtep_ip>

This command is used to Add a VXLAN instance

- Usage:

```
config vxlan add [OPTIONS] <vxlan_name> <src_ip>
  Add VXLAN
Options:
  -h, -?, --help  Show this message and exit.
```

- Example:

```
 admin@sonic:~$ sudo config vxlan add vtep1 1.0.0.1
 admin@sonic:~$ sudo config vxlan del vtep1
```

config vxlan evpn_nvo add nvo <vtep_name>

This command is used to open EVPN enable

- Usage:

```
config vxlan evpn_nvo [OPTIONS] COMMAND [ARGS]...

Options:
 -?, -h, --help  Show this message and exit.

Commands:
 add  Add NVO
 del  Del NVO
```

- Example:

```
admin@sonic:~$ sudo config vxlan evpn_nvo add nvo vtep1
admin@sonic:~$ sudo config vxlan evpn_nvo del nvo
```

config vxlan map <add|del> <vtep_name> <vlan_id>

This command is used to vlan vni map

- Usage:

```
config vxlan map [OPTIONS] COMMAND [ARGS]...

Options:
  -h, -?, --help  Show this message and exit.

Commands:
  add  Add VLAN-VNI map entry
  del  Del VLAN-VNI map entry
```

- Example:

```
admin@sonic:~$ sudo config vxlan map add vtep1 11 100011
admin@sonic:~$ sudo config vxlan map del vtep1 11 100011
```

config vxlan mac capacity <add|del> <capacity_number>

This command is used to configure the size of VNI-based mac entry learning

- Usage:

```
config vxlan mac capacity [OPTIONS] <oper> <vni> <capacity_number>
add/del Vxlan mac capacity

Options:
  -h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config vxlan mac capacity add 100011 100
admin@sonic:~$ sudo config vxlan mac capacity del 100011 100
```

config vxlan mac filter <add|del> <mac_address>

This command is used to configure the filtering mac entries of VNI-based

- Usage:

```
config vxlan mac filter [OPTIONS] <oper> <vni> <mac_address>
add/del Vxlan filter mac

Options:
  -h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config vxlan mac filter add 100011 00:00:00:10:10:10
admin@sonic:~$ sudo config vxlan mac filter del 100011 00:00:00:10:10:10
```

config vxlan remote-neigh-learn <vtep_name> <enable|disable>

This command is used to Configure the ability to remote learning

- Usage:

```
config vxlan remote-neigh-learn [OPTIONS] <vtep_name> <learn_mode>
config vxlan remote-neigh-learn vtep_name enable/disable

Options:
  -?, -h, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config vxlan remote-neigh-learn enable
admin@sonic:~$ sudo config vxlan remote-neigh-learn disable
```

config vxlan storm-control <add|del> <unicast|broadcast|multicast> <pps pps-value|kbps kbps-value|level level-value>

This command is used to Configure traffic storm control of VNI-based.

- Usage:

```
config vxlan storm-control [OPTIONS] <add|del> <vni>
                                <unicast|broadcast|multicast>
                                <pps|kbps|level>
                                <<2-476190000>|<64-240000000>|<1-100>>

Vxlan storm-control

Options:
-h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config vxlan storm-control add 100011 unicast pps 1000
admin@sonic:~$ sudo config vxlan storm-control del 100011 unicast pps 1000
```

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Vnet

Vnet show commands

show vnet brief

This command displays brief information about all the vnets configured in the device. It displays the vnet name, vxlan tunnel name, vni and peer list (if configured).

- Usage:

```
show vnet brief
```

- Example:

```
admin@sonic:~$ show vnet brief
vnet name    vxlan tunnel      vni  peer list
-----------  --------------  -----  ------------------
Vnet_2000    tunnel1          2000
Vnet_3000    tunnel1          3000  Vnet_2000,Vnet4000
```

show vnet name <vnet_name>

This command displays brief information about <vnet_name> configured in the device.

- Usage:

```
show vnet name <vnet_name>
```

- Example:

```
admin@sonic:~$ show vnet name Vnet_3000
vnet name    vxlan tunnel      vni  peer list
-----------  --------------  -----  ------------------
Vnet_3000    tunnel1          3000  Vnet_2000,Vnet4000
```

show vnet interfaces

This command displays vnet interfaces information about all the vnets configured in the device.

- Usage:

```
show vnet interfaces
```

- Example:

```
admin@sonic:~$ show vnet interfaces
vnet name    interfaces
-----------  ------------
Vnet_2000    Ethernet1
Vnet_3000    Vlan2000
```

show vnet neighbors

This command displays vnet neighbor information about all the vnets configured in the device. It displays the vnet name, neighbor IP address, neighbor mac address (if configured) and interface.

- Usage:

```
show vnet neighbors
```

- Example:

```
admin@sonic:~$ show vnet neighbors
Vnet_2000    neighbor     mac_address    interfaces
-----------  -----------  -------------  ------------
             11.11.11.11                 Ethernet1
             11.11.11.12                 Ethernet1

Vnet_3000    neighbor     mac_address        interfaces
-----------  -----------  -----------------  ------------
             20.20.20.20  aa:bb:cc:dd:ee:ff  Vlan2000
```

show vnet routes all

This command displays all routes information about all the vnets configured in the device.

- Usage:

```
show vnet routes all
```

- Example:

```
admin@sonic:~$ show vnet routes all
vnet name    prefix          nexthop    interface
-----------  --------------  ---------  -----------
Vnet_2000    100.100.3.0/24             Ethernet52
Vnet_3000    100.100.4.0/24             Vlan2000

vnet name    prefix          endpoint    mac address        vni
-----------  --------------  ----------  -----------------  -----
Vnet_2000    100.100.1.1/32  10.10.10.1
Vnet_3000    100.100.2.1/32  10.10.10.2  00:00:00:00:03:04
```

show vnet routes tunnel

This command displays tunnel routes information about all the vnets configured in the device.

- Usage:

```
show vnet routes tunnel
```

- Example:

```
admin@sonic:~$ show vnet routes tunnel
vnet name    prefix          endpoint    mac address        vni
-----------  --------------  ----------  -----------------  -----
Vnet_2000    100.100.1.1/32  10.10.10.1
Vnet_3000    100.100.2.1/32  10.10.10.2  00:00:00:00:03:04
```

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Warm Reboot

warm-reboot command initiates a warm reboot of the device.

warm-reboot command doesn't require setting warm restart configuration. The command will setup everything needed to perform warm reboot.

This command requires root privilege.

- Usage:

```
warm-reboot [-h|-?|-v|-f|-i|-d|-r|-k|-x|-c <control plane assistant IP list>|-s|-t|-D]
```

- Parameters:

```
-h,-? : get this help
-v    : turn on verbose mode
-f    : force execution - ignore Orchagent RESTARTCHECK failure
-i    : force execution - ignore ASIC MD5-checksum-verification
-d    : force execution - ignore database integrity check
-r    : reboot with /sbin/reboot
-k    : reboot with /sbin/kexec -e [default]
-x    : execute script with -x flag
-c    : specify control plane assistant IP list
-s    : strict mode: do not proceed without:
        - control plane assistant IP list.
-t    : Don't tag the current kube images as latest
-D    : detached mode - closing terminal will not cause stopping reboot
```

- Example:

```
admin@sonic:~$ sudo warm-reboot -v
Mon 20 Mar 2023 09:55:11 AM UTC Saving counters folder before warmboot...
Mon 20 Mar 2023 09:55:15 AM UTC Pausing orchagent ...
Mon 20 Mar 2023 09:55:15 AM UTC Collecting logs to check ssd health before warm-reboot...
Mon 20 Mar 2023 09:55:15 AM UTC Stopping lldp.timer ...
Mon 20 Mar 2023 09:55:15 AM UTC Stopped lldp.timer ...
Mon 20 Mar 2023 09:55:15 AM UTC Stopping mgmt-framework.timer ...
Mon 20 Mar 2023 09:55:15 AM UTC Stopped mgmt-framework.timer ...
Mon 20 Mar 2023 09:55:15 AM UTC Stopping pmon.timer ...
Mon 20 Mar 2023 09:55:15 AM UTC Stopped pmon.timer ...
Mon 20 Mar 2023 09:55:15 AM UTC Stopping snmp.timer ...
Mon 20 Mar 2023 09:55:15 AM UTC Stopped snmp.timer ...
Mon 20 Mar 2023 09:55:15 AM UTC Stopping telemetry.timer ...
Mon 20 Mar 2023 09:55:15 AM UTC Stopped telemetry.timer ...
Mon 20 Mar 2023 09:55:15 AM UTC Stopping lldp ...
Mon 20 Mar 2023 09:55:17 AM UTC Stopped lldp
Mon 20 Mar 2023 09:55:17 AM UTC Stopping radv ...
Mon 20 Mar 2023 09:55:17 AM UTC Stopped radv
Mon 20 Mar 2023 09:55:17 AM UTC Stopping bgp ...
Mon 20 Mar 2023 09:55:22 AM UTC Stopped bgp
Mon 20 Mar 2023 09:55:22 AM UTC Stopping swss ...
Mon 20 Mar 2023 09:55:29 AM UTC Stopped swss
Mon 20 Mar 2023 09:55:29 AM UTC Initialize pre-shutdown ...
Mon 20 Mar 2023 09:55:30 AM UTC Requesting pre-shutdown ...
Mon 20 Mar 2023 09:55:30 AM UTC Waiting for pre-shutdown ...
Mon 20 Mar 2023 09:55:30 AM UTC Pre-shutdown succeeded, state: pre-shutdown-succeeded ...
Mon 20 Mar 2023 09:55:30 AM UTC Backing up database ...
Mon 20 Mar 2023 09:55:31 AM UTC Stopping teamd ...
Mon 20 Mar 2023 09:55:31 AM UTC Stopped teamd
Mon 20 Mar 2023 09:55:31 AM UTC Stopping syncd ...
Mon 20 Mar 2023 09:55:41 AM UTC Stopped syncd
Mon 20 Mar 2023 09:55:41 AM UTC Stopping all remaining containers ...
Mon 20 Mar 2023 09:55:44 AM UTC Stopped all remaining containers ...
Mon 20 Mar 2023 09:55:46 AM UTC Enabling Watchdog before warm-reboot
Mon 20 Mar 2023 09:55:46 AM UTC Rebooting with /sbin/kexec -e to SONiC-OS-SONiC_1.3.0_20230320003403 ...
```

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Warm Restart

Besides device level warm reboot, SONiC also provides docker based warm restart. This feature is currently supported by following dockers: BGP, teamD, syncd, and SWSS. A user can manage to restart a particular docker, with no interruption on packet forwarding and no effect on other services. This helps to reduce operational costs as well as development efforts. For example, to fix a bug in BGP routing stack, only the BGP docker image needs to be built, tested and upgraded.

To achieve uninterrupted packet forwarding during the restarting stage and database reconciliation at the post restarting stage, warm restart enabled dockers with adjacency state machine facilitate standardized protocols. For example, a BGP restarting switch must have BGP "Graceful Restart" enabled, and its BGP neighbors must be "Graceful Restart Helper Capable", as specified in IETF RFC4724.

Before warm restart BGP docker, the following BGP commands should be enabled:

```
bgp graceful-restart
bgp graceful-restart preserve-fw-state
```

In current SONiC release, the above two commands are enabled by default.

It should be aware that during a warm restart, certain BGP fast convergence feature and black hole avoidance feature should either be disabled or be set to a lower preference to avoid conflicts with BGP graceful restart.

For example, BGP BFD could be disabled via:

```
no neighbor <A.B.C.D|X:X::X:X|WORD> bfd
```

otherwise, the fast failure detection would cause packet drop during warm reboot.

Another commonly deployed blackhole avoidance feature: dynamic route priority adjustment, could be disabled via:

```
no bgp max-med on-peerup
```

to avoid large routes churn during BGP restart.

Warm Restart show commands

show warm_restart config

This command displays all the configuration related to warm_restart.

- Usage:

  ```
  show warm_restart config
  ```

- Example:

```
admin@sonic:~$ show warm_restart config
name    enable    timer_name    timer_duration    eoiu_enable
------  --------  ------------  ----------------  -------------
bgp     true      NULL          NULL              NULL
swss    true      NULL          NULL              NULL
syncd   true      NULL          NULL              NULL
teamd   true      NULL          NULL              NULL
```

show warm_restart state

This command displays the warm_restart state.

