AOS-CX 10.09 CoPP Guide

6200, 6300, 6400 Switch Series

aruba

a Hewlett Packard
Enterprise company

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Contents

This document describes features of the AOS-CX network operating system. It is intended for administrators responsible for installing, configuring, and managing Aruba switches on a network.

Applicable products

This document applies to the following products:

- Aruba 6200 Switch Series (JL724A, JL725A, JL726A, JL727A, JL728A)
- Aruba 6300 Switch Series (JL658A, JL659A, JL660A, JL661A, JL662A, JL663A, JL664A, JL665A, JL666A, JL667A, JL668A, JL762A)
- Aruba 6400 Switch Series (JL741A, R0X26A, R0X27A, R0X29A, R0X30A)

Latest version available online

Updates to this document can occur after initial publication. For the latest versions of product documentation, see the links provided in Support and Other Resources.

Command syntax notation conventions

Convention	Usage
`example-text`	Identifies commands and their options and operands, code examples, filenames, pathnames, and output displayed in a command window. Items that appear like the example text in the previous column are to be entered exactly as shown and are required unless enclosed in brackets (`[ ]`).
example-text	In code and screen examples, indicates text entered by a user.
Any of the following: ■ *`<example-text>`* ■ `<example-text>` ■ *example-text* ■ *example-text*	Identifies a placeholder—such as a parameter or a variable—that you must substitute with an actual value in a command or in code: ■ For output formats where italic text cannot be displayed, variables are enclosed in angle brackets (`< >`). Substitute the text—including the enclosing angle brackets—with an actual value. ■ For output formats where italic text can be displayed, variables might or might not be enclosed in angle brackets. Substitute the text including the enclosing angle brackets, if any, with an actual value.
|	Vertical bar. A logical `OR` that separates multiple items from which you can choose only one. Any spaces that are on either side of the vertical bar are included for readability and are not a required part of the command syntax.

Convention	Usage
`{ }`	Braces. Indicates that at least one of the enclosed items is required.
`[ ]`	Brackets. Indicates that the enclosed item or items are optional.
… or `...`	Ellipsis: ■ In code and screen examples, a vertical or horizontal ellipsis indicates an omission of information. ■ In syntax using brackets and braces, an ellipsis indicates items that can be repeated. When an item followed by ellipses is enclosed in brackets, zero or more items can be specified.

About the examples

Examples in this document are representative and might not match your particular switch or environment.

The slot and port numbers in this document are for illustration only and might be unavailable on your switch.

Understanding the CLI prompts

When illustrating the prompts in the command line interface (CLI), this document uses the generic term `switch`, instead of the host name of the switch. For example:
`switch>`

The CLI prompt indicates the current command context. For example:
`switch>`

Indicates the operator command context.
`switch#`

Indicates the manager command context.

`switch(CONTEXT-NAME)#`

Indicates the configuration context for a feature. For example:
`switch(config-if)#`

Identifies the `interface` context.

Variable information in CLI prompts

In certain configuration contexts, the prompt may include variable information. For example, when in the VLAN configuration context, a VLAN number appears in the prompt:
`switch(config-vlan-100)#`

When referring to this context, this document uses the syntax:
`switch(config-vlan-<VLAN-ID>)#`

Where `<VLAN-ID>` is a variable representing the VLAN number.

Identifying switch ports and interfaces

Physical ports on the switch and their corresponding logical software interfaces are identified using the format:
`member/slot/port`

On the 6200 Switch Series

- *member*: Member number of the switch in a Virtual Switching Framework (VSF) stack. Range: 1 to 8. The primary switch is always member 1. If the switch is not a member of a VSF stack, then member is 1.
- *slot*: Always 1. This is not a modular switch, so there are no slots.
- *port*: Physical number of a port on the switch.

For example, the logical interface `1/1/4` in software is associated with physical port 4 in slot 1 on member 1.

On the 6300 Switch Series

- *member*: Member number of the switch in a Virtual Switching Framework (VSF) stack. Range: 1 to 10. The primary switch is always member 1. If the switch is not a member of a VSF stack, then member is 1.
- *slot*: Always 1. This is not a modular switch, so there are no slots.
- *port*: Physical number of a port on the switch.

For example, the logical interface `1/1/4` in software is associated with physical port 4 on member 1.

