AOS-CX 10.17 ACLs and Classifier Policies Guide

(6300, 6400, 8100, 8360 Switch Series)

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Chapter 1
About this document

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

Applicable products

This document applies to the following products:

- HPE Aruba Networking 6300 Switch Series (JL658A, JL659A, JL660A, JL661A, JL662A, JL663A, JL664A, JL665A, JL666A, JL667A, JL668A, JL762A, R8S89A, R8S90A, R8S91A, R8S92A, S0E91A, S0X44A, S3L75A, S3L76A, S3L77A, S4P41A,S4P42A, S4P43A, S4P44A, S4P45A, S4P46A, S4P47A, S4P48A)
- HPE Aruba Networking 6400 Switch Series (R0X31A, R0X38B, R0X38C, R0X39B, R0X39C, R0X40B, R0X40C, R0X41A, R0X41C, R0X42A, R0X42C, R0X43A, R0X43C, R0X44A, R0X44C, R0X45A, R0X45C, R0X26A, R0X27A, JL741A, S0E48A,S0E48A #0D1, S1T83A, S1T83A #0D1)
- HPE Aruba Networking 8100 Switch Series (R9W94A, R9W95A, R9W96A, R9W97A)
- HPE Aruba Networking 8360 Switch Series (JL700A, JL701A, JL702A, JL703A, JL706A, JL707A, JL708A, JL709A, JL710A, JL711A, JL700C, JL701C, JL702C, JL703C, JL706C, JL707C, JL708C, JL709C, JL710C, JL711C, JL704C, JL705C, JL719C, JL718C, JL717C, JL720C, JL722C, JL721C)

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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

Convention	Usage
	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.
{ }	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 HPE Aruba Networking 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 HPE Aruba Networking 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.

On the HPE Aruba Networking 8xxx, 93xx, and 10xxx 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.

If using breakout cables, the port designation changes to x:y, where x is the physical port and y is the lane when split. For example, the logical interface 1/1/4:2 in software is associated with lane 2 on physical port 4 in slot 1 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.

Access Control Lists

Access Control Lists (ACLs) let a network administrator permit or deny passage of traffic based on network addresses, protocols, service ports, and other packet attributes. ACLs are composed of one or more Access Control Entries (called ACEs). Each ACE defines a filter criteria and an action, either **permit** or **deny**. If the traffic matches the filter criteria, the specified action is taken. The **permit** action permits the traffic to continue through the switch. The **deny** action causes the traffic to be discarded (dropped). ACEs can also log or count matching traffic.

Three ACL types are supported; IPv4, IPv6, and MAC. Each ACL type is focused on relevant frame or packet characteristics.

ACLs must be applied (using an **apply access-list** command) to take effect. ACLs can be applied to interfaces (including LAGs), VLANs, or the Control Plane.

Access Control Entries (ACEs) are listed according to priority by sequence number and processed in lowest to highest sequence number order. Each ACE attempts to match on one or more attributes of the particular traffic type. Attempted ACE matching ceases upon the first successful match. For a match to be considered successful, a packet must match all the criteria, qualifiers, and attributes of a particular ACE. Higher-numbered ACEs are only processed if no lower-numbered ACE matches. If the traffic matches no ACE in the entire ACL, the default action **deny** is taken, causing the traffic to be discarded (dropped).

When defining an ACE, if the sequence number is omitted, the ACE is auto-assigned a new sequence number that is 10 greater than the existing highest ACE sequence number. The first auto-assigned sequence number is 10. If you choose to include the ACE sequence numbers, you can use any number you like, however it is suggested that you follow the practice of entering them as 10, 20, 30, and so on. Regardless of the order in which ACEs are entered, they are stored in low-to-high sequence number order. If you enter three ACEs numbered 10, 30, 20, when creating an ACL, the ACEs are stored in the ACL as 10, 20, 30.