- Usage:

```
show warm_restart state
```

- Example:

```
admin@sonic:~$ show warm_restart state
name          restore_count  state
----------  ---------------  ----------
bgp                       1  reconciled
fdbsyncd                  2  replayed
intfmgrd                  2  reconciled
neighsyncd                2  reconciled
orchagent                 2  reconciled
portsyncd                 2  reconciled
syncd                     1  reconciled
teamsyncd                 1  reconciled
vlanmgrd                  2  reconciled
vrfmgrd                   2  reconciled
vxlanmgrd                 2  reconciled
```

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Warm Restart Config commands

This sub-section explains the various configuration related to warm restart feature. Following parameters can be configured using this command.

1. bgp_timer
2. disable
3. enable
4. neighsyncd_timer

5. teamsyncd_timer
   Each of these sub-commands are explained in the following section.

Users can use an optional parameter "-s" to use the unix domain socket for communicating with the RedisDB which will be faster when compared to using the default network sockets.
All these commands have the following option.

Options:
-s, --redis-unix-socket-path TEXT
unix socket path for redis connection

config warm_restart bgp_timer

This command is used to set the bgp_timer value for warm_restart of BGP service.
bgp_timer holds the time interval utilized by fpmsyncd during warm-restart episodes.
During this interval fpmsyncd will recover all the routing state previously pushed to AppDB, as well as all the new state coming from zebra/bgpd.
Upon expiration of this timer, fpmsyncd will execute the reconciliation logic to eliminate all the stale entries from AppDB.
This timer should match the BGP-GR restart-timer configured within the elected routing-stack.
Supported range: 1-3600.

- Usage:

  ```
  config warm_restart [-s|--redis-unix-socket-path <socket_path>] bgp_timer <seconds>
  ```

  - Parameters:
    - seconds: Range from 1 to 3600
- Example:

  ```
  admin@sonic:~$ sudo config warm_restart bgp_timer 1000
  ```

config warm_restart enable/disable

This command is used to enable or disable the warm_restart for a particular service that supports warm reboot.
Following four services support warm reboot. When user restarts the particular service using "systemctl restart <service_name>", this configured value will be checked for whether it is enabled or disabled.
If this configuration is enabled for that service, it will perform warm reboot for that service. Otherwise, it will do cold restart of the service.

- Usage:

```
config warm_restart [-s|--redis-unix-socket-path <socket_path>] enable [<module_name>]
```

  - Parameters:
    - module_name: Can be either system or swss or bgp or teamd. If "module_name" argument is not specified, it will enable "system" module.
- Example (Set warm_restart as "enable" for the "system" service):

```
admin@sonic:~$ sudo config warm_restart enable
```

- Example (Set warm_restart as "enable" for the "swss" service. When user does "systemctl restart swss", it will perform warm reboot instead of cold reboot)

```
admin@sonic:~$ sudo config warm_restart enable swss
```

- Example (Set warm_restart as "enable" for the "teamd" service. When user does "systemctl restart teamd", it will perform warm reboot instead of cold reboot)

```
admin@sonic:~$ sudo config warm_restart enable teamd
```

- Example (Set warm_restart as "enable" for the "syncd" service. When user does "systemctl restart syncd", it will perform warm reboot instead of cold reboot)

```
admin@sonic:~$ sudo config warm_restart enable syncd
```

config warm_restart neighsyncd_timer

This command is used to set the neighsyncd_timer value for warm_restart of "swss" service.
neighsyncd_timer is the timer used for "swss" (neighsyncd) service during the warm restart.
Timer is started after the neighborTable is restored to internal data structures.
neighborsyncd then starts to read all Linux kernel entries and mark the entries in the data structures accordingly.
Once the timer is expired, reconciliation is done and the delta is pushed to appDB
Valid value is 1-9999. 0 is invalid.

- Usage:

```
config warm_restart [-s|--redis-unix-socket-path <socket_path>] neighsyncd_timer <seconds>
```

  - Parameters:
    - seconds: Range from 1 to 9999
- Example:

```
admin@sonic:~$ sudo config warm_restart neighsyncd_timer 2000
```

config warm_restart bgp_timer

This command is used to set the bgp_timer value for warm_restart of "bgp" service.
bgp_timer is the timer used for "bgp" service during the warm restart.
Timer is started after the BGP table is restored to internal data structures.
BGP services then start to read all Linux kernel entries and mark the entries in the data structures accordingly.
Once the timer is expired, reconciliation is done and the delta is pushed to appDB
Valid value is 1-9999. 0 is invalid.

- Usage:

```
config warm_restart [-s|--redis-unix-socket-path <socket_path>] bgp_timer <seconds>
```

  - Parameters:
    - seconds: Range from 1 to 9999
- Example:

```
admin@sonic:~$ sudo config warm_restart bgp_timer 2000
```

config warm_restart teamsyncd_timer

This command is used to set the teamsyncd_timer value for warm_restart of teamd service.
teamsyncd_timer holds the time interval utilized by teamsyncd during warm-restart episodes.
The timer is started when teamsyncd starts. During the timer interval, teamsyncd will preserve all LAG interface changes, but it will not apply them.
The changes will only be applied when the timer expires.
When the changes are applied, the stale LAG entries will be removed, the new LAG entries will be created.
Supported range: 1-9999. 0 is invalid

- Usage:

```
config warm_restart teamsyncd_timer <seconds>
```

  - Parameters:
    - seconds: Range from 1 to 9999
- Example:

```
admin@sonic:~$ sudo config warm_restart teamsyncd_timer 3000
```

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Watermark

Watermark Show commands

show watermark telemetry interval

This command displays the configured interval for the telemetry.

- Usage:

```
show watermark telemetry interval
```

- Example:

```
admin@sonic:~$ show watermark telemetry interval

Telemetry interval 120 second(s)
```

Watermark Config commands

config watermark telemetry interval

This command is used to configure the interval for telemetry.
The default interval is 120 seconds.
There is no regulation on the valid range of values; it leverages linux timer.

- Usage:

```
config watermark telemetry interval <value>
```

- Example:

```
admin@sonic:~$ sudo config watermark telemetry interval 999
```

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Software Installation and Management

SONiC images can be installed in one of two methods:

1. From within a running SONiC image using the `sonic-installer` utility

2. From the vendor's bootloader (E.g., ONIE, Aboot, etc.)

SONiC packages are available as prebuilt Docker images and meant to be installed with the *sonic-package-manager* utility.

SONiC Package Manager

The *sonic-package-manager* is a command line tool to manage (e.g. install, upgrade or uninstall) SONiC Packages.

sonic-package-manager list

This command lists all available SONiC packages, their desription, installed version and installation status.
SONiC package status can be *Installed*, *Not installed* or *Built-In*. "Built-In" status means that a feature is built-in to SONiC image and can't be upgraded or uninstalled.

- Usage:

```
sonic-package-manager list
```

- Example:

```
admin@sonic:~$ sonic-package-manager list
Name            Repository                  Description                   Version    Status
--------------  --------------------------  ----------------------------  ---------  --------------
cpu-report      azure/cpu-report            CPU report package            N/A        Not Installed
database        docker-database             SONiC database package        1.0.0      Built-In
dhcp-relay      azure/docker-dhcp-relay     SONiC dhcp-relay package      1.0.0      Installed
fpm-frr         docker-fpm-frr              SONiC fpm-frr package         1.0.0      Built-In
lldp            docker-lldp                 SONiC lldp package            1.0.0      Built-In
macsec          docker-macsec               SONiC macsec package          1.0.0      Built-In
mgmt-framework  docker-sonic-mgmt-framework SONiC mgmt-framework package  1.0.0      Built-In
nat             docker-nat                  SONiC nat package             1.0.0      Built-In
pmon            docker-platform-monitor     SONiC pmon package            1.0.0      Built-In
radv            docker-router-advertiser    SONiC radv package            1.0.0      Built-In
sflow           docker-sflow                SONiC sflow package           1.0.0      Built-In
snmp            docker-snmp                 SONiC snmp package            1.0.0      Built-In
swss            docker-orchagent            SONiC swss package            1.0.0      Built-In
syncd           docker-syncd-mlnx           SONiC syncd package           1.0.0      Built-In
teamd           docker-teamd                SONiC teamd package           1.0.0      Built-In
telemetry       docker-sonic-telemetry      SONiC telemetry package       1.0.0      Built-In
```

sonic-package-manager repository add

This command will add a new repository as source for SONiC packages to the database. *NOTE*: requires elevated (root) privileges to run

- Usage:

```
Usage: sonic-package-manager repository add [OPTIONS] NAME REPOSITORY

  Add a new repository to database.

  NOTE: This command requires elevated (root) privileges to run.

Options:
  --default-reference TEXT  Default installation reference. Can be a tag or
                            sha256 digest in repository.
  --description TEXT        Optional package entry description.
  --help                    Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo sonic-package-manager repository add \
  cpu-report azure/sonic-cpu-report --default-reference 1.0.0
```

sonic-package-manager repository remove

This command will remove a repository as source for SONiC packages from the database . The package has to be *Not Installed* in order to be removed from package database. *NOTE*: requires elevated (root) privileges to run

- Usage:

```
Usage: sonic-package-manager repository remove [OPTIONS] NAME

  Remove repository from database.

  NOTE: This command requires elevated (root) privileges to run.

Options:
  --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo sonic-package-manager repository remove cpu-report
```

sonic-package-manager install

This command pulls and installs a package on SONiC host. *NOTE*: this command requires elevated (root) privileges to run

- Usage:

```
Usage: sonic-package-manager install [OPTIONS] [PACKAGE_EXPR]

  Install/Upgrade package using [PACKAGE_EXPR] in format
  "<name>[=<version>|@<reference>]".

    The repository to pull the package from is resolved by lookup in
    package database,    thus the package has to be added via "sonic-
    package-manager repository add" command.

    In case when [PACKAGE_EXPR] is a package name "<name>" this command
    will install or upgrade    to a version referenced by "default-
    reference" in package database.

  NOTE: This command requires elevated (root) privileges to run.

Options:
  --enable                  Set the default state of the feature to enabled
                            and enable feature right after installation. NOTE:
                            user needs to execute "config save -y" to make
                            this setting persistent.
  --set-owner [local|kube]  Default owner configuration setting for a feature.
  --from-repository TEXT    Fetch package directly from image registry
                            repository. NOTE: This argument is mutually
                            exclusive with arguments: [package_expr,
                            from_tarball].
  --from-tarball FILE       Fetch package from saved image tarball. NOTE: This
                            argument is mutually exclusive with arguments:
                            [package_expr, from_repository].
  -f, --force               Force operation by ignoring package dependency
                            tree and package manifest validation failures.
  -y, --yes                 Automatically answer yes on prompts.
  -v, --verbosity LVL       Either CRITICAL, ERROR, WARNING, INFO or DEBUG.
                            Default is INFO.
  --skip-host-plugins       Do not install host OS plugins provided by the
                            package (CLI, etc). NOTE: In case when package
                            host OS plugins are set as mandatory in package
                            manifest this option will fail the installation.
  --allow-downgrade         Allow package downgrade. By default an attempt to
                            downgrade the package will result in a failure
                            since downgrade might not be supported by the
                            package, thus requires explicit request from the
                            user.
  --help                    Show this message and exit..
```

- Example:

```
admin@sonic:~$ sudo sonic-package-manager install dhcp-relay=1.0.2
```

```
admin@sonic:~$ sudo sonic-package-manager install dhcp-relay@latest

admin@sonic:~$ sudo sonic-package-manager install dhcp-relay@sha256:9780f6d83e45878749497a6297ed9906c19ee0c

admin@sonic:~$ sudo sonic-package-manager install --from-repository azure/sonic-cpu-report:latest

admin@sonic:~$ sudo sonic-package-manager install --from-tarball sonic-docker-image.gz
```

sonic-package-manager uninstall

This command uninstalls package from SONiC host. User needs to stop the feature prior to uninstalling it.
NOTE: this command requires elevated (root) privileges to run.