On the 6400 Switch Series

- *member*: Always 1. VSF is not supported on this switch.
- *slot*: Specifies physical location of a module in the switch chassis.
  - Management modules are on the front of the switch in slots 1/1 and 1/2.
  - Line modules are on the front of the switch starting in slot 1/3.
- *port*: Physical number of a port on a line module.

For example, the logical interface `1/3/4` in software is associated with physical port 4 in slot 3 on member 1.

Identifying modular switch components

- Power supplies are on the front of the switch behind the bezel above the management modules. Power supplies are labeled in software in the format: *member/power supply*:
  - *member*: 1.
  - *power supply*: 1 to 4.
- Fans are on the rear of the switch and are labeled in software as: *member/tray/fan*:
  - *member*: 1.
  - *tray*: 1 to 4.
  - *fan*: 1 to 4.
- Fabric modules are not labeled on the switch but are labeled in software in the format: *member/module*:
  - *member*: 1.
  - *member*: 1 or 2.
- The display module on the rear of the switch is not labeled with a member or slot number.

Overview

CoPP provides a way for administrators to protect the management processor on the switch from high packet loads (generated by malicious or nonmalicious sources) that might interfere with its ability to keep data plane traffic flowing. For example, a denial of service attack can result in excessive traffic that would slow down the management processor and negatively affect switch throughput.

A CoPP policy is composed of one or more classes. Each class defines one or more target protocols and how their traffic is managed. Every policy also has a default class to regulate packets that do not match any other class. The following actions can be applied for all packets matching a class:

- Drop the packets. (Excluding the default class.)
- Set the processing priority in the range 0 to 6 (0 - highest priority and 6 - lowest priority).
- Set the maximum data rate in packets per second (pps) at which each line module can send packets to the management processor.
- Set the maximum burst size in packets at which each line module can send packets to the management processor.

Up to 32 CoPP policies can be defined, but only one can be active on the switch at a time.

A CoPP policy must always be active on the switch. By default, the switch has a CoPP policy named **default** which is automatically applied at first boot.

When a line module is hot-swapped or a new line module comes up after boot on a 6400 switch, the CoPP policy that is actively applied to the switch will be applied.

When the switch is rebooted, the CoPP policy that was actively applied to the switch before the reboot occurred will be applied if it was saved to the startup configuration with the `copy running-config startup-config` command.

For GRE tunneled traffic, CoPP policies match on the payload.

CoPP policies do not regulate traffic received from the Out-of-Band-Management (OOBM) Ethernet port.

Configuring CoPP

Procedure

1. Configure the default CoPP policy, edit an existing policy, or create a policy with the command `copp-policy`.
2. Add, edit, or remove classes in the policy with the command `class`.
3. If the policy is not the active policy on the switch, apply it with the command `apply copp-policy`. (Changes made to an active policy take effect immediately and do not need to be applied.)
4. Review the CoPP policy configuration settings with the command `show copp-policy`.

Example

This example creates the following configuration:

- Defines a new policy named **My_CoppPolicy**.
- Adds two classes to the policy.
- Activates the policy.
- Displays policy configuration settings.

```
switch(config)# copp-policy My_CoppPolicy
switch(config-copp)# class igmp priority 6 rate 5000 burst 60
switch(config-copp)# class lacp priority 2 rate 2000 burst 2050
switch(config-copp)# exit
switch(config)# apply copp-policy My_CoppPolicy
switch(config)# exit
switch# show copp-policy My_CoppPolicy
class                drop priority rate pps burst pkts hardware rate pps
-------------------- ---- -------- -------- ---------- ----------------
igmp                      6        5000     60         5000
lacp                      2        2000     2050       2000
default                   1        6000     70         6000
```

Actual rates in hardware

Currently, the actual rate in hardware is determined by a mapping based on the configured rate, shown by the following table of the first nine actual rates.

Configured Rate (pps)	Actual Rate in Hardware (pps)
25-49	25
50-74	50
75-99	75
100-124	100
125-149	125
150-174	150
175-199	175
200-224	200
225-249	225

The preceding table shows the first nine actual rates available in hardware. Higher rates are available. The `show copp-policy statistics class <CLASS>` command can be used to show the actual rate in hardware for a specific class. The `show copp-policy <NAME>` command can be used to show the actual rates for all classes configured in a specific CoPP policy, if the policy is actively applied.

