

# **AOS-CX 10.09 CoPP Guide**

**4100i, 6000, 6100 Switch Series**



a Hewlett Packard  
Enterprise company

## **Copyright Information**

© Copyright 2022 Hewlett Packard Enterprise Development LP.

## **Open Source Code**

This product includes code licensed under the GNU General Public License, the GNU Lesser General Public License, and/or certain other open source licenses. A complete machine-readable copy of the source code corresponding to such code is available upon request. This offer is valid to anyone in receipt of this information and shall expire three years following the date of the final distribution of this product version by Hewlett Packard Enterprise Company. To obtain such source code, send a check or money order in the amount of US \$10.00 to:

Hewlett Packard Enterprise Company  
6280 America Center Drive  
San Jose, CA 95002  
USA

## **Notices**

The information contained herein is subject to change without notice. The only warranties for Hewlett Packard Enterprise products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. Hewlett Packard Enterprise shall not be liable for technical or editorial errors or omissions contained herein.

Confidential computer software. Valid license from Hewlett Packard Enterprise required for possession, use, or copying. Consistent with FAR 12.211 and 12.212, Commercial Computer Software, Computer Software Documentation, and Technical Data for Commercial Items are licensed to the U.S. Government under vendor's standard commercial license.

Links to third-party websites take you outside the Hewlett Packard Enterprise website. Hewlett Packard Enterprise has no control over and is not responsible for information outside the Hewlett Packard Enterprise website.

---

|   |           |
|---|-----------|
| <b>Contents</b> .....                         | <b>3</b>  |
| <b>About this document</b> .....              | <b>4</b>  |
| Applicable products .....                     | 4         |
| Latest version available online .....         | 4         |
| Command syntax notation conventions .....     | 4         |
| About the examples .....                      | 5         |
| Identifying switch ports and interfaces ..... | 5         |
| <b>Control Plane Policing (CoPP)</b> .....    | <b>7</b>  |
| Overview .....                                | 7         |
| Configuring CoPP .....                        | 7         |
| Example .....                                 | 7         |
| Actual rates in hardware .....                | 8         |
| CoPP commands .....                           | 8         |
| Classes of traffic .....                      | 8         |
| apply copp-policy .....                       | 9         |
| class .....                                   | 10        |
| clear copp-policy statistics .....            | 11        |
| copp-policy .....                             | 11        |
| default-class .....                           | 13        |
| reset copp-policy .....                       | 13        |
| show copp-policy .....                        | 15        |
| show copp-policy factory-default .....        | 16        |
| show copp-policy statistics .....             | 17        |
| show tech copp .....                          | 19        |
| <b>Support and Other Resources</b> .....      | <b>20</b> |
| Accessing Aruba Support .....                 | 20        |
| Accessing Updates .....                       | 21        |
| Aruba Support Portal .....                    | 21        |
| My Networking .....                           | 21        |
| Warranty Information .....                    | 21        |
| Regulatory Information .....                  | 21        |
| Documentation Feedback .....                  | 22        |

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 4100i Switch Series (JL817A, JL818A)
- Aruba 6000 Switch Series (R8N85A, R8N86A, R8N87A, R8N88A, R8N89A)
- Aruba 6100 Switch Series (JL675A, JL676A, JL677A, JL678A, JL679A)

### 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   |
|---|---|
| <code>example-text</code>   | 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 ( [ ] ).  |
| <b>example-text</b>   | In code and screen examples, indicates text entered by a user.  |
| Any of the following: <ul style="list-style-type: none"><li>■ <code>&lt;example-text&gt;</code></li><li>■ <code>&lt;example-text&gt;</code></li><li>■ <i>example-text</i></li><li>■ <i>example-text</i></li></ul> | Identifies a placeholder—such as a parameter or a variable—that you must substitute with an actual value in a command or in code: <ul style="list-style-type: none"><li>■ For output formats where italic text cannot be displayed, variables are enclosed in angle brackets (&lt; &gt;). Substitute the text—including the enclosing angle brackets—with an actual value.</li><li>■ 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.</li></ul> |
|   | Vertical bar. A logical OR that separates multiple items from which you can choose only one.<br>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.  |
| { }   | Braces. Indicates that at least one of the enclosed items is required.  |

| Convention    | Usage  |
|---------------|--|
| [ ]           | Brackets. Indicates that the enclosed item or items are optional.  |
| ... or<br>... | Ellipsis: <ul style="list-style-type: none"> <li>■ In code and screen examples, a vertical or horizontal ellipsis indicates an omission of information.</li> <li>■ 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.</li> </ul> |

## 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 4100i Switch Series

- *member*: Always 1. VSF is not supported on this switch.
- *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 the switch.