- Usage:

```
Usage: sonic-package-manager uninstall [OPTIONS] NAME

  Uninstall package.

  NOTE: This command requires elevated (root) privileges to run.

Options:
  -f, --force          Force operation by ignoring package dependency tree and
                      package manifest validation failures.
  -y, --yes            Automatically answer yes on prompts.
  -v, --verbosity LVL  Either CRITICAL, ERROR, WARNING, INFO or DEBUG. Default
                      is INFO.
  --help               Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo sonic-package-manager uninstall dhcp-relay
```

sonic-package-manager reset

This comamnd resets the package by reinstalling it to its default version. *NOTE*: this command requires elevated (root) privileges to run.

- Usage:

```
Usage: sonic-package-manager reset [OPTIONS] NAME

  Reset package to the default version.

  NOTE: This command requires elevated (root) privileges to run.

Options:
  -f, --force          Force operation by ignoring package dependency tree and
                       package manifest validation failures.
  -y, --yes            Automatically answer yes on prompts.
  -v, --verbosity LVL  Either CRITICAL, ERROR, WARNING, INFO or DEBUG. Default
                       is INFO.
  --skip-host-plugins  Do not install host OS plugins provided by the package
                       (CLI, etc). NOTE: In case when package host OS plugins
                       are set as mandatory in package manifest this option
                       will fail the installation.
  --help               Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo sonic-package-manager reset dhcp-relay
```

sonic-package-manager show package versions

This command will retrieve a list of all available versions for the given package from the configured upstream repository

- Usage:

```
Usage: sonic-package-manager show package versions [OPTIONS] NAME

  Show available versions.

Options:
  --all    Show all available tags in repository.
  --plain  Plain output.
  --help   Show this message and exit.
```

- Example:

```
admin@sonic:~$ sonic-package-manager show package versions dhcp-relay
• 1.0.0
• 1.0.2
• 2.0.0
```

```
admin@sonic:~$ sonic-package-manager show package versions dhcp-relay --plain
1.0.0
1.0.2
2.0.0


admin@sonic:~$ sonic-package-manager show package versions dhcp-relay --all
• 1.0.0
• 1.0.2
• 2.0.0
• latest
```

sonic-package-manager show package changelog

This command fetches the changelog from the package manifest and displays it. *NOTE*: package changelog can be retrieved from registry or read from image tarball without installing it.

- Usage:

```
Usage: sonic-package-manager show package changelog [OPTIONS] [PACKAGE_EXPR]

  Show package changelog.

Options:
  --from-repository TEXT  Fetch package directly from image registry
                          repository NOTE: This argument is mutually exclusive
                          with arguments: [from_tarball, package_expr].
  --from-tarball FILE     Fetch package from saved image tarball NOTE: This
                          argument is mutually exclusive with arguments:
                          [package_expr, from_repository].
  --help                  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sonic-package-manager show package changelog dhcp-relay
1.0.0:

  • Initial release

      Author (author@email.com) Mon, 25 May 2020 12:25:00 +0300
```

sonic-package-manager show package manifest

This command fetches the package manifest and displays it. *NOTE*: package manifest can be retrieved from registry or read from image tarball without installing it.

- Usage:

```
Usage: sonic-package-manager show package manifest [OPTIONS] [PACKAGE_EXPR]

  Show package manifest.

Options:
  --from-repository TEXT  Fetch package directly from image registry
                          repository NOTE: This argument is mutually exclusive
                          with arguments: [package_expr, from_tarball].
  --from-tarball FILE     Fetch package from saved image tarball NOTE: This
                          argument is mutually exclusive with arguments:
                          [from_repository, package_expr].
  -v, --verbosity LVL     Either CRITICAL, ERROR, WARNING, INFO or DEBUG
  --help                  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sonic-package-manager show package manifest dhcp-relay=2.0.0
{
  "version": "1.0.0",
  "package": {
    "version": "2.0.0",
    "depends": [
      "database>=1.0.0,<2.0.0"
    ]
  },
  "service": {
    "name": "dhcp_relay"
  }
}
```

SONiC Installer

This is a command line tool available as part of the SONiC software; If the device is already running the SONiC software, this tool can be used to install an alternate image in the partition.
This tool has facility to install an alternate image, list the available images and to set the next reboot image.
This command requires elevated (root) privileges to run.

sonic-installer list

This command displays information about currently installed images. It displays a list of installed images, currently running image and image set to be loaded in next reboot.

- Usage:

```
sonic-installer list
```

- Example:

```
admin@sonic:~$ sudo sonic-installer list
Current: SONiC-OS-HEAD.XXXX
Next: SONiC-OS-HEAD.XXXX
Available:
SONiC-OS-HEAD.XXXX
SONiC-OS-HEAD.YYYY
```

TIP: This output can be obtained without evelated privileges by running the `show boot` command. See here for details.

sonic-installer install

This command is used to install a new image on the alternate image partition. This command takes a path to an installable SONiC image or URL and installs the image.

- Usage:

```
sonic-installer install <image_file_path>
```

- Example:

```
admin@sonic:~$ sudo sonic-installer install https://sonic-jenkins.westus.cloudapp.azure.com/job/xxxx/job/bui
New image will be installed, continue? [y/N]: y
Downloading image...
...100%, 480 MB, 3357 KB/s, 146 seconds passed
Command: /tmp/sonic_image
Verifying image checksum ... OK.
Preparing image archive ... OK.
ONIE Installer: platform: XXXX
onie_platform:
Installing SONiC in SONiC
Installing SONiC to /host/image-xxxx
Directory /host/image-xxxx/ already exists. Cleaning up...
Archive:  fs.zip
   creating: /host/image-xxxx/boot/
  inflating: /host/image-xxxx/boot/vmlinuz-3.16.0-4-amd64
  inflating: /host/image-xxxx/boot/config-3.16.0-4-amd64
  inflating: /host/image-xxxx/boot/System.map-3.16.0-4-amd64
  inflating: /host/image-xxxx/boot/initrd.img-3.16.0-4-amd64
   creating: /host/image-xxxx/platform/
 extracting: /host/image-xxxx/platform/firsttime
  inflating: /host/image-xxxx/fs.squashfs
  inflating: /host/image-xxxx/dockerfs.tar.gz
Log file system already exists. Size: 4096MB
Installed SONiC base image SONiC-OS successfully

Command: cp /etc/sonic/minigraph.xml /host/

Command: grub-set-default --boot-directory=/host 0

Done
```

Installing a new image using the sonic-installer will keep using the packages installed on the currently running SONiC image and automatically migrate those. In order to perform clean SONiC installation use the *--skip-package-migration* option:

- Example:

```
admin@sonic:~$ sudo sonic-installer install https://sonic-jenkins.westus.cloudapp.azure.com/job/xxxx/job/bui
```

sonic-installer set_default

This command is be used to change the image which can be loaded by default in all the subsequent reboots.

- Usage:

```
sonic-installer set_default <image_name>
```

- Example:

```
admin@sonic:~$ sudo sonic-installer set_default SONiC-OS-HEAD.XXXX
```

sonic-installer set_next_boot

This command is used to change the image that can be loaded in the *next* reboot only. Note that it will fallback to current image in all other subsequent reboots after the next reboot.

- Usage:

```
sonic-installer set_next_boot <image_name>
```

- Example:

```
admin@sonic:~$ sudo sonic-installer set_next_boot SONiC-OS-HEAD.XXXX
```

sonic-installer remove

This command is used to remove the unused SONiC image from the disk. Note that it's *not* allowed to remove currently running image.

- Usage:

```
sonic-installer remove [-y|--yes] <image_name>
```

- Example:

```
admin@sonic:~$ sudo sonic-installer remove SONiC-OS-HEAD.YYYY
Image will be removed, continue? [y/N]: y
Updating GRUB...
Done
Removing image root filesystem...
Done
Command: grub-set-default --boot-directory=/host 0

Image removed
```

sonic-installer cleanup

This command removes all unused images from the device, leaving only the currently active image and the image which will be booted into next (if different) installed. If there are no images which can be removed, the command will output `No image(s) to remove`

- Usage:

```
sonic-installer cleanup [-y|--yes]
```

- Example:

```
admin@sonic:~$ sudo sonic-installer cleanup
Remove images which are not current and next, continue? [y/N]: y
No image(s) to remove
```

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Troubleshooting Commands

For troubleshooting and debugging purposes, this command gathers pertinent information about the state of the device; information is as diverse as syslog entries, database state, routing-stack state, etc., It then compresses it into an archive file. This archive file can be sent to the SONiC development team for examination.
Resulting archive file is saved as `/var/dump/<DEVICE_HOST_NAME>_YYYYMMDD_HHMMSS.tar.gz`

- Usage:

```
show techsupport
```

- Example:

```
admin@sonic:~$ show techsupport [--since=<time_specifier>]
```

If the SONiC system was running for quite some time `show techsupport` will produce a large dump file. To reduce the amount of syslog and core files gathered during system dump use `--since` option:

- Examples:

```
admin@sonic:~$ show techsupport --since=yesterday  # Will collect syslog and core files for the last 24 hour
```

```
admin@sonic:~$ show techsupport --since='hour ago' # Will collect syslog and core files for the last one hou
```

Debug Dumps

In SONiC, there usually exists a set of tables related/relevant to a particular module. All of these might have to be looked at to confirm whether any configuration update is properly applied and propagated. This utility comes in handy because it prints a unified view of the redis-state for a given module

- Usage:

```
Usage: dump state [OPTIONS] MODULE IDENTIFIER
Dump the redis-state of the identifier for the module specified

Options:
    -s, --show            Display Modules Available
    -d, --db TEXT         Only dump from these Databases
    -t, --table           Print in tabular format  [default: False]
    -k, --key-map         Only fetch the keys matched, don't extract field-value dumps  [default: False]
    -v, --verbose         Prints any intermediate output to stdout useful for dev & troubleshooting  [defaul
    -n, --namespace TEXT  Dump the redis-state for this namespace.  [default: DEFAULT_NAMESPACE]
    --help                Show this message and exit.
```

- Examples:

```
root@sonic# dump state --show
Module    Identifier
--------  ------------
port      port_name
copp      trap_id


admin@sonic:~$ dump state copp arp_req --key-map --db ASIC_DB
{
      "arp_req": {
        "ASIC_DB": {
            "keys": [
                "ASIC_STATE:SAI_OBJECT_TYPE_HOSTIF_TRAP:oid:0x22000000000c5b",
                "ASIC_STATE:SAI_OBJECT_TYPE_HOSTIF_TRAP_GROUP:oid:0x11000000000c59",
                "ASIC_STATE:SAI_OBJECT_TYPE_POLICER:oid:0x12000000000c5a",
                "ASIC_STATE:SAI_OBJECT_TYPE_QUEUE:oid:0x15000000000626"
            ],
            "tables_not_found": [],
            "vidtorid": {
                "oid:0x22000000000c5b": "oid:0x200000000022",
                "oid:0x11000000000c59": "oid:0x300000011",
                "oid:0x12000000000c5a": "oid:0x200000012",
                "oid:0x15000000000626": "oid:0x12e0000040015"
            }
        }
      }
  }
```

Event Driven Techsupport Invocation

This feature/capability makes the techsupport invocation event-driven based on core dump generation. This feature is only applicable for the processes running in the containers. More detailed explanation can be found in the HLD
https://github.com/Azure/SONiC/blob/master/doc/auto_techsupport_and_coredump_mgmt.md

config auto-techsupport global commands

config auto-techsupport global state

- Usage:

```
config auto-techsupport global state <enabled/disabled>
```

- Example:

```
config auto-techsupport global state enabled
```

config auto-techsupport global rate-limit-interval

- Usage:

```
config auto-techsupport global rate-limit-interval <uint16>
```

  - Parameters:
    - rate-limit-interval: Minimum time in seconds to wait after the last techsupport creation time before invoking a new one.
- Example:

```
config auto-techsupport global rate-limit-interval 200
```

config auto-techsupport global max-techsupport-limit

- Usage:

```
config auto-techsupport global max-techsupport-limit <float upto two decimal places>
```

  - Parameters:
    - max-techsupport-limit: A percentage value should be specified. This signifies maximum size to which /var/dump/ directory can be grown until.
- Example:

```
config auto-techsupport global max-techsupport-limit 10.15
```

config auto-techsupport global max-core-limit

- Usage:

```
config auto-techsupport global max-core-limit <float upto two decimal places>
```