CoPP commands

Classes of traffic

The different classes of traffic that can be individually configured are:

- `acl-logging`: Access Control List logging packets.
- `arp-broadcast`: Address Resolution Protocol packets with a broadcast destination MAC address.
- `arp-protect`: Address Resolution Protocol packets intercepted and inspected for ARP protection.
- `arp-unicast`: Address Resolution Protocol packets with a switch system destination MAC address.
- `bfd-control`: Bidirectional Forwarding Detection (BFD) control packets with a destination IP address owned by the switch.

> The `bfd-control` class is not supported for 6200 switch.

- `bgp`: Border Gateway Protocol packets with a destination IPv4 or IPv6 address owned by the switch.

> The `bgp` class is not supported for 6200 switch.

- `captive-portal`: Packets intercepted in support of the Captive Portal feature.
- `dhcp`: Dynamic Host Configuration Protocol packets. Also includes snooped DHCP packets if DHCP snooping is enabled.
- `erps`: Ethernet Ring Protection Switching control packets with the destination MAC address 01:19:a7:00:00:XX, where XX can be any value.
- `icmp-broadcast-ipv4`: Internet Control Message Protocol packets with a broadcast or multicast destination IPv4 address.
- `icmp-multicast-ipv6`: Internet Control Message Protocol packets with a well-known multicast destination IPv6 address.
- `icmp-security-ipv6`: IPv6 Internet Control Message Protocol packets intercepted and inspected.
- `icmp-unicast-ipv4`: Internet Control Message Protocol packets with a destination IPv4 address owned by the switch
- `icmp-unicast-ipv6`: Internet Control Message Protocol packets with a destination IPv6 address owned by the switch.
- `ieee-8021x`: IEEE 802.1X protocol packets with EtherType 0x0888E.
- `igmp`: Internet Group Management Protocol packets.
- `ip-exceptions`: Routable packets that would exceed the MTU for the egress interface, packets that trigger ICMP redirects, and packets with TTL/hop_limit=1 that are discarded when routing through the switch.
- `ip-lockdown`: Packets denied and logged due to violation of allowed "IP address/VLAN/port/MAC address" association.
- `ip-tracker`: Track packets received for client IP address tracking.

> The `ip-tracker` class is not supported for 6300 and 6400 switches.

- `ipsec`: Internet Protocol Security IPv4 or IPv6, unicast or configured multicast. All IPsec traffic received by the CPU will be regulated by the `ipsec` class regardless of the encapsulated protocol.
- `ipv4-options`: Unicast IPv4 packets including option headers.
- `lacp`: Link Aggregation Control Protocol packets with the destination MAC address 01:80:c2:00:00:02.
- `lldp`: Link Layer Discovery Protocol packets with the destination MAC address 01:80:c2:00:00:0e.
- `loop-protect`: Loop Protection packets with the destination MAC address 09:00:09:09:13:a6.
- `mac-lockout`: Packets denied and logged due to locked-out MAC address.
- `manageability`: Unicast IP packets addressed to the switch for specific protocols that do not have a dedicated CoPP class like HTTP, SSH, RADIUS.
- `mirror-to-cpu`: Packets from mirroring session configured to deliver to the console.
- `mld`: Multicast Listener Discovery packets of type V1 or V2 with an IPv6 address of FF00::/8, FF02::16 or FF02::2.

- `mvrp`: Multiple VLAN Registration Protocol packets with the destination MAC address 01:80:c2:00:00:20 or 01:80:c2:00:00:21
- `ntp`: Network Time Protocol packets with a destination IP address owned by the switch.
- `ospf-multicast`: Open Shortest Path First packets with the multicast destination IPv4 address 224.0.0.5 or 224.0.0.6, or IPv6 address FF02::5 or FF02::6.
- `ospf-unicast`: Open Shortest Path First packets with a local destination IPv4 address or IPv6 address.
- `pim`: Protocol Independent Multicast packets with the destination IPv4 address 224.0.0.13 or IPv6 address FF02::D, or with a destination IP address owned by the switch.
- `secure-learn`: Packets intercepted and inspected to see if source MAC address is allowed on the port.
- `sflow`: Packet headers sampled by the switch that will be sent to the sFlow collector.
- `stp`: Spanning Tree Protocol (STP) packets with the destination MAC address 01:80:c2:00:00:00 or Per-VLAN Spanning Tree (PVST) packets with the destination MAC address 01:00:0c:cc:cc:cd.
- `udld`: Unidirectional Link Detection packets with the destination MAC address 01:00:0c:cc:cc:cc or 00:e0:52:00:00:00, or Cisco Discovery Protocol packets with the destination MAC address 01:00:0c:cc:cc:cc.
- `unknown-multicast`: Packets with an unknown multicast destination IP address.
- `unresolved-ip-unicast`: Packets to be software forwarded by the management processor.
- `vrrp`: Virtual Router Redundancy Protocol packets with the destination IPv4 address 224.0.0.18 or IPv6 address FF02::12, or VSX-Keepalive packets.