This simple ACL definition permits traffic passage for a particular address range and otherwise counts all nonmatching (dropped) traffic:

```
switch(config)# access-list ip network-A-udp-only
switch(config-acl-ip)# 10 permit udp any 172.16.1.0/24
switch(config-acl-ip)# 20 deny any any any count
switch(config-acl-ip)# exit
```

The main traffic characteristics that ACEs can filter on are as follows (see the full list in the ACE parameters list of the ACL commands):

- Protocol such as: ICMP, TCP, UDP
- Source and/or destination addresses (IPv4, IPv6, or MAC)
- Source and/or destination TCP/UDP ports (if applicable to the specified protocol)

A few real-world uses of ACLs are as follows:

- Restrict traffic arriving on a routed port, destined to a particular address or subnet by applying an ACL that matches on a destination IP address or an IP address and a mask.
- Prevent an entire subnet from routing through a port by applying an ACL that matches on IP source address and a mask.
- Prevent certain protocols from using a particular multicast MAC address (advertising through a port) by applying an ACL that matches on the destination MAC address.
- Prevent any IP host from accessing a particular IP port/application on a specific server by applying an ACL that matches on IP addresses and Layer 4 port.

See also ACL and Policy hardware resource considerations.

ACL usage tips

When using the `access-list ip` or `access-list ipv6` commands, if you enter an existing `ACL-NAME`, the existing ACL is modified as follows:

- Any ACE entered with a new sequence-number creates an additional ACE.
- Any ACE entered with an existing sequence-number replaces the existing ACE.

If you modify an ACL that has already been applied, it is possible that packets, blocked by the previous ACL, will briefly pass through the switch during the ACL reconfiguration.

In a highly secure environment, it is safest to first bring down interfaces and VLANs to which an ACL has been applied before modifying the ACL. Then bring the targets of ACL application back up after completing the ACL modification. Respecting this recommendation ensures that an ACL is never partially programmed while traffic is passing through the switch.

About applying ACLs to interfaces or LAGs

You can apply an ACL to an interface or LAG to affect or control the traffic arriving on that interface or LAG (inbound) or leaving the interface or LAG (outbound), or both. A given interface or LAG supports the application of a single ACL per type, per direction. ACLs can be applied to interfaces or LAGs as follows:

- One MAC ACL inbound
- One MAC ACL outbound
- One IPv4 ACL inbound
- One IPv4 ACL outbound
- One IPv6 ACL inbound
- One IPv6 ACL outbound

Different ACLs of the same type can be used in opposite directions for MAC, IPv4, and IPv6. If you apply an ACL of a particular type, in a direction that is already in use, the switch replaces the current ACL with the new ACL.

About applying ACLs to VLANs

ACLs can be applied to VLANs in the inbound (ingress) and outbound (egress) directions.

Sequence numbering

If no sequence number is specified, the software appends new ACEs to the end of the ACL with a sequence number equal to the highest ACE currently in the list plus 10.

The sequence numbers may be resequenced using the `access-list resequence` command.

ACL Logging

On the 6200, 6300, and 6300L Switch Series: From 10.17 release onwards, ACL Logging will function properly on a VSF stack for packets received on a member that is not the conductor. The ACL name, sequence number, action, and other relevant details for the matching ACE will be logged.

Deny ACLs

If multiple ACLs of different types are applied in the same direction, a deny ACE, whether explicit or implicit, in one ACL overrides a permit ACL in another. A deny ACE is an ACE within an ACL that uses the `deny` action keyword.

Denied ping requests

A ping request is denied when an ACL is applied on ingress or egress unless the request is explicitly permitted.

```
switch# ping 100.1.2.10
PING 100.1.2.10 (100.1.2.10) 100(128) bytes of data.
ping: sendmsg: Operation not permitted
ping: sendmsg: Operation not permitted
ping: sendmsg: Operation not permitted
ping: sendmsg: Operation not permitted
ping: sendmsg: Operation not permitted
```