  - Parameters:

    - max-core-limit: A percentage value should be specified. This signifies maximum size to which /var/core/ directory can be grown until.
- Example:

```
config auto-techsupport global max-core-limit 10.15
```

config auto-techsupport global since

- Usage:

```
config auto-techsupport global since <string>
```

    - Parameters:
        - since: This limits the auto-invoked techsupport to only collect the logs & core-dumps generated since the time provided. Any valid date string of the formats specified here can be used. (https://www.gnu.org/software/coreutils/manual/html_node/Date-input-formats.html). If this value is not explicitly configured or a non-valid string is provided, a default value of "2 days ago" is used.
- Example:

```
config auto-techsupport global since <string>
```

config auto-techsupport-feature commands

config auto-techsupport-feature add

- Usage:

```
config auto-techsupport-feature add <feature_name> --state <enabled/disabled> --rate-limit-interval <uint16>
```

    - Parameters:
        - state: enable/disable the capability for the specific feature/container.
        - rate-limit-interval: Rate limit interval for the corresponding feature. Configure 0 to explicitly disable. For the techsupport to be generated by auto-techsupport, both the global and feature specific rate-limit-interval has to be passed
- Example:

```
config auto-techsupport-feature add bgp --state enabled --rate-limit-interval 200
```

config auto-techsupport-feature delete

- Usage:

```
config auto-techsupport-feature delete <feature_name>
```

- Example:

```
config auto-techsupport-feature delete swss
```

config auto-techsupport-feature update

- Usage:

```
config auto-techsupport-feature update <feature_name> --state <enabled/disabled>
config auto-techsupport-feature update <feature_name> --rate-limit-interval <uint16>
```

- Example:

```
config auto-techsupport-feature update snmp --state enabled
config auto-techsupport-feature update swss --rate-limit-interval 200
```

Show CLI:

show auto-techsupport global

- Usage:

```
show auto-techsupport global
```

- Example:

```
admin@sonic:~$ show auto-techsupport global
STATE      RATE LIMIT INTERVAL (sec)    MAX TECHSUPPORT LIMIT (%)    MAX CORE LIMIT (%)       SINCE
-------  --------------------------   --------------------------    ------------------  ----------
enabled                          180                        10.0                   5.0   2 days ago
```

show auto-techsupport-feature

- Usage:

```
show auto-techsupport-feature
```

- Example:

```
admin@sonic:~$ show auto-techsupport-feature
FEATURE NAME    STATE       RATE LIMIT INTERVAL (sec)
--------------  --------  --------------------------
bgp             enabled                          600
database        enabled                          600
dhcp_relay      enabled                          600
lldp            enabled                          600
swss            disabled                         800
```

show auto-techsupport history

- Usage:

```
show auto-techsupport history
```

- Example:

```
admin@sonic:~$ show auto-techsupport history
TECHSUPPORT DUMP                           TRIGGERED BY    CORE DUMP
-----------------------------------------  --------------  -----------------------------
sonic_dump_r-lionfish-16_20210901_221402  bgp             bgpcfgd.1630534439.55.core.gz
sonic_dump_r-lionfish-16_20210901_203725  snmp            python3.1630528642.23.core.gz
sonic_dump_r-lionfish-16_20210901_222408  teamd           python3.1630535045.34.core.gz
```

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Routing Stack

SONiC software is agnostic of the routing software that is being used in the device. For example, users can use either Quagga or FRR routing stack as per their requirement.
A separate shell (vtysh) is provided to configure such routing stacks.
Once if users go to "vtysh", they can use the routing stack specific commands as given in the following example.

- Example (FRR Routing Stack):

```
admin@sonic:~$ vtysh

Hello, this is FRRouting (version 7.5.1-sonic)
Copyright 1996-2005 Kunihiro Ishiguro, et al.

sonic# show route-map (This command displays the route-map that is configured for the routing protocol.)
ZEBRA:
route-map RM_SET_SRC, permit, sequence 10
  Match clauses:
  Set clauses:
    src 10.12.0.102
  Call clause:
  Action:
    Exit routemap
```

Refer the routing stack Quagga Command Reference or FRR Command Reference to know more about about the routing stack configuration.

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Only new command information is listed, and existing commands refer to [FRR Command Reference]

bgp advertise lowest-priority on-startup

This command is used to enable BGP to adjust the priority of advertised routes to the lowest priority upon system restart.

- Usage:

```
[no] bgp advertise lowest-priority on-startup [recover-time]
```

- Parameter Description:

```
recover-time: Indicates the timer time for restoring the priority of the advertised routes, in seconds.
              The value range is from 1 to 65535, and the default value is 600.
```

- Example:

```
admin@sonic:~$ sudo vtysh -c "configure terminal" -c "router bgp 100" -c "bgp advertise lowest-priority on-s
```

clear bgp advertise lowest-priority on-startup

This command is used to restore the priority of the routes advertised by BGP to neighbors to that before the priority is adjusted to the lowest priority.

- Usage:

```
clear bgp advertise lowest-priority on-startup
```

- Example:

```
admin@sonic:~$ sudo vtysh -c "clear bgp advertise lowest-priority on-startup"
```

bgp advertise lowest-priority on-startup

This command is intended for the parameter configuration of neighbor route delay advertisement upon system restart.

delay-time indicates the maximum waiting time for BGP neighbors to send routes to their neighbors after establishing a connection. After a neighborship is established, normally the first route advertisement adopts immediate advertisement, and the subsequent route advertisement adopts the default time advertisement (see the neighbor advertisement-interval command). startup-time indicates the user configurable startup time, which is timed from the time when the configuration command

takes effect. During startup-time, all the neighbor route advertisements of BGP are sent at the interval of delay-time. This command can change the route advertisement behavior of BGP peers to neighbors after system restart.

The prefix-list policy is configured to ensure that partial routes can be normally delivered. The prefix-list policy applies to distributed routes. Matched routes will be normally delivered without being affected by delayed advertisement. For details about the address family scope to which the prefix-list policy applies, see the neighbor prefix-list command.

This command is used by the administrator to adjust the BGP route advertisement behavior during device restart based on the hardware conditions, number of neighbors, number of routes, and actual deployment requirements.

- Usage:

```
[no] bgp initial-advertise-delay {delay-time [ startup-time ] | prefix-list name}
```

- Parameter Description:

```
delay-time: Indicates the delay time for advertising routes after the BGP neighborship is established upon s
            The value range is from 1 to 600. The default value is 1 second.
startup-time: Specifies the time range for system restart (the mechanism of delayed route advertisement is a
            The value range is from 5 to 58400. The default value is 600 seconds.
name: Specifies the name of the prefix list.
```

- Example:

```
admin@sonic:~$ sudo vtysh -c "configure terminal" -c "router bgp 100" -c "bgp initial-advertise-delay 60 500
```

bgp evpn-vni-list

When the local host goes online, BGP will send the host ARP routing information to its neighbors. However, if the peer end does not want to generate traffic redirection through ARP, you can control the local ARP routes so that local ARP routes are not sent to the peer end.
This command combines route map and is used on neighbors.

- Usage:

```
[no] bgp evpn-vni-list {list_name} vni1,vni2,...
```

- Parameter Description:

```
list_name: Indicates the name of a VNI list.
vni: Indicates the VNI ID. The value range is from 1 to 16777215.
     The information of multiple VNIs can be configured at the same time, and all the VNIs are separated usi
```

- Example:

```
admin@sonic:~$ sudo vtysh -c "configure terminal" -c "bgp evpn-vni-list v1 100,200"
admin@sonic:~$ sudo vtysh -c "configure terminal" -c "route-map map1 deny 10" -c "match evpn deny-arp v1 loc
admin@sonic:~$ sudo vtysh -c "configure terminal" -c "route-map map1 permit 20"
admin@sonic:~$ sudo vtysh -c "configure terminal" -c "router bgp 65530" -c "address-family l2vpn evpn" -c "r
```

show bgp evpn-vni-list

This command is used to display the VNI-list configuration of EVPN.

- Usage:

```
show bgp evpn-vni-list {list_name}
```

- Parameter Description:

```
list_name: Specifies the name of a VNI-list.
```

- Example:

```
admin@sonic:~$ sudo vtysh -c "show bgp evpn-vni-list "
bgp evpn-vni-list v1:
    10 20
```

redistribute [arp-host | nd-route]

This route redistribution command can redistribute the route information of other routing protocols to BGP.
Redistribution arp-host added to IPv4 unicast address family
Redistribution nd route added to IPv6 unicast address family

- Usage:

```
[no] redistribute [arp-host | nd-route]
```

- Parameter Description:

```
arp-host: host routes converted from ARP entries
nd-route: host routes converted from ND
```

- Example:

```
admin@sonic:~$ sudo vtysh -c "configure terminal" -c "router bgp 100" -c "address-family ipv4 unicast" -c "r
```

FRRouting BGP Show Commands

show ip bgp summary

This command displays the summary of all IPv4 bgp neighbors that are configured and the corresponding states.

- Usage:

```
show ip bgp summary
```

- Example:

```
admin@sonic:~$ show ip bgp summary
BGP router identifier 1.2.3.4, local AS number 65061
RIB entries 6124, using 670 KiB of memory
Peers 2, using 143 KiB of memory

Neighbor        V         AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
192.168.1.161    4 65501   88698  102781        0    0    0 08w5d14h        2
192.168.1.163    4 65502   88698  102780        0    0    0 08w5d14h        2

Total number of neighbors 2
```

show ip bgp neighbors

This command displays all the details of IPv4 & IPv6 BGP neighbors when no optional argument is specified.

When the optional argument IPv4_address is specified, it displays the detailed neighbor information about that specific IPv4 neighbor.

Command has got additional optional arguments to display only the advertised routes, or the received routes, or all routes.

In order to get details for an IPv6 neigbor, use "show ipv6 bgp neighbor <ipv6_address>" command.

- Usage:

```
show ip bgp neighbors [<ipv4-address> [advertised-routes | received-routes | routes]]
```

- Example:

```
admin@sonic:~$ show ip bgp neighbors
BGP neighbor is 192.168.1.161, remote AS 65501, local AS 65061, external link
 Description: Router01T0
  BGP version 4, remote router ID 1.2.3.4
  BGP state = Established, up for 08w5d14h
  Last read 00:00:46, hold time is 180, keepalive interval is 60 seconds
  Neighbor capabilities:
    4 Byte AS: advertised and received
    Dynamic: received
    Route refresh: advertised and received(old & new)
    Address family IPv4 Unicast: advertised and received
    Graceful Restart Capabilty: advertised and received
      Remote Restart timer is 120 seconds
      Address families by peer:
        IPv4 Unicast(not preserved)
  Graceful restart informations:
    End-of-RIB send: IPv4 Unicast
    End-of-RIB received: IPv4 Unicast
  Message statistics:
    Inq depth is 0
    Outq depth is 0
                         Sent       Rcvd
    Opens:                  1          1
    Notifications:          0          0
    Updates:            14066          3
    Keepalives:         88718      88698
    Route Refresh:          0          0
    Capability:             0          0
    Total:             102785      88702
  Minimum time between advertisement runs is 30 seconds

 For address family: IPv4 Unicast
  Community attribute sent to this neighbor(both)
  2 accepted prefixes

  Connections established 1; dropped 0
  Last reset never
Local host: 192.168.1.160, Local port: 32961
Foreign host: 192.168.1.161, Foreign port: 179
Nexthop: 192.168.1.160
Nexthop global: fe80::f60f:1bff:fe89:bc00
Nexthop local: ::
BGP connection: non shared network
Read thread: on  Write thread: off
```

Optionally, you can specify an IP address in order to display only that particular neighbor. In this mode, you can optionally specify whether you want to display all routes advertised to the specified neighbor, all routes received from the specified neighbor or all routes (received and accepted) from the specified neighbor.

- Examples:

```
admin@sonic:~$ show ip bgp neighbors 192.168.1.161

admin@sonic:~$ show ip bgp neighbors 192.168.1.161 advertised-routes

admin@sonic:~$ show ip bgp neighbors 192.168.1.161 received-routes

admin@sonic:~$ show ip bgp neighbors 192.168.1.161 routes
```

show ipv6 bgp summary

This command displays the summary of all IPv4 bgp neighbors that are configured and the corresponding states.