To regulate any other traffic destined for the CPU, every CoPP policy has a class named `default` that can also be configured to regulate other traffic to the CPU or prevent other traffic from being delivered.

All IPsec traffic received by the CPU will be regulated by the `ipsec` class regardless of the encapsulated protocol.

When ARP protection is enabled on the system, all ARP traffic will be regulated by the `arp-protect` class, regardless of the ARP destination and configuration of `arp-broadcast` or `arp-unicast` CoPP classes.

Packets for each of the CoPP classes above may have arrived through a tunnel, if tunneling was enabled.

---

apply copp-policy

```
apply copp-policy { <NAME> | default }
no apply copp-policy <NAME>
```

Description

Applies a CoPP policy to the switch, replacing the policy that is in effect. There may be a brief interruption in traffic flow to the management processor while the switch implements the change.

Enter the `no apply copp-policy <NAME>` command with the name of a CoPP policy to unapply a CoPP policy and apply the default CoPP policy. This will only take effect if the specified policy is actively applied. Since there must always be a CoPP policy applied, this command effectively attempts to replace the applied CoPP policy with the default CoPP policy. The default CoPP policy cannot be unapplied using this command.

Parameter	Description
`<NAME>`	Specifies the name of the policy to apply. Length: 1 to 64 characters.
`default`	Applies the default policy.

Usage

If the new policy cannot be applied (for example, due to a lack of hardware resources), the previous policy remains in effect. Use the `show copp-policy` command to determine which policy is in effect.

Examples

Applying a policy named My_CoppPolicy:

```
switch(config)# apply copp-policy My_CoppPolicy
```

Applying the default policy:

```
switch(config)# apply copp-policy default
```

Unapplying a policy named My_CoppPolicy:

```
switch(config)# no apply copp-policy My_CoppPolicy
```

Command History

Release	Modification
10.07 or earlier	--

Command Information

Platforms	Command context	Authority
All platforms	`config`	Administrators or local user group members with execution rights for this command.

class

```
class <CLASS> {drop | priority <PRIORITY> rate <RATE> [burst <BURST>]}
no class <CLASS> {drop | priority <PRIORITY> rate <RATE> [burst <BURST>]}
```

Description

Adds a class to a CoPP policy. If the class exists, the existing class is modified. Changes made to an active (applied) policy take effect immediately.

When adding or modifying a class in an active policy, CoPP immediately activates the change on the switch. In cases where insufficient hardware resources exist to support a class or its action, CoPP fails to activate the changed class on the switch. When this failure occurs, the active configuration on the switch will be out of sync with its definition. To diagnose and remedy this situation:

- Use the `show copp-policy` command to determine which classes are out of sync between the active policy and its definition.
- Use the `reset copp-policy` command to synchronize the active policy with its definition. This synchronization changes the classes in the definition to match the classes in the active policy.

The `no` form of this command removes the configuration for the class. Traffic for the class will be prioritized and regulated using the factory default configuration for the class. Use the `show copp-policy factory-default` command to display the factory default CoPP policy. To stop a class of traffic from reaching the processor, set the class action to drop.

Parameter	Description
`<CLASS>`	Specifies the class to add or edit.
`drop`	Drop packets matching the selected class.
`priority <PRIORITY>`	Specifies the priority for packets matching the selected class. Range: 0 to 6.
`rate <RATE>`	Specifies the maximum rate, in packets per second (pps), for packets matching the selected class. Range: 25 to 99999.
`burst <BURST>`	Specifies the maximum burst size, in packets, for packets matching the selected class. Range: 1 to 9999.

Examples

Adding a class to handle LACP traffic with priority of 2 and rate of 2000:

```
switch(config-copp)# class lacp priority 2 rate 2000
```

Modifying the class to drop LLDP packets:

```
switch(config-copp)# class lldp drop
```

Removing the class that handles LLDP packets.

```
switch(config-copp)# no class lldp
```

Command History

Release	Modification
10.07 or earlier	--

Command Information

Platforms	Command context	Authority
All platforms	`config-copp`	Administrators or local user group members with execution rights for this command.

clear copp-policy statistics

```
clear copp-policy statistics
```

Description

Resets statistics for all CoPP classes to zero.