ACL failure behaviors

- In the event of a failed ACL application to a VLAN or VLAN interface during a hotswap or switch reboot, all of the ports will shut down. The switch, line card or stack member must be restarted to recover from the failure. Modifying the VLAN, VLAN interface, or ACL configuration will not cause the switch, line card or stack member to be restarted.
- In the event of a failed ACL application to a subinterface during switch reboot, the subinterface will be shut down. The switch must be restarted to recover from the failure. Modifying the subinterface or ACL configuration will not cause the switch to be restarted.
- In the event of a failed ACL application to a subinterface during hotswap or switch reboot, the subinterface will be shut down. The line card or stack member must be restarted or hotswapped to recover from the failure. Modifying the subinterface or ACL configuration will not cause the line card or stack member to be restarted. In the event of a failed ACL application to one or more added subinterface LAG members, the subinterface will be shut down. For this to occur, the ACL must already be successfully applied to existing subinterface LAG members. This is done to prevent traffic from circumventing the ACL by passing through new LAG members where the ACL was not successfully applied. The line card or stack member must be restarted or hotswapped to recover from the failure. Modifying the subinterface or ACL configuration will not cause the line card or stack member to be restarted.

ACLs and VXLAN Traffic

ACLs applied to an SVI will not match on VxLAN traffic over a VNI.

About address and port object groups

Object groups are useful for defining groups of IP addresses and Layer 4 ports for use exclusively in the two ACL-defining commands `access-list ip` and `access-list ipv6`.

Often, common groups of addresses and ports or port ranges are used repeatedly in many ACL definitions. Without address and port object groups, the same addresses and ports must be repeated in each ACL definition that uses them.

With address and port object groups, the IP addresses and ports can be defined once, using any of these commands:

- `object-group ip address`
- `object-group ipv6 address`
- `object-group port`

Once an object group is defined, the group is available for inclusion by name as the *<ADDRESS-GROUP>* and *<PORT-GROUP>* parameters in the `access-list ip` and `access-list ipv6` ACL-definition commands.

Object groups simplify the ACL definition process and help ensure consistent address and port specification across many ACLs.

Keep in mind that it is possible to consume many hardware resource entries when using the object group commands. For example, in a typical situation, an ACE that uses object groups with 3 source addresses, 3 source L4 ports, 3 destination addresses, and 3 destination L4 ports, a total of 81 hardware entries are consumed (3 * 3 * 3 * 3 = 81).

VLAN ACLs and interaction with VXLAN traffic

This section applies to these AOS-CX platforms that support VXLAN and VXLAN ACLs: 5420, 6200, 6300, 6400, 8100, 8325, 8360, 9300/9300S, 10040, 10000.

VLAN policies applied to an SVI will not match VXLAN traffic over a VNI.

Interactions with VXLAN traffic on an L2 VNI

The way VLAN ACLs interact with VLAN traffic carried by VXLAN tunnels depends on the AOS-CX platform.

For the purposes of this discussion, VLAN traffic is Ethernet traffic with an IP payload. VXLAN traffic includes a VXLAN header, encapsulating the Ethernet frame and IP header into the VXLAN UDP packet. VLAN traffic can be considered to be "normal" L2 traffic, and VXLAN traffic can be considered to be "tunneled" (encapsulated) L2 traffic.

VLAN ACL matching of VLAN traffic arriving through a VXLAN tunnel is available on the various AOS-CX platforms as follows:

- On the 5420, 6200, 6400, 6400, 8100, and 8360, VLAN ACLs are able to match decapsulated VLAN traffic arriving through a VXLAN tunnel, however, VLAN ACLs are unable to match VLAN traffic leaving the switch through a VXLAN tunnel.
- On the 8325, 9300/9300S, 10040, and 10000, ingress VLAN ACLs are able to match decapsulated VLAN traffic arriving through a VXLAN tunnel.

- On the 8325, 9300/9300S, 10040, and 10000, egress VLAN ACLs are not able to match decapsulated VLAN traffic arriving through a VXLAN tunnel. VLAN ACLs are able to match on the VXLAN IP in this case (packets egressing to the VXLAN tunnel).
- On the 8400, ingress VLAN ACLs are not able to match decapsulated VLAN traffic arriving through a VXLAN tunnel. The 8400 does not support egress VLAN ACLs. Instead they can match on the VXLAN IP.