- Usage:

```
show ipv6 bgp summary
```

- Example:

```
admin@sonic:~$ show ipv6 bgp summary
BGP router identifier 10.1.0.32, local AS number 65100
RIB entries 12809, using 1401 KiB of memory
Peers 8, using 36 KiB of memory

Neighbor        V         AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
fc00::72        4 64600   12588   12591        0    0    0 06:51:17     6402
fc00::76        4 64600   12587    6190        0    0    0 06:51:28     6402
fc00::7a        4 64600   12587    9391        0    0    0 06:51:23     6402
fc00::7e        4 64600   12589   12592        0    0    0 06:51:25     6402

Total number of neighbors 4
```

show ipv6 bgp neighbors

This command displays all the details of one particular IPv6 Border Gateway Protocol (BGP) neighbor. Option is also available to display only the advertised routes, or the received routes, or all routes.

- Usage:

```
show ipv6 bgp neighbors <ipv6-address> (advertised-routes | received-routes | routes)
```

- Examples:

```
admin@sonic:~$ show ipv6 bgp neighbors fc00::72 advertised-routes

admin@sonic:~$ show ipv6 bgp neighbors fc00::72 received-routes

admin@sonic:~$ show ipv6 bgp neighbors fc00::72 routes
```

show route-map

This command displays the routing policy that takes precedence over the other route processes that are configured.

- Usage:

```
show route-map
```

- Example:

```
admin@sonic:~$ show route-map
ZEBRA:
route-map RM_SET_SRC, permit, sequence 10
  Match clauses:
  Set clauses:
    src 10.12.0.102
  Call clause:
  Action:
    Exit routemap
ZEBRA:
route-map RM_SET_SRC6, permit, sequence 10
  Match clauses:
  Set clauses:
    src fc00:1::102
  Call clause:
  Action:
    Exit routemap
BGP:
route-map FROM_BGP_SPEAKER_V4, permit, sequence 10
  Match clauses:
  Set clauses:
  Call clause:
  Action:
    Exit routemap
BGP:
route-map TO_BGP_SPEAKER_V4, deny, sequence 10
  Match clauses:
  Set clauses:
  Call clause:
  Action:
    Exit routemap
BGP:
route-map ISOLATE, permit, sequence 10
  Match clauses:
  Set clauses:
    as-path prepend 65000
  Call clause:
  Action:
    Exit routemap
```

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ZTP Configuration And Show Commands

This section explains all the Zero Touch Provisioning commands that are supported in SONiC.

ZTP show commands

This command displays the current ZTP configuration of the switch. It also displays detailed information about current state of a ZTP session. It displays information related to all configuration sections as defined in the switch provisioning information discovered in a particular ZTP session.

- Usage:
  show ztp status
  show ztp status --verbose
- Example:

```
root@B1-SP1-7712:/home/admin# show ztp status
ZTP Admin Mode : True
ZTP Service    : Inactive
ZTP Status     : SUCCESS
ZTP Source     : dhcp-opt67 (eth0)
Runtime        : 05m 31s
Timestamp      : 2019-09-11 19:12:24 UTC

ZTP Service is not running

01-configdb-json: SUCCESS
02-connectivity-check: SUCCESS
```

Use the verbose option to display more detailed information.

```
root@B1-SP1-7712:/home/admin# show ztp status --verbose
Command: ztp status --verbose
=======================================
ZTP
=======================================
ZTP Admin Mode : True
ZTP Service    : Inactive
ZTP Status     : SUCCESS
ZTP Source     : dhcp-opt67 (eth0)
Runtime        : 05m 31s
Timestamp      : 2019-09-11 19:12:16 UTC
ZTP JSON Version : 1.0

ZTP Service is not running

---------------------------------------
01-configdb-json
---------------------------------------
Status          : SUCCESS
Runtime         : 02m 48s
Timestamp       : 2019-09-11 19:11:55 UTC
Exit Code       : 0
Ignore Result   : False

---------------------------------------
02-connectivity-check
---------------------------------------
Status          : SUCCESS
Runtime         : 04s
Timestamp       : 2019-09-11 19:12:16 UTC
Exit Code       : 0
Ignore Result   : False
```

- Description
  - **ZTP Admin Mode** - Displays if the ZTP feature is administratively enabled or disabled. Possible values are True or False. This value is configurable using "config ztp enabled" and "config ztp disable" commands.
  - **ZTP Service** - Displays the ZTP service status. The following are possible values this field can display:
    - *Active Discovery*: ZTP service is operational and is performing DHCP discovery to learn switch provisioning information
    - *Processing*: ZTP service has discovered switch provisioning information and is processing it
  - **ZTP Status** - Displays the current state and result of ZTP session. The following are possible values this field can display:

        - *IN-PROGRESS*: ZTP session is currently in progress. ZTP service is processing switch provisioning information.
        - *SUCCESS*: ZTP service has successfully processed the switch provisioning information.
        - *FAILED*: ZTP service has failed to process the switch provisioning information.
        - *Not Started*: ZTP service has not started processing the discovered switch provisioning information.
    - **ZTP Source** - Displays the DHCP option and then interface name from which switch provisioning information has been discovered.
    - **Runtime** - Displays the time taken for ZTP process to complete from start to finish. For individual configuration sections it indicates the time taken to process the associated configuration section.
    - **Timestamp** - Displays the date/time stamp when the status field has last changed.
    - **ZTP JSON Version** - Version of ZTP JSON file used for describing switch provisioning information.
    - **Status** - Displays the current state and result of a configuration section. The following are possible values this field can display:
        - *IN-PROGRESS*: Corresponding configuration section is currently being processed.
        - *SUCCESS*: Corresponding configuration section was processed successfully.
        - *FAILED*: Corresponding configuration section failed to execute successfully.
        - *Not Started*: ZTP service has not started processing the corresponding configuration section.
        - *DISABLED*: Corresponding configuration section has been marked as disabled and will not be processed.
    - **Exit Code** - Displays the program exit code of the configuration section executed. Non-zero exit code indicates that the configuration section has failed to execute successfully.
    - **Ignore Result** - If this value is True, the result of the corresponding configuration section is ignored and not used to evaluate the overall ZTP result.
    - **Activity String** - In addition to above information an activity string is displayed indicating the current action being performed by the ZTP service and how much time it has been performing the mentioned activity. Below is an example.
        - (04m 12s) Discovering provisioning data

ZTP configuration commands

This sub-section explains the list of the configuration options available for ZTP.

config ztp enable

Use this command to enable ZTP administrative mode

- Example:

```
root@sonic:/home/admin# config ztp enable
Running command: ztp enable
```

config ztp disable

Use this command to disable ZTP administrative mode. This command can also be used to abort a current ZTP session and load the factory default switch configuration.

- Usage:
  config ztp disable
  config ztp disable -y
- Example:

```
root@sonic:/home/admin# config ztp disable
Active ZTP session will be stopped and disabled, continue? [y/N]: y
Running command: ztp disable -y
```

config ztp run

Use this command to manually restart a new ZTP session. This command deletes the existing */etc/sonic/config_db.json* file and stats ZTP service. It also erases the previous ZTP session data. ZTP configuration is loaded on to the switch and ZTP discovery is performed.

- Usage:
  config ztp run
  config ztp run -y
- Example:

```
root@sonic:/home/admin# config ztp run
ZTP will be restarted. You may lose switch data and connectivity, continue? [y/N]: y
Running command: ztp run -y
```

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STP Commands

This section explains all the Spanning Tree Protocol commands that are supported in SONiC.

STP configuration commands

This command is used to add STP configure.

config spanning-tree version <stp|rstp>

This command config STP mode(stp/rstp) .STP (Spanning Tree Protocol) is a protocol used to prevent loops in a network by creating a tree-like topology. STP achieves this by selecting a root bridge and disabling some of the links in the network to create a loop-free topology. RSTP (Rapid Spanning Tree Protocol) is a protocol used to prevent loops in a network by creating a tree-like topology. It is an improvement over the original STP (Spanning Tree Protocol) in that it has a faster convergence time, meaning it can quickly adapt to changes in the network topology.

- Usage:

```
config spanning-tree version [OPTIONS] <stp|rstp>

spanning-tree version

Options:
-h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config spanning-tree version rstp
```

config spanning-tree priority <priority_value>

This command is to configure STP Bridge priority, and priority_value must be multiple of 4096.In STP,priority is a parameter that is used to determine the priority of a switch in the network. The priority value is used in the election of the root bridge, and the switch with the lowest priority value becomes the root bridge. If two switches have the same priority, the switch with the lowest MAC address becomes the root bridge. Priority values can be manually configured on each switch, or they can be automatically assigned based on the switch model and firmware. The default priority value for STP is 32768.

- Usage:

```
config spanning-tree priority [OPTIONS] <0-61440>

spanning-tree priority

Options:
-h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config spanning-tree priority 32768
```

config spanning-tree forward-delay <forward_delay_value>

This command is to configure STP Bridge forward-delay, and forward_delay_value must be 2* (forward_delay_value-1) >= max_age_value >= 2*(hello_time_value +1).In STP, forward_delay is a parameter that determines the time a switch spends in the listening and learning states before forwarding packets. When a switch receives a BPDU (Bridge Protocol Data Unit) and determines that it is not the root bridge, it moves into the listening state, during which it listens for BPDU messages from other switches. After a period of time, the switch moves into the learning state, during which it learns the MAC addresses of devices connected to its ports. Finally, the switch moves into the forwarding state, during which it forwards packets. The forward_delay parameter is used to ensure that the network topology is stable before forwarding packets, and the default value is 15 seconds.

- Usage:

```
config spanning-tree forward-delay [OPTIONS] <4-30>

spanning-tree forward-delay

Options:
-h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config spanning-tree forward-delay 15
```

config spanning-tree hello <hello_value>

This command is to configure STP Bridge hello-time, and hello_value must be 2* (forward_delay_value-1) >= max_age_value >= 2*(hello_time_value +1).In STP, Hello Time is the interval at which switches send Bridge Protocol Data Unit (BPDU) messages to each other. BPDU messages are used to establish the network topology and calculate the tree. Switches exchange BPDU messages to determine the root bridge and port states. Hello Time determines how often

switches send BPDU messages, or how frequently switches update their information about the network topology. By default, Hello Time is set to 2 seconds, but it can be adjusted as needed.

- Usage:

```
config spanning-tree hello [OPTIONS] <1-10>

spanning-tree hello_time

Options:
-?, -h, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config spanning-tree hello 2
```

config spanning-tree max-age <max_age_value>

This command is to configure STP Bridge max-age, and max_age_value must be 2* (forward_delay_value-1) >= max_age_value >= 2*(hello_time_value +1).In STP, max-age is a parameter that determines the maximum time a switch will consider a BPDU valid.The default value for max-age is 20 seconds.

- Usage:

```
config spanning-tree max-age [OPTIONS] <6-40>

spanning-tree max_age

Options:
-h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config spanning-tree max-age 20
```

config spanning-tree interface autoedge <enable|disable> <interface_name>

This command is to configure STP port autoedge. In STP, autoedge is a feature that allows a port to automatically transition to the forwarding state if it is connected to an end device, such as a computer or printer. End devices do not generate BPDU (Bridge Protocol Data Unit) messages, so autoedge allows the switch to quickly recognize that the port is not part of the spanning tree and can forward packets immediately. If the switch later receives a BPDU on an autoedge port, the port will transition to

the blocking state and participate in the spanning tree. Autoedge is enabled by default on STP-enabled switches.

- Usage:

```
config spanning-tree interface autoedge [OPTIONS] <enable|disable>
                                                   <interface>


spanning-tree interface autoedge

Options:
-h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config spanning-tree interface autoedge enable Ethernet49
```

config spanning-tree interface bpdufilter <enable|disable> <interface_name>

This command is to configure STP port bpdufilter. In STP , bpdufilter is a feature that allows a port to discard all incoming BPDU (Bridge Protocol Data Unit) messages. This can be useful in situations where a switch is connected to a non-STP aware device, such as a server or router, and the switch port should not participate in the spanning tree. By enabling bpdufilter on the port, the switch will not receive or process any BPDU messages on that port. However, enabling bpdufilter on a port can also create a potential loop in the network if the non-STP aware device generates its own BPDU messages. Bpdufilter should be used with caution and only in specific situations where it is necessary.