Examples

Displaying and then resetting statistics for all classes in the active policy:

```
switch# show copp-policy statistics
Statistics for CoPP policy 'default':
Totals:
    packets passed   : 1000              packets dropped  : 1500
Class: default
    packets passed   : 400               packets dropped  : 600
Class: acl-logging
    packets passed   : 100               packets dropped  : 100
Class: arp-broadcast
    packets passed   : 500               packets dropped  : 800
         <--OUTPUT OMITTED FOR BREVITY-->
switch# clear copp-policy statistics
switch# show copp-policy statistics
Statistics for CoPP policy 'default':
Totals:
    packets passed   : 0                 packets dropped  : 0
Class: default
    packets passed   : 0                 packets dropped  : 0
Class: acl-logging
    packets passed   : 0                 packets dropped  : 0
Class: arp-broadcast
    packets passed   : 0                 packets dropped  : 0
```

Command History

Release	Modification
10.07 or earlier	--

Command Information

Platforms	Command context	Authority
All platforms	Operator (>) or Manager (#)	Operators or Administrators or local user group members with execution rights for this command. Operators can execute this command from the operator context (>) only.

copp-policy

```
copp-policy {<NAME> | default [revert]}
no copp-policy <NAME>
```

Description

Creates a CoPP policy and switches to the `config-copp` context for the policy. Or, if the specified policy exists, switches to the `config-copp` context for the policy. A predefined policy, named `default`, contains factory default classes and is applied to the switch at first startup. This policy cannot be deleted, but its configuration can be changed.

The `no` form of this command removes a CoPP policy. If a policy is active (applied), it cannot be removed . It must be replaced with another policy before it can be removed.

Parameter	Description
<NAME>	Specifies the name of the policy to add or edit. Length: 1 to 64 characters. The name must not be a substring of any of the following reserved words: default, factory-default, commands, configuration, or statistics.
default	Specifies the default CoPP policy. Use this default policy to configure the default policy.
revert	Sets the default CoPP policy to its factory settings.

Examples

Creating a policy named My_CoppPolicy:

```
switch(config)# copp-policy My_CoppPolicy
switch(config-copp)#
```

Removing a policy named My_CoppPolicy:

```
switch(config)# no copp-policy My_CoppPolicy
```

Setting the default policy to its factory settings:

```
switch(config)# copp-policy default revert
```

Unapplying the policy named My_CoppPolicy:

```
switch(config)# no apply copp-policy My_CoppPolicy
```

Command History

Release	Modification
10.07 or earlier	--

Command Information

Platforms	Command context	Authority
All platforms	config	Administrators or local user group members with execution rights for this command.

default-class

default-class priority *<PRIORITY>* rate *<RATE>* [burst *<BURST>*]

Description

Configures the default class that is automatically defined for all CoPP policies. The default class cannot be removed, but its configuration can be changed. The default class is applied to traffic that does not match any other class defined for a policy.

Parameter	Description
priority <PRIORITY>	Specifies the priority for packets matching the selected class. Range: 0 to 6.
rate <RATE>	Specifies the maximum rate, in packets per second (pps), for packets matching the selected class. Range: 25 to 99999.
burst <BURST>	Specifies the maximum burst size, in packets, for packets matching the selected class. Range: 1 to 9999.

Example

Setting the default class to a priority of **2** and rate of **2000**:

```
switch(config-copp)# default-class priority 2 rate 2000
```

Command History

Release	Modification
10.07 or earlier	--

Command Information

Platforms	Command context	Authority
All platforms	config-copp	Administrators or local user group members with execution rights for this command.

reset copp-policy

```
reset copp-policy { <NAME> | default }
```

Description

Resets an active CoPP policy to match the settings that are currently in effect for the active policy on the switch. Changes made to the active policy that could not be activated are removed from the active policy. When the switch fails to add or modify a class in an active CoPP policy, it is possible the active policy settings on the switch may be out of sync with those defined in the policy.

Parameter	Description
<NAME>	Specifies the name of the policy to reset. Length: 1 to 64 characters.
default	Resets the default policy to match its active settings.