### **On the 6000 and 6100 Switch Series**

- *member*: Always 1. VSF is not supported on this switch.
- *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 the switch.

### 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.

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 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.

### 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
switch(config-copp)# class lacp priority 2 rate 2000
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 hardware rate pps
-----
igmp                  6          5000   5000
lacp                  2          2000   2000
default              1          6000   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.

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:

- `arp-broadcast`: Address Resolution Protocol packets with a broadcast destination MAC address.
- `arp-unicast`: Address Resolution Protocol packets with a switch system destination MAC address.
- `dhcp`: Dynamic Host Configuration Protocol packets. Also includes snooped DHCP packets if DHCP snooping is enabled.
- `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.
- `igmp`: Internet Group Management Protocol packets.
- `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.
- `manageability`: Unicast IP packets addressed to the switch for specific protocols that do not have a dedicated CoPP class like HTTP, SSH, RADIUS.
- `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.
- `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.
- `unresolved-ip-unicast`: Packets to be software forwarded by the management processor.

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.

---

## 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  |
|---------------------------|--|
| <code>&lt;NAME&gt;</code> | Specifies the name of the policy to apply. Length: 1 to 64 characters. |
| <code>default</code>      | 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>}  
no class <CLASS> {drop | priority <PRIORITY> rate <RATE>}
```

## 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. |

## 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:

## 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   |
|---------------------------|---|
| <code>&lt;NAME&gt;</code> | 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: <code>default</code> , <code>factory-default</code> , <code>commands</code> , <code>configuration</code> , or <code>statistics</code> . |
| <code>default</code>      | Specifies the default CoPP policy. Use this default policy to configure the default policy.   |
| <code>revert</code>       | 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>
```

### 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 7.  |
| rate <RATE>         | Specifies the maximum rate, in packets per second (pps), for packets matching the selected class. Range: 25 to 99999. |

### 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 hardware rate pps
-----
igmp                  6          5000    5000
lACP                  2          2000    2000
default               1          6000    6000
switch# config terminal
switch(config)# copp-policy My_CoppPolicy
switch(config-copp)# class stp priority 4 rate 4000
switch(config-copp)# do show copp-policy My_CoppPolicy
class                drop priority rate pps hardware rate pps
-----
igmp                  6          5000    5000
lACP                  2          2000    2000
default               1          6000    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 applied
-----
igmp                  6          5000    yes
lACP                  2          2000    yes
stp                   4          4000    no
default               1          6000    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 hardware rate pps
-----
igmp                  6          5000    5000
lACP                  2          2000    2000
default               1          6000    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]
```

### 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 <b>not</b> the active settings.                   |

### 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:

Displaying the `default` policy:

```
switch# show copp-policy default
class                drop priority rate pps hardware rate pps
-----
arp-broadcast                2          1250    1250
arp-unicast                  3           825     825
  <--OUTPUT OMITTED FOR BREVITY-->
default                    2          4225    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]

### Description

Display the configuration for the factory-default CoPP policy.

| Parameter | Description                      |
|-----------|----------------------------------|
| commands  | Displays output as CLI commands. |

### Example

Displaying the factory-default policy:

```
switch# show copp-policy factory-default
class                drop priority rate pps
-----
arp-broadcast        2          1250
arp-unicast          3          825
  <---OUTPUT OMITTED FOR BREVITY-->
default              2          4225
```

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 hardware rate pps
-----
igmp                 6          5000    5000
lACP                 2          2000    2000
default              1          6000    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
  class lACP priority 2 rate 2000
```



```
default-class priority 1 rate 6000
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 applied
-----
igmp           6          5000  yes
lACP           2          2000  yes
default        1          6000  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
  class lACP priority 2 rate 2000
  default-class priority 1 rate 6000
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]
```

### 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 <a href="#">class</a> for which to display statistics. |
| default-class | Displays statistics for the default class.                           |
| non-zero      | Displays statistics for all classes with non-zero statistics.        |

### Usage

If a single class is specified, the priority and rate 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: 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

  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

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

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   | <a href="https://community.arubanetworks.com/">https://community.arubanetworks.com/</a>   |
| AOS-CX Switch Software Documentation Portal | <a href="https://www.arubanetworks.com/techdocs/AOS-CX/help_portal/Content/home.htm">https://www.arubanetworks.com/techdocs/AOS-CX/help_portal/Content/home.htm</a> |

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

## 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/>.

## **Documentation Feedback**

Aruba is committed to providing documentation that meets your needs. To help us improve the documentation, send any errors, suggestions, or comments to Documentation Feedback ([docsfeedback-switching@hpe.com](mailto:docsfeedback-switching@hpe.com)). When submitting your feedback, include the document title, part number, edition, and publication date located on the front cover of the document. For online help content, include the product name, product version, help edition, and publication date located on the legal notices page.