- Usage:

```
config spanning-tree interface bpdufilter [OPTIONS]
                                             <enable|disable>
                                             <interface>


spanning-tree interface bpdufilter

Options:
-h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config spanning-tree interface bpdufilter disable Ethernet49
```

config spanning-tree interface bpduguard <enable|disable> <interface_name>

This command is to configure STP port bpduguard. In STP , bpduguard is a feature that disables a port if it receives a BPDU (Bridge Protocol Data Unit) message on that port. Bpduguard is designed to

prevent loops in the network caused by rogue switches or misconfigured devices. If a switch detects a BPDU on a port that has bpduguard enabled, the port is immediately disabled and placed into an error-disabled state. This prevents the switch from participating in the spanning tree and potentially causing network problems. Bpduguard should be enabled on ports that are not expected to receive BPDU messages, such as ports connected to end devices or servers.

- Usage:

```
config spanning-tree interface bpduguard [OPTIONS] <enable|disable>
                                                    <interface>


spanning-tree interface bpduguard

Options:
-?, -h, --help  Show this message and exit..
```

- Example:

```
admin@sonic:~$ sudo config spanning-tree interface bpduguard disable Ethernet49
```

config spanning-tree interface cost <cost_value> <interface_name>

This command is to configure STP port path_cost. In STP, path_cost is a parameter that is used to determine the cost of a particular path through the network. The path_cost is calculated based on the bandwidth of the link between switches. The formula for calculating path_cost is 10^8/bandwidth, where bandwidth is measured in bits per second. The path_cost is used in the selection of root and designated ports, as well as in the calculation of the shortest path to the root bridge. By default, the path_cost is set to 20000.

- Usage:

```
config spanning-tree interface cost [OPTIONS] <interface>
                                          <2-200000000>


spanning-tree  interface path-cost

Options:
-?, -h, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config spanning-tree interface cost Ethernet49 20000
```

config spanning-tree interface priority <interface_name> <priority_value>

This command is to configure STP port priority,and port priority_value must be multiple of 16.In STP , port priority is a parameter that is used to determine the priority of a port on a switch. Port priority is used in the election of designated ports, which are the ports that are responsible for forwarding traffic on a segment. The port with the lowest port priority on a segment becomes the designated port. If two ports have the same port priority, the port with the lowest port number becomes the designated port. Port priority can be manually configured on each port, or it can be automatically assigned based on the switch model and firmware. The default port priority value for STP is 128.

- Usage:

```
config spanning-tree interface priority [OPTIONS] <interface>
                                                <0-240>


spanning-tree interface priority

Options:
-h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config spanning-tree interface priority Ethernet49 128
```

STP show commands

This command displays the current STP configuration of the switch. It also displays detailed information about current state of a STP session.

show spanning-tree

This command displays brief information about all the spanning tree Protocol configured in the device. It displays the CIST(Common and Internal Spanning Tree) information.

- Usage:

```
show spanning-tree
```

- Example:

```
admin@sonic:~$ show spanning-tree
Bridge CIST info
enabled         yes
bridge id       8.000.C0:B8:E6:C0:AB:B3
designated root 8.000.C0:B8:E6:C0:AB:B3
regional root   8.000.C0:B8:E6:C0:AB:B3
root port       none
path cost     0          internal path cost   0
max age       20         bridge max age       20
forward delay 15         bridge forward delay 15
tx hold count 6          max hops             20
hello time    2          ageing time          300
force protocol version     rstp
time since topology change 836
topology change count      0
topology change            no
topology change port       None
last topology change port  None
```

show spanning-tree interface

This command displays brief information about all the spanning tree Protocol configured in the device. It displays the CIST(Common and Internal Spanning Tree) information base Port.

- Usage:

```
show spanning-tree interface
show spanning-tree interface <interface_name>
```

- Example:

```
admin@sonic:~$ show spanning-tree interface
Bridge:Ethernet49 CIST info
enabled            yes                     role                 Designated
port id            8.002                   state                forwarding
external port cost 500                     admin external cost  0
internal port cost 500                     admin internal cost  0
designated root    8.000.C0:B8:E6:C0:AB:B3 dsgn external cost   0
dsgn regional root 8.000.C0:B8:E6:C0:AB:B3 dsgn internal cost   0
designated bridge  8.000.C0:B8:E6:C0:AB:B3 designated port      8.002
admin edge port    no                      auto edge port       yes
oper edge port     yes                     topology change ack  no
point-to-point     yes                     admin point-to-point auto
restricted role    no                      restricted TCN       no
port hello time    2                       disputed             no
bpdu guard port    no                      bpdu guard error     no
network port       no                      BA inconsistent      no
bpdu filter port   no                      Num RX BPDU Filtered 0
Num TX BPDU        1239                    Num TX TCN           0
Num RX BPDU        0                       Num RX TCN           0
Num Transition FWD 1                       Num Transition BLK   1
Rcvd BPDU          no                      Rcvd STP             no
Rcvd RSTP          no                      Send RSTP            yes
Rcvd TC Ack        no                      Rcvd TCN             no
Bridge:Ethernet51 CIST info
enabled            yes                     role                 Designated
port id            8.003                   state                forwarding
external port cost 500                     admin external cost  0
internal port cost 500                     admin internal cost  0
designated root    8.000.C0:B8:E6:C0:AB:B3 dsgn external cost   0
dsgn regional root 8.000.C0:B8:E6:C0:AB:B3 dsgn internal cost   0
designated bridge  8.000.C0:B8:E6:C0:AB:B3 designated port      8.003
admin edge port    no                      auto edge port       yes
oper edge port     yes                     topology change ack  no
point-to-point     yes                     admin point-to-point auto
restricted role    no                      restricted TCN       no
port hello time    2                       disputed             no
bpdu guard port    no                      bpdu guard error     no
network port       no                      BA inconsistent      no
bpdu filter port   no                      Num RX BPDU Filtered 0
Num TX BPDU        1239                    Num TX TCN           0
Num RX BPDU        0                       Num RX TCN           0
Num Transition FWD 1                       Num Transition BLK   1
Rcvd BPDU          no                      Rcvd STP             no
Rcvd RSTP          no                      Send RSTP            yes
Rcvd TC Ack        no                      Rcvd TCN             no

admin@sonic:~$ show spanning-tree interface Ethernet49
Bridge:Ethernet49 CIST info
enabled            yes                     role                 Designated
port id            8.002                   state                forwarding
external port cost 500                     admin external cost  0
```

```
internal port cost 500                     admin internal cost  0
designated root    8.000.C0:B8:E6:C0:AB:B3 dsgn external cost   0
dsgn regional root 8.000.C0:B8:E6:C0:AB:B3 dsgn internal cost   0
designated bridge  8.000.C0:B8:E6:C0:AB:B3 designated port      8.002
admin edge port    no                      auto edge port       yes
oper edge port     yes                     topology change ack  no
point-to-point     yes                     admin point-to-point auto
restricted role    no                      restricted TCN       no
port hello time    2                       disputed             no
bpdu guard port    no                      bpdu guard error     no
network port       no                      BA inconsistent      no
bpdu filter port   no                      Num RX BPDU Filtered 0
Num TX BPDU        1239                    Num TX TCN           0
Num RX BPDU        0                       Num RX TCN           0
Num Transition FWD 1                       Num Transition BLK   1
Rcvd BPDU          no                      Rcvd STP             no
Rcvd RSTP          no                      Send RSTP            yes
Rcvd TC Ack        no                      Rcvd TCN             no
```

show runningconfiguration spanning-tree

This command displays the STP view setting.

- Usage:

```
show runningconfiguration spanning-tree
```

- Example:

```
admin@sonic:~$ show runningconfiguration spanning-tree
"STP":
{
    "GLOBAL": {
        "force_version": "rstp",
        "forward_delay": "15",
        "hello_time": "2",
        "max_age": "20",
        "priority": "32768"
    }
}
"STP_PORT":
{
    "Ethernet49": {
        "autoedge": "disable",
        "bpdu_filter": "disable",
        "bpdu_guard": "disable",
        "path_cost": "500",
        "priority": "128"
    }
}
```

STP clear commands

This command is for clearing BPDU (Bridge Protocol Data Unit) messages.

sonic-clear spanning-tree statistics

The command is used to clear the statistics for the Spanning Tree Protocol. This command clears all the counters and statistics related to STP, including the number of packets received and transmitted, the number of topology changes, and the number of BPDU (Bridge Protocol Data Unit) messages sent and received. This command can be useful for troubleshooting STP-related issues, as it allows the user to start with a fresh set of statistics and counters.

- Usage:

```
sonic-clear spanning-tree [OPTIONS] COMMAND [ARGS]...

Clear Spanning-tree counters

Options:
-?, -h, --help  Show this message and exit.

Commands:
statistics
```

- Example:

```
admin@sonic:~$ sudo sonic-clear spanning-tree statistics
```

sonic-clear spanning-tree statistics interface <interface_name>

The command is used to clear the statistics for the STP port. provide the interface name with the sub-command.

- Usage:

```
sonic-clear spanning-tree statistics interface <interface_name>

Options:
-h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo sonic-clear spanning-tree statistics interface Ethernet49
```

STP debug commands

This command is used to display the STP log level, which is convenient for debugging.

debug spanning-tree loglevel

This command is used to display the STP log level

- Usage:

```
debug spanning-tree loglevel [OPTIONS] <DEBUG|INFO|ERROR>

Options:
-?, -h, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo debug spanning-tree loglevel DEBUG
```

VRRP Commands

This section explains all the Virtual Router Redundancy Protocol commands that are supported in SONiC.

VRRP configuration commands

This command is used to add VRRP configure.

config interface vrrp add <interface_name> <vrrp_id>

This command adds a VRRP instance on an interface.

- Usage:

```
Usage: config interface vrrp add [OPTIONS] <interface_name> <vrrp_id>

  Add vrrp instance to the interface

Options:
  -?, -h, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config interface vrrp add Ethernet51 5
```

config interface vrrp remove <interface_name> <vrrp_id>

This command removes a VRRP instance on an interface.

- Usage:

```
Usage: config interface vrrp remove [OPTIONS] <interface_name> <vrrp_id>

  Remove vrrp instance to the interface

Options:
  -h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config interface vrrp remove Ethernet51 5
```

config interface vrrp backup_forward <interface_name> <vrrp_id>

This command configures enables/disables the VRRP instance to forward service traffic even if the VRRP instance in the backup state.

- Usage:

```
Usage: config interface vrrp backup_forward [OPTIONS] <interface_name>
                                             <vrrp_id> <forward>

  Config backup_forward mode to the vrrp instance

Options:
  -h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config interface vrrp backup_forward Ethernet51 5 enabled
```

config interface vrrp ip add <interface_name> <vrrp_id> <ip_addr>

This command adds a virtual IP address for a VRRP instance on an interface.

- Usage:

```
Usage: config interface vrrp ip add [OPTIONS] <interface_name> <vrrp_id>
                                    <ip_addr>

  Add IPv4 or IPv6 address to the vrrp instance

Options:
  -h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config interface vrrp ip add Ethernet51 5 10.10.10.10/24
```

config interface vrrp ip remove <interface_name> <vrrp_id> <ip_addr>

This command removes a virtual IP address for a VRRP instance on an interface.

- Usage:

```
Usage: config interface vrrp ip remove [OPTIONS] <interface_name> <vrrp_id>
                                       <ip_addr>

  Remove IPv4 or IPv6 address to the vrrp instance

Options:
  -h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config interface vrrp ip remove Ethernet51 5 10.10.10.10/24
```

config interface vrrp adv_interval <interface_name> <vrrp_id>

This command configures VRRP periodic advertisement interval for a VRRP instance.

- Usage:

```
Usage: config interface vrrp adv_interval [OPTIONS] <interface_name> <vrrp_id>
                                          <interval>

  config adv_interval to the vrrp instance

Options:
  -?, -h, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config interface vrrp adv_interval Ethernet51 5 1200
```

config interface vrrp priority <interface_name> <vrrp_id>

This command configures priority for a VRRP instance.