Examples

Resetting a policy named My_CoppPolicy:

```
switch# show copp-policy My_CoppPolicy
class               drop priority rate pps burst pkts hardware rate pps
------------------- ---- -------- -------- ---------- -----------------
igmp                     6        5000     60         5000
lacp                     2        2000     2050       2000
default                  1        6000     70         6000
switch# config terminal
switch(config)# copp-policy My_CoppPolicy
switch(config-copp)# class stp priority 4 rate 4000 burst 60
switch(config-copp)# do show copp-policy My_CoppPolicy
class               drop priority rate pps burst pkts hardware rate pps
------------------- ---- -------- -------- ---------- -----------------
igmp                     6        5000     60         5000
lacp                     2        2000     2050       2000
default                  1        6000     70         6000
% Warning: user-specified classes in CoPP policy My_CoppPolicy do not match
 active configuration.
switch(config-copp)# do show copp-policy My_CoppPolicy configuration
class               drop priority rate pps burst pkts applied
------------------- ---- -------- -------- ---------- -------
igmp                     6        5000     60         yes
lacp                     2        2000     2050       yes
stp                      4        4000     60         no
default                  1        6000     70         yes
% Warning: user-specified classes in CoPP policy My_CoppPolicy do not match
 active configuration.
switch(config-copp)# exit
switch(config)# reset copp-policy My_CoppPolicy
switch(config)# do show copp-policy My_CoppPolicy
class               drop priority rate pps burst pkts hardware rate pps
------------------- ---- -------- -------- ---------- -----------------
igmp                     6        5000     60         5000
lacp                     2        2000     2050       2000
default                  1        6000     70         6000
```

Resetting the default policy:

```
switch(config)# reset copp-policy default
```

Command History

Release	Modification
10.07 or earlier	--

Command Information

Platforms	Command context	Authority
All platforms	`config`	Administrators or local user group members with execution rights for this command.

show copp-policy

```
show copp-policy  [<NAME> | default] [commands] [configuration] [vsx-peer]
```

Description

Shows CoPP policy settings for a specific CoPP policy. When entered without specifying either a name or the `default` parameter, shows all the CoPP policy settings that are active on the switch and have successfully been programmed into the hardware.

A warning is displayed if:

- The active and user-specified applications of a policy do not match.
- The active and user-specified configurations of a policy do not match.

Parameter	Description
<NAME>	Specifies the name of the policy for which to display settings. Length: 1 to 64 characters.
default	Displays CoPP settings for the default policy.
commands	Displays output as CLI commands.
configuration	Displays user-specified CoPP settings and **not** the active settings.
vsx-peer	Shows the output from the VSX peer switch. If the switches do not have the VSX configuration or the ISL is down, the output from the VSX peer switch is not displayed. This parameter is available on switches that support VSX.

Example

Displaying the CoPP policies defined in the configuration and the active application:

```
switch# show copp-policy
applied copp_policy_name
------- ----------------
        My_CoppPolicy
applied default
switch#
```

Displaying the active configuration of all CoPP policies as CLI commands:

```
switch# show copp-policy commands
copp-policy My_CoppPolicy
    class igmp priority 6 rate 5000 burst 60
    class lacp priority 2 rate 2000 burst 2050
    default-class priority 1 rate 6000 burst 70
copp-policy default
    class acl-logging priority 0 rate 25 burst 3
    class arp-broadcast priority 2 rate 1250 burst 1250
    class arp-protect priority 2 rate 2075 burst 2075
    class arp-unicast priority 3 rate 825 burst 825
    class bfd-control priority 5 rate 850 burst 850
        <--OUTPUT OMITTED FOR BREVITY-->
    default-class priority 2 rate 4225 burst 528
apply copp-policy default
switch#
```

Displaying the `default` policy:

```
switch# show copp-policy default
class                 drop priority rate pps burst pkts hardware rate pps
--------------------- ---- -------- -------- ---------- -----------------
acl-logging              0       25        3          25
arp-broadcast            2     1250     1250        1250
arp-protect              2     2075     2075        2075
arp-unicast              3      825      825         825
bfd-control              5      850      850         850
    <--OUTPUT OMITTED FOR BREVITY-->
default                  2     4225      528        4225
```

Command History

Release	Modification
10.07 or earlier	--

Command Information

Platforms	Command context	Authority
All platforms	Operator (>) or Manager (#)	Operators or Administrators or local user group members with execution rights for this command. Operators can execute this command from the operator context (>) only.

show copp-policy factory-default

```
show copp-policy factory-default [commands] [vsx-peer]
```

Description

Display the configuration for the factory-default CoPP policy.