VLAN ACLs do not match on the inner VXLAN header (encapsulated packet).

Consider the following two-node VXLAN L2 bridging topology:

```
Host-1 <--> Switch-1 <--> Switch-2 <--> Host-2
```

Each switch has a single VLAN, connected with VXLAN VTEPs, and each host is connected to the VLAN on the respective switch. The four relevant control points for ACL application are as follows:

1. Switch-1 Ingress
2. Switch-1 Egress
3. Switch-2 Ingress
4. Switch-2 Egress

For traffic initiated from Host-1 to Host-2:

1. At Switch-1 (Ingress) the packet from Host-1 is still a normal VLAN packet, therefore Ingress VLAN ACLs can be applied here.
2. At Switch-1 (Egress) the packet from Host-1 has been encapsulated into a VXLAN UDP tunnel packet, and therefore Egress VLAN ACLs cannot be applied here.
3. At Switch-2 (Ingress) the packet from Host-1 is decapsulated from its VXLAN header so that it can be delivered to the local VLAN associated with the VXLAN VTEP. On AOS-CX platforms that support it, ingress VLAN ACLs can be applied here.
4. At Switch-2 (Egress) the packet which arrived from Switch-1 has been decapsulated and becomes a normal VLAN packet on egress, and therefore, on AOS-CX platforms that support it, Egress VLAN ACLs can be applied here.

Separately, consider this three-switch topology:

```
Host-1 <--> Switch-1 <--> Switch-M <--> Switch-2 <--> Host-2
```

In this topology, traffic from the hosts is never decapsulated on the middle switch, Switch-M. Therefore, Switch-M simply forwards the VXLAN UDP frames back and forth. Since the packet is not decapsulated, the VLAN ACLs cannot be applied on Switch-M.

Interactions with VxLAN traffic on an L3 VNI

All VNIs that have routing enabled are considered L3 VNIs. A common use case for an L3 VNI would be a symmetric IRB topology. Symmetric IRB uses the same layer-3 VNI for bidirectional traffic between two hosts on different VNIs.

Policies applied to VLANs do not match on traffic being routed over an L3 VNI.

To match on traffic routed between L3 VNIs over a VxLAN, a VNI policy may be used. Policy applications are supported on VNIs that have routing enabled only in the routed-inbound direction.

ACL and ACE-related tasks

Common ACL and ACE-related tasks are as follows:

On the HPE Aruba Networking 6400 Switch Series, interface identification differs.

Task	Command name	Example

Creating an IPv4 ACL	`access-list ip`	`access-list ip MY_IP_ACL`
		`  10 permit udp any 172.16.1.0/24`
		`  20 permit tcp 172.16.2.0/16 gt 1023 any`
		`  30 deny any any any count`

Creating an IPv6 ACL	`access-list ipv6`	`access-list ipv6 MY_IPV6_ACL`
		`  10 permit udp any 2001::1/64`
		`  20 permit tcp 2001:2011::1/64 any`
		`  30 deny any any any count`

Creating a MAC ACL	`access-list mac`	`access-list mac MY_MAC_ACL`
		`  10 permit any any appletalk vlan 40`
		`  20 deny any any any count`