- Usage:

```
Usage: config interface vrrp priority [OPTIONS] <interface_name> <vrrp_id>
                                      <priority>

  config priority to the vrrp instance

Options:
  -?, -h, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config interface vrrp priority Ethernet51 5 120
```

config interface vrrp pre_empt <interface_name> <vrrp_id>

This command enables/disables pre-emption of a Master when a higher priority VRRP router arrives.

- Usage:

```
Usage: config interface vrrp pre_empt [OPTIONS] <interface_name> <vrrp_id>
                                      <mode>

  Config pre_empt mode to the vrrp instance

Options:
  -h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config interface vrrp pre_empt Ethernet51 5 enabled
```

config interface vrrp track_interface add <interface_name> <vrrp_id> <track_interface>

This command adds a track interface to a VRRP Instance.

- Usage:

```
Usage: config interface vrrp track_interface add [OPTIONS] <interface_name>
                                                  <vrrp_id> <track_interface>
                                                  <weight>

  add track_interface to the vrrp instance

Options:
  -h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config interface vrrp track_interface add Ethernet51 5 Ethernet4 20
```

config interface vrrp shutdown <interface_name> <vrrp_id>

This command configs the vrrp instance into administrative shutdown.

- Usage:

```
Usage: config interface vrrp shutdown [OPTIONS] <interface_name> <vrrp_id>

  Config the vrrp instance into administrative shutdown

Options:
  -?, -h, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config interface vrrp shutdown Ethernet51 5
```

config interface vrrp startup <interface_name> <vrrp_id>

This command configs the vrrp instance into administrative up.

- Usage:

```
Usage: config interface vrrp startup [OPTIONS] <interface_name> <vrrp_id>

  Config the vrrp instance into administrative up

Options:
  -?, -h, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config interface vrrp startup Ethernet51 5
```

VRRP show commands

show vrrp summary

This command displays a summary of the vrrp instances information.

- Usage:

```
Usage: show vrrp summary [OPTIONS]

  show vrrp summary

Options:
  --verbose       Enable verbose output
  -h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ show vrrp summary

Interface      VRID    Configured Priority    Priority    IPv4    IPv6  State (v4)    State (v6)
-----------  ------  ---------------------  ----------  ------  ------  ------------  ------------
Ethernet2        10                    100         100       0       0  Backup        Backup
Ethernet53        5                    100         100       1       0  Master        Backup
```

show vrrp interface <interface_name>

This command displays the VRRP instance information for the specified interface.

- Usage:

```
Usage: show vrrp interface [OPTIONS] <interface_name> <vrid>

  show vrrp interface <interface_name> <vrid>

Options:
  --verbose       Enable verbose output
  -h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ show vrrp interface Ethernet53

Virtual Router ID                   5
Protocol Version                    3
Autoconfigured                      No
Shutdown                            No
Interface                           Ethernet53
VRRP interface (v4)                 Vrrp4-5
VRRP interface (v6)                 None
Primary IP (v4)                     10.0.0.98
Primary IP (v6)                     ::
Virtual MAC (v4)                    00:00:5e:00:01:05
Virtual MAC (v6)                    00:00:5e:00:02:05
Status (v4)                         Master
Status (v6)                         Initialize
Priority                            100
Effective Priority (v4)             100
Effective Priority (v6)             100
Preempt Mode                        Yes
Accept Mode                         Yes
Advertisement Interval              1000 ms
Master Advertisement Interval (v4)  1000 ms
Master Advertisement Interval (v6)  0 ms
Advertisements Tx (v4)              1
Advertisements Tx (v6)              0
Advertisements Rx (v4)              0
Advertisements Rx (v6)              0
Gratuitous ARP Tx (v4)              1
Neigh. Adverts Tx (v6)              0
State transitions (v4)              2
State transitions (v6)              0
Skew Time (v4)                      600 ms
Skew Time (v6)                      0 ms
Master Down Interval (v4)           3600 ms
Master Down Interval (v6)           0 ms
IPv4 Addresses                      1
.............................       11.11.11.11
IPv6 Addresses                      0
```

show vrrp vrid

This command displays the VRRP instance information for the specified vrid.

- Usage:

```
Usage: show vrrp vrid [OPTIONS] <vrid>

  show vrrp vrid <vrid>

Options:
  --verbose       Enable verbose output
  -h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ show vrrp vrid 5

Virtual Router ID                   5
Protocol Version                    3
Autoconfigured                      No
Shutdown                            No
Interface                           Ethernet53
VRRP interface (v4)                 Vrrp4-5
VRRP interface (v6)                 None
Primary IP (v4)                     10.0.0.98
Primary IP (v6)                     ::
Virtual MAC (v4)                    00:00:5e:00:01:05
Virtual MAC (v6)                    00:00:5e:00:02:05
Status (v4)                         Master
Status (v6)                         Initialize
Priority                            100
Effective Priority (v4)             100
Effective Priority (v6)             100
Preempt Mode                        Yes
Accept Mode                         Yes
Advertisement Interval              1000 ms
Master Advertisement Interval (v4)  1000 ms
Master Advertisement Interval (v6)  0 ms
Advertisements Tx (v4)              1
Advertisements Tx (v6)              0
Advertisements Rx (v4)              0
Advertisements Rx (v6)              0
Gratuitous ARP Tx (v4)              1
Neigh. Adverts Tx (v6)              0
State transitions (v4)              2
State transitions (v6)              0
Skew Time (v4)                      600 ms
Skew Time (v6)                      0 ms
Master Down Interval (v4)           3600 ms
Master Down Interval (v6)           0 ms
IPv4 Addresses                      1
.............................       11.11.11.11
IPv6 Addresses                      0
```

OSPF Commands

This section explains all the OSPF commands that are supported in SONiC.

OSPF configuration commands

This command is used to add OSPF configure.

config frr mgmt-framework <true|false>

This command config FRR mgmt-framework. FRRouting is an open source Internet routing protocol suite. frr mgmt-framework is the framework used to manage frr under SONiC. The frr suite contains many protocol components, including OSPF. to use SONiC's OSPF commands, must set mgmt-framework as true.

- Usage:

```
config frr mgmt-framework [OPTIONS] <true|false>

Options:
-h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config frr mgmt-framework 'true'
```

config docker-routing-config-mode <unified|split|separated>

This command config the bgp docker routing config mode. When it is 'spilt', it will stop your configuration from being overrwirrten with a builtin template each time the FFR docker container is restarted. When it is 'unified' or 'seperated', both of which overwrite any FRR routing protocol configuration.

- Usage:

```
config docker-routing-config-mode [OPTIONS] <unified|split|separated>

Options:
-h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config docker-routing-config-mode split
```

config frr ospf add router-id <A.B.C.D> [--vrfname VRF]

This sets the router-ID of the OSPF process. It MUST be unique within the entire OSPF domain to the OSPF speaker - bad things will happen if multiple OSPF speakers are configured with the same router-ID!

- Usage:

```
config frr ospf add router-id <A.B.C.D> [--vrfname VRF]

Options:
-h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config frr ospf add router-id 10.0.0.5
```

config frr ospf add network-area <A.B.C.D/M> area <A.B.C.D> [--vrfname VRF]

This command specifies the OSPF enabled interface(s). If the interface has an address from range A.B.C.D/M then the command below enables ospf on this interface so router can provide network information to the other ospf routers via this interface.

- Usage:

```
config frr ospf add network-area <A.B.C.D/M> area <A.B.C.D> [--vrfname VRF]

Options:
-h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config frr ospf add network-area 192.168.0.1/24 area 0.0.0.5
```

config frr ospf add interface-area <A.B.C.D> <A.B.C.D> [--vrfname VRF]

Enable OSPF on the interface, optionally restricted to just the IP address given by ADDR, putting it in the AREA area.

- Usage:

```
config frr ospf add network-area <A.B.C.D/M> area <A.B.C.D> [--vrfname VRF]

Options:
-h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config frr ospf add interface-area Ethernet12 10.0.0.24 0.0.0.5
```

config frr ospf add interface-network-type <A.B.C.D> <broadcast|point-to-point|point-to-multipoint|non-broadcast> [--vrfname VRF]

When configuring a point-to-point network on an interface and the interface has a /32 address associated with then OSPF will treat the interface as being unnumbered.

- Usage:

```
config frr ospf add interface-network-type <INTERFACE> <A.B.C.D> <broadcast|point-to-point|point-to-multipoi

Options:
-h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ config frr ospf add interface-network-type Ethernet12 10.0.0.24 broadcast
```

config frr ospf add area-virtual-link <A.B.C.D> virtual-link <A.B.C.D> [--vrfname VRF]

This command set virtual-link for area.

- Usage:

```
config frr ospf add area-virtual-link <A.B.C.D> virtual-link <A.B.C.D> [--vrfname VRF]

Options:
-h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ config frr ospf add area-virtual-link 0.0.0.2 virtual-link 0.0.0.6
```

config frr ospf add area-range <A.B.C.D> range <A.B.C.D/M> [--advertise <true|false>] [--cost (0-167777214)] [--vrfname VRF]

Summarize intra area paths from specified area into one Type-3 summary-LSA announced to other areas.

- Usage:

```
config frr ospf add area-range <A.B.C.D> range <A.B.C.D/M> [--vrfname VRF]

Options:
-h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ config frr ospf add area-range 0.0.0.5 range 192.168.10.2/24
```

config frr ospf add redistribution <arp-host|bgp|eigrp|kernel|openfabric|rip|static|vnc|babel|connected|isis|nhrp|ospf|sharp|table> [--metric-type (1-2)] [--metric (0-16777214)] [--route-map NAME] [--vrfname VRF]

Redistribute routes of the specified protocol or kind into OSPF, with the metric type and metric set if specified, filtering the routes using the given route-map if specified.

- Usage:

```
config frr ospf add redistribution <arp-host|bgp|eigrp|kernel|openfabric|rip|static|vnc|babel|connected|isis

Options:
-h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config frr ospf add redistribution ospf
```

config frr ospf6 add router-id <A.B.C.D>

Set router's Router-ID.

- Usage:

```
config frr ospf6 add router-id <A.B.C.D> [--vrfname VRF]

Options:
-h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config frr ospf6 add router-id 10.0.0.5
```

config frr ospf6 add interface-area <A.B.C.D>

Enable OSPFv3 on the interface and add it to the specified area.

- Usage:

```
config frr ospf6 add network-area <INTERFACE> <A.B.C.D>

Options:
-h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config frr ospf6 add interface-area Ethernet14 0.0.0.5
```

config frr ospf6 add interface-network-type <broadcast|point-to-point>

Set explicitly network type for specified interface.

- Usage:

```
config frr ospf6 add interface-network-type <INTERFACE> <broadcast|point-to-point>

Options:
-h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ config frr ospf6 add interface-network-type Ethernet12 broadcast
```

config frr ospf6 add area-range <A.B.C.D> range <A::B/M> [--advertise <true|false>] [--cost (0-167777214)]

Summarize a group of internal subnets into a single Inter-Area-Prefix LSA. This command can only be used at the area boundary (ABR router).

- Usage:

```
config frr ospf6 add area-range <A.B.C.D> range <A::B/M> [--advertise <true|false>] [--cost (0-167777214)]

Options:
-h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ config frr ospf6 add area-range 0.0.0.5 range 1100::5/64
```

config frr ospf6 add redistribution <babel|bgp|connected|isis|kernel|nd-route|nhrp|openfabric|ripng|sharp|static|table|vnc> [--route-map NAME]

Redistribute routes of the specified protocol or kind into OSPFv3, with the metric type and metric set if specified, filtering the routes using the given route-map if specified.

- Usage:

```
config frr ospf6 add redistribution <babel|bgp|connected|isis|kernel|nd-route|nhrp|openfabric|ripng|sharp|st

Options:
-h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config frr ospf6 add redistribution bgp
```

OSPF show commands

show ip ospf <all|border-routers|database|interface|neighbor|route|router-info>

This command displays the ospf status.