Parameter	Description
commands	Displays output as CLI commands.
vsx-peer	Shows the output from the VSX peer switch. If the switches do not have the VSX configuration or the ISL is down, the output from the VSX peer switch is not displayed. This parameter is available on switches that support VSX.

Example

Displaying the factory-default policy:

```
switch# show copp-policy factory-default
class                 drop priority rate pps burst pkts
--------------------- ---- -------- -------- ----------
acl-logging              0       25        3
arp-broadcast            2     1250     1250
arp-protect              2     2075     2075
arp-unicast              3      825      825
bfd-control              5      850      850
```

```
     <--OUTPUT OMITTED FOR BREVITY-->
default                      2        4225      528
```

Displaying the active configuration of `My_CoppPolicy` (`My_CoppPolicy` is applied):

```
switch# config terminal
switch(config)# apply copp-policy My_CoppPolicy
switch(config)# do show copp-policy My_CoppPolicy
class                  drop priority rate pps burst pkts hardware rate pps
--------------------- ---- -------- -------- ---------- ------------------
igmp                        6        5000     60         5000
lacp                        2        2000     2050       2000
default                     1        6000     70         6000
```

Displaying the active configuration of `My_CoppPolicy` as CLI commands:

```
switch# show copp-policy My_CoppPolicy commands
copp-policy My_CoppPolicy
    class igmp priority 6 rate 5000 burst 60
    class lacp priority 2 rate 2000 burst 2050
    default-class priority 1 rate 6000 burst 70
apply copp-policy My_CoppPolicy
```

Displaying the user-specified configuration of `My_CoppPolicy`:

```
switch# show copp-policy My_CoppPolicy configuration
class                  drop priority rate pps burst pkts applied
--------------------- ---- -------- -------- ---------- -------
igmp                        6        5000     60         yes
lacp                        2        2000     2050       yes
default                     1        6000     70         yes
```

Displaying the user-specified configuration of `My_CoppPolicy` as CLI commands:

```
switch# show copp-policy My_CoppPolicy commands configuration
copp-policy My_CoppPolicy
    class igmp priority 6 rate 5000 burst 60
    class lacp priority 2 rate 2000 burst 2050
    default-class priority 1 rate 6000 burst 70
apply copp-policy My_CoppPolicy
```

Command History

Release	Modification
10.07 or earlier	--

Command Information

Platforms	Command context	Authority
All platforms	Operator (>) or Manager (#)	Operators or Administrators or local user group members with execution rights for this command. Operators can execute this command from the operator context (>) only.

show copp-policy statistics

```
show copp-policy statistics [class <CLASS> | default-class | non-zero] [vsx-peer]
```

Description

Displays statistics for all classes, a single class, or all classes with non-zero statistics in the active CoPP policy.

Parameter	Description
`<CLASS>`	Specifies the class for which to display statistics.
`default-class`	Displays statistics for the default class.
`non-zero`	Displays statistics for all classes with non-zero statistics.
`vsx-peer`	Shows the output from the VSX peer switch. If the switches do not have the VSX configuration or the ISL is down, the output from the VSX peer switch is not displayed. This parameter is available on switches that support VSX.

Usage

If a single class is specified, the priority, rate, and burst size that has been programmed in hardware for that class will be shown.

Examples

Applying the `default` CoPP policy and displaying statistics for all classes in the actively applied policy:

The rate displayed is the actual rate in hardware.

```
switch# config terminal
switch(config)# apply copp-policy default
switch(config)# exit
switch# show copp-policy statistics
Statistics for CoPP policy 'default':
Totals:
    packets passed   : 1000              packets dropped  : 1500
Class: default
    packets passed   : 400               packets dropped  : 600
Class: acl-logging
    packets passed   : 100               packets dropped  : 100
Class: arp-broadcast
    packets passed   : 500               packets dropped  : 800
        <--OUTPUT OMITTED FOR BREVITY-->
```

Displaying statistics for the default class in the active policy:

```
switch(config)# show copp-policy statistics default-class
Statistics for CoPP policy 'default':
Class: default
Description: Default
    priority            : 2
    rate (pps)          : 4225
    burst size (pkts)   : 528


    packets passed   : 400              packets dropped  : 600
```

Displaying statistics for the class `arp-broadcast` in the actively applied policy:

```
switch# show copp-policy statistics class arp-broadcast
Statistics for CoPP policy 'default':
Class: arp-broadcast
Description: Address Resolution Protocol broadcast
    priority            : 2
    rate (pps)          : 1250
    burst size (pkts)   : 1250

    packets passed   : 500              packets dropped  : 800
```

Command History

Release	Modification
10.07 or earlier	--

Command Information

Platforms	Command context	Authority
All platforms	Operator (>) or Manager (#)	Operators or Administrators or local user group members with execution rights for this command. Operators can execute this command from the operator context (>) only.

show tech copp

```
show tech copp
```

Description

Displays the output of all show commands supported by CoPP.

Examples

Capturing the command output into a local file:

```
switch# show tech copp local-file
Show Tech output stored in local-file.  Please use 'copy show-tech local-file' to
copy-out this file.

switch# copy show-tech local-file ?
  REMOTE_URL   URL of syntax
```

```
                 {tftp://|sftp://USER@}{IP|HOST}[:PORT][;blocksize=VAL]/FILE
    STORAGE_URL  URL of syntax usb:/file
switch# copy show-tech local-file
```

Command History

Release	Modification
10.07 or earlier	--

Command Information

Platforms	Command context	Authority
All platforms	Manager (#)	Administrators or local user group members with execution rights for this command.

Accessing Aruba Support

Aruba Support Services	https://www.arubanetworks.com/support-services/
Aruba Support Portal	https://asp.arubanetworks.com/
North America telephone	1-800-943-4526 (US & Canada Toll-Free Number) +1-408-754-1200 (Primary - Toll Number) +1-650-385-6582 (Backup - Toll Number - Use only when all other numbers are not working)
International telephone	https://www.arubanetworks.com/support-services/contact-support/

Be sure to collect the following information before contacting Support:

- Technical support registration number (if applicable)
- Product name, model or version, and serial number
- Operating system name and version
- Firmware version
- Error messages
- Product-specific reports and logs
- Add-on products or components
- Third-party products or components

Other useful sites

Other websites that can be used to find information:

Airheads social forums and Knowledge Base	https://community.arubanetworks.com/
AOS-CX Switch Software Documentation Portal	https://www.arubanetworks.com/techdocs/AOS-CX/help_portal/Content/home.htm

Aruba Hardware Documentation and Translations Portal	https://www.arubanetworks.com/techdocs/hardware/DocumentationPortal/Content/home.htm
Aruba software	https://asp.arubanetworks.com/downloads
Software licensing	https://lms.arubanetworks.com/
End-of-Life information	https://www.arubanetworks.com/support-services/end-of-life/
Aruba Developer Hub	https://developer.arubanetworks.com/

Accessing Updates

You can access updates from the Aruba Support Portal or the HPE My Networking Website.

Aruba Support Portal

https://asp.arubanetworks.com/downloads

If you are unable to find your product in the Aruba Support Portal, you may need to search My Networking, where older networking products can be found:

My Networking

https://www.hpe.com/networking/support

To view and update your entitlements, and to link your contracts and warranties with your profile, go to the Hewlett Packard Enterprise Support Center **More Information on Access to Support Materials** page:

https://support.hpe.com/portal/site/hpsc/aae/home/

Access to some updates might require product entitlement when accessed through the Hewlett Packard Enterprise Support Center. You must have an HP Passport set up with relevant entitlements.

Some software products provide a mechanism for accessing software updates through the product interface. Review your product documentation to identify the recommended software update method.

To subscribe to eNewsletters and alerts:

https://asp.arubanetworks.com/notifications/subscriptions (requires an active Aruba Support Portal (ASP) account to manage subscriptions). Security notices are viewable without an ASP account.

Warranty Information

To view warranty information for your product, go to https://www.arubanetworks.com/support-services/product-warranties/.

Regulatory Information

To view the regulatory information for your product, view the *Safety and Compliance Information for Server, Storage, Power, Networking, and Rack Products*, available at https://www.hpe.com/support/Safety-Compliance-EnterpriseProducts

Additional regulatory information

Aruba is committed to providing our customers with information about the chemical substances in our products as needed to comply with legal requirements, environmental data (company programs, product recycling, energy efficiency), and safety information and compliance data, (RoHS and WEEE). For more information, see https://www.arubanetworks.com/company/about-us/environmental-citizenship/.

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