- Usage:

```
show ip ospf <all|border-routers|database|interface|neighbor|route|router-info>
```

- Example:

```
admin@sonic:~$ show ip ospf all
 OSPF Routing Process, Router ID: 10.0.0.5
 Supports only single TOS (TOS0) routes
 This implementation conforms to RFC2328
 RFC1583Compatibility flag is disabled
 OpaqueCapability flag is disabled
 Initial SPF scheduling delay 0 millisec(s)
 Minimum hold time between consecutive SPFs 50 millisec(s)
 Maximum hold time between consecutive SPFs 5000 millisec(s)
 Hold time multiplier is currently 1
 SPF algorithm last executed 44m57s ago
 Last SPF duration 23 usecs
 SPF timer is inactive
 LSA minimum interval 5000 msecs
 LSA minimum arrival 1000 msecs
 Write Multiplier set to 20
 Refresh timer 10 secs
 Number of external LSA 0. Checksum Sum 0x00000000
 Number of opaque AS LSA 0. Checksum Sum 0x00000000
 Number of areas attached to this router: 4
 Area ID: 0.0.0.0 (Backbone)
   Number of interfaces in this area: Total: 1, Active: 0
   Number of fully adjacent neighbors in this area: 0
   Area has no authentication
   SPF algorithm executed 0 times
   Number of LSA 0
   Number of router LSA 0. Checksum Sum 0x00000000
   Number of network LSA 0. Checksum Sum 0x00000000
   Number of summary LSA 0. Checksum Sum 0x00000000
   Number of ASBR summary LSA 0. Checksum Sum 0x00000000
   Number of NSSA LSA 0. Checksum Sum 0x00000000
   Number of opaque link LSA 0. Checksum Sum 0x00000000
   Number of opaque area LSA 0. Checksum Sum 0x00000000

 Area ID: 0.0.0.1
   Shortcutting mode: Default, S-bit consensus: ok
   Number of interfaces in this area: Total: 0, Active: 0
   Number of fully adjacent neighbors in this area: 0
   Area has no authentication
   Number of full virtual adjacencies going through this area: 0
   SPF algorithm executed 3 times
   Number of LSA 1
   Number of router LSA 1. Checksum Sum 0x00004ef4
   Number of network LSA 0. Checksum Sum 0x00000000
   Number of summary LSA 0. Checksum Sum 0x00000000
   Number of ASBR summary LSA 0. Checksum Sum 0x00000000
   Number of NSSA LSA 0. Checksum Sum 0x00000000
   Number of opaque link LSA 0. Checksum Sum 0x00000000
   Number of opaque area LSA 0. Checksum Sum 0x00000000
```

show ipv6 ospf6 <all|border-routers|interface|neighbor|route|area|database|linkstate|redistribute|spf>

This command displays the ospf6 status.

- Usage:

```
show ipv6 ospf6 <all|border-routers|interface|neighbor|route|area|database|linkstate|redistribute|spf>
```

- Example:

```
admin@sonic:~$ show ipv6 ospf6 all
 OSPFv3 Routing Process (0) with Router-ID 51.0.0.1
 Running 00:28:28
 LSA minimum arrival 1000 msecs
 Initial SPF scheduling delay 0 millisec(s)
 Minimum hold time between consecutive SPFs 50 millsecond(s)
 Maximum hold time between consecutive SPFs 5000 millsecond(s)
 Hold time multiplier is currently 1
 SPF algorithm has not been run
 SPF timer is inactive
 Number of AS scoped LSAs is 0
 Number of areas in this router is 1

 Area 0.0.0.5
     Number of Area scoped LSAs is 0
     Interface attached to this area: Ethernet14
SPF has not been run
```

L2MC Commands

This section explains all the L2MC(Layer-2 Multicast) commands that are supported in SONiC.

L2MC configuration commands

This command is used to add L2MC configure.

config igmp-snooping <enable|disable> <vlan_id>

This command configure IGMP snooping VLAN. Devices running IGMP Snooping provide multicast services based on VLANs. Multicast streams can only be forwarded within the VLAN to which they belong, and user hosts can only apply for multicast streams within the VLAN to which they belong.

- Usage:

```
 config igmp-snooping [OPTIONS] COMMAND [ARGS]...

Options:
  -s, --redis-unix-socket-path TEXT
                                  unix socket path for redis connection
  -h, -?, --help                  Show this message and exit.

Commands:
  disable                     Disable for a VLAN
  enable                      Enable for a VLAN
```

- Example:

```
admin@sonic:~$ sudo config igmp-snooping enable 10
admin@sonic:~$ sudo config igmp-snooping disable 10
```

config igmp-snooping querier <enable|disable> <vlan_id>

This command configuring VLAN-based IGMP Snooping querier. In a Layer 3 multicast network, the Layer 3 multicast device acts as a querier and runs the IGMP protocol to maintain group membership. Layer 2 multicast devices only need to listen to IGMP messages to establish and maintain forwarding entries to implement Layer 2 multicast. However, in a scenario where the multicast source and the user host are on the same Layer 2 network, the query item function cannot be implemented because the Layer 2 device does not support IGMP. To solve this problem, enable the IGMP Snooping querier on the Layer 2 device, send IGMP Query messages to the user host instead of the Layer 3 multicast device, and monitor and maintain the IGMP Report messages answered by the user to establish Layer 2 multicast. forwarding entry.

- Usage:

```
Configure IGMP snooping  querier

Options:
  -?, -h, --help  Show this message and exit.

Commands:
  disable  Disable IGMP Querier for a VLAN
  enable   Enable IGMP Querier for a VLAN
```

- Example:

```
admin@sonic:~$ sudo config igmp-snooping querier enable 10
admin@sonic:~$ sudo config igmp-snooping querier disable 10
```

config igmp-snooping fast-leave <enable|disable> <vlan_id>

This command configuring VLAN-based IGMP Snooping fast leave. After the port fast leave function is enabled, when a port of the device receives a Leave message (including IGMPv2 Leave message and IGMPv3 INCLUDE type Report message without any source address), it directly forwards the member of the corresponding forwarding entry from the Delete the port. After that, when the device receives the corresponding specific group query packets and multicast data packets, the device will no longer forward them to the port.

- Usage:

```
Configure IGMP snooping fast-leave

Options:
  -?, -h, --help  Show this message and exit.

Commands:
  disable  Disable IGMP fast-leave for a VLAN
  enable   Enable IGMP fast-leave for a VLAN
```

- Example:

```
admin@sonic:~$ sudo config igmp-snooping fast-leave enable 10
admin@sonic:~$ sudo config igmp-snooping fast-leave disable 10
```

config igmp-snooping query-interval <vlan_id>

This command configuring VLAN-based IGMP Snooping query interval.The IGMP Snooping querier sends query messages periodically. This parameter defines the sending interval of the query messages. The valid range is 1s to 18000s.

- Usage:

```
IGMP Query Interval for a VLAN

Options:
  -?, -h, --help  Show this message and exit.xit.
```

- Example:

```
admin@sonic:~$ sudo config igmp-snooping query-interval 10 125
```

config igmp-snooping last-member-query-interval <vlan_id>

This command configure VLAN-based IGMP Snooping last member query interval. This command When the querier receives an IGMP leave message, it verifies that the multicast group has no remaining listeners by sending a set of group-specific queries at a configured interval. If the querier

does not receive a response to the query, it deletes the multicast and stops forwarding multicast traffic. This command configures the sending interval for sending specific multicast or specific group source query messages to the interface. The valid range is 100ms to 25500ms.

- Usage:

```
Last Member Query Interval for a VLAN

Options:
  -?, -h, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config igmp-snooping last-member-query-interval 10 1000
```

config igmp-snooping query-max-response-time <vlan_id>

This command Configuring the maximum response time of VLAN-based IGMP Snooping query. After receiving the query message from the device, the host in the network segment directly connected to the device needs to respond to the Report message within the maximum response time. This function allows you to configure the maximum response time on the device, requiring the host to respond to the Report message after receiving the query message sent by the device. If the host does not respond to the Report message within the maximum response time, the device will consider that there are no group members in the directly connected network segment and delete the group information. The valid range is 1s to 25s.

- Usage:

```
 Query Max Response Time  for a VLAN

Options:
  -?, -h, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ sudo config igmp-snooping query-max-response-time 10 10
```

config igmp-snooping mrouter <add|del> <vlan_id> <interface_name>

This command configure VLAN-based mrouter interface.The role of the routing connection port is to receive upstream multicast data and guide the forwarding of IGMP Report/Leave messages. When an interface is configured as a static routing interface, the interface will not age and can forward IGMP Report/Leave messages to the upstream IGMP querier stably for a long time.

- Usage:

```
Configure IGMP snooping mrouter

Options:
  -h, -?, --help  Show this message and exit.

Commands:
  add  Add router interface for VLAN
  del  Remove router interface from VLAN
```

- Example:

```
admin@sonic:~$ config igmp-snooping mrouter add 10 Ethernet1
admin@sonic:~$ config igmp-snooping mrouter del 10 Ethernet1
```

config igmp-snooping static-group <add|del> <vlan_id> <interface_name> <ip_addr>

This command configure VLAN-based static member interfaces.Configure the interface connecting the member host as a static member port. Then the member host can receive the multicast stream of the specified multicast group regardless of whether it joins the multicast group, and the static member port will not be aged out.

- Usage:

```
Configure IGMP snooping static-group

Options:
  -h, -?, --help  Show this message and exit.

Commands:
  add  Add static-group for VLAN
  del  Del static-group for VLAN
```

- Example:

```
admin@sonic:~$ config igmp-snooping static-group add 10 Ethernet2 224.1.1.1
admin@sonic:~$ config igmp-snooping static-group del 10 Ethernet2 224.1.1.1
```

sudo config igmp-snooping version <vlan_id>

This command configuring VLAN-based IGMP Snooping version.Configuring the IGMP Snooping version can specify the version of IGMP messages that IGMP Snooping can process.Configuring IGMP Snooping v3 version can process all information of IGMPv1, IGMPv2 and IGMPv3 messages.

IGMP Snooping v2 only performs simple processing on IGMPv3 and does not process the source information carried in the packets.

- Usage:

```
IGMP Version

Options:
  -?, -h, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ config igmp-snooping version 10 2
```

L2MC show commands

show igmp-snooping all

This command displays IGMP Snooping protocol configuration on all VLANs

- Usage:

```
Show IGMP snooping all

Options:
  -h, -?, --help  Show this message and exit.
```

- Example:

```
root@sonic:/home/admin/ll# show igmp-snooping all

Vlan ID: 1
Multicast Router ports:
Querier - false
IGMP Operation mode: IGMPv2
Is Fast-Leave Enabled: Disabled
Max Response time = 10
Query Interval = 125
Last Member Query Interval = 1000


Vlan ID: 10
Multicast Router ports: Ethernet1
Querier - false
IGMP Operation mode: IGMPv2
Is Fast-Leave Enabled: Disabled
Max Response time = 10
Query Interval = 125
Last Member Query Interval = 1000

Total number of entries:  2
```

show igmp-snooping vlan <vlan_id>

This command displays IGMP Snooping protocol configuration on a specific VLAN.

- Usage:

```
Show IGMP snooping vlan <vlan-id>

Options:
 -h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ show igmp-snooping vlan 10
Vlan ID: 10
Multicast Router ports: Ethernet1
Querier - false
IGMP Operation mode: IGMPv2
Is Fast-Leave Enabled: Disabled
Max Response time = 10
Query Interval = 125
Last Member Query Interval = 1000
```

show igmp-snooping groups all

This command displays L2MC entries for all VLANs

- Usage:

```
Show IGMP snooping groups all

Options:
  -h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ show igmp-snooping groups all

Vlan ID : 1
--------------
Total number of entries: 0

Vlan ID : 10
--------------
Mrouters Ports:
  Ethernet1(static)
1 (*, 224.1.1.1)
  Members Ports:
    Ethernet2(static)
Total number of entries: 1
```

show igmp-snooping groups vlan <vlan_id>

This command displays L2MC entries for specific VLANs

- Usage:

```
Show IGMP snooping groups vlan <vlan-id>

Options:
  -h, -?, --help  Show this message and exit.
```

- Example:

```
admin@sonic:~$ show igmp-snooping groups vlan 10

Vlan ID : 10
--------------
Mrouters Ports:
  Ethernet1(static)
1 (*, 224.1.1.1)
  Members Ports:
    Ethernet2(static)
Total number of entries: 1
```