Applying an IPv6 ACL to an interface	`apply access-list` (to interface or LAG)	`interface 1/1/1` `  apply access-list ipv6 MY_IPV6_ACL in`
Applying an IPv4 ACL to a LAG	`apply access-list` (to interface or LAG)	`interface lag 100` `  apply access-list ip MY_IP_ACL in`
Applying an IPv4 ACL to a VLAN	`apply access-list` (to VLAN)	`vlan 10` `  apply access-list ip MY_IP_ACL in`
Applying a MAC ACL to a VLAN	`apply access-list` (to VLAN)	`vlan 40` `  apply access-list mac MY_MAC_ACL in`
Applying an IPv4 ACL to the Control Plane (OOBM)	`apply access-list control-plane`	`apply access-list ip MY_IP_ACL control-plane vrf mgmt`
Removing application of an ACL from an interface	`apply access-list` (to interface or LAG)	`interface 1/1/1` `  no apply access-list ipv6 MY_IPV6_ACL in`
Removing application of an ACL from a VLAN	`apply access-list` (to VLAN)	`vlan 40` `  no apply access-list mac MY_MAC_ACL in`
Removing application of an ACL from the Control Plane (OOBM)	`apply access-list control-plane`	`no apply access-list ip MY_IP_ACL control-plane vrf mgmt`
Showing all ACLs	`show access-list`	`show access-list`
Showing all IPv6 ACLs	`show access-list`	`show access-list ipv6`
Showing all ACLs applied to interface `1/1/1`	`show access-list`	`show access-list interface 1/1/1`
Showing all ACLs applied to VLAN `10`	`show access-list`	`show access-list vlan 10`
Showing all ACLs applied to the Control Plane	`show access-list control-plane`	`show access-list control-plane`
Showing a particular ACL	`show access-list`	`show access-list ip MY_ACL`

Task	Command name	Example
Showing an ACL as commands	`show access-list`	`show access-list ip MY_ACL commands`
Showing ACL hit counts for an ACL applied to an interface	`show access-list hitcounts`	`show access-list hitcounts ip MY_ACL interface 1/1/1`
Showing ACL hit counts for an ACL applied to a VLAN	`show access-list hitcounts`	`show access-list hitcounts ip MY_ACL vlan 10`
Showing ACL hit counts for an ACL applied to the Control Plane	`show access-list hitcounts control-plane`	`show access-list hitcounts ip MY_ACL control-plane vrf mgmt`
Clearing ACL hit counts	`clear access-list hitcounts`	`clear access-list hitcounts ip MY_ACL vlan 10`
Clearing ACL hit counts for Control Plane	`clear access-list hitcounts control-plane`	`clear access-list hitcounts control-plane vrf mgmt`
Copying an ACL	`access-list copy`	`access-list ipv6 MY_IPV6_ACL copy MY_IPV6_ACL2`
Resequencing the ACEs of an ACL	`access-list resequence`	`access-list ip MY_IP_ACL resequence 1 1`
Resetting an ACL	`access-list reset`	`access-list ip MY_IP_ACL reset`
Setting the ACL log timer frequency	`access-list log-timer`	`access-list log-timer 30`

Object group-related tasks

Object groups are useful for defining groups of addresses and ports for use exclusively in the two ACL-defining commands `access-list ip` and `access-list ipv6`.

Common object group-related tasks are as follows:

Task	Command name	Example
Creating an IPv4 address object group	`object-group ip address`	`object-group ip address my_ipv4_addr_group`
Creating an IPv6 address object group	`object-group ipv6 address`	`object-group ipv6 address my_ipv6_addr_group`
Creating a port object group	`object-group port`	`object-group port my_port_group`

Task	Command name	Example
Showing an IPv4 address object group	`show object-group`	`show object-group ip address my_ipv4_addr_group`
Showing all IPv6 address object groups	`show object-group`	`show object-group ipv6 address`
Showing a port object group	`show object-group`	`show object-group port my_port_group`
Showing all port object groups as commands	`show object-group`	`show object-group port commands`
Resequencing an IPv4 address object group	`object-group ip address`	`object-group ip address my_ipv4_addr_group resequence 100 10`
Resequencing a port object group	`object-group port`	`object-group port my_port_group resequence 200 5`
Resetting an IPv6 address object group	`object-group ipv6 address`	`object-group ipv6 address my_ipv6_addr_group reset`
Resetting a port object group	`object-group port`	`object-group port my_port_group reset`

Active ACL configuration versus user-specified configuration

The **show access-list** command shows the active configuration of the switch. The active configuration is the ACLs that have been configured and accepted by the system. The active configurations are the interfaces on which the ACLs have successfully been programmed in the hardware.

The output of the `show access-list` command with the **configuration** parameter shows the ACLs that have been configured. The output of this command may not be the same as what was programmed in the hardware or what is active on the switch. The situation might occur because of one or more of the following:

- Unsupported command parameters might have been configured.
- Unsupported applications might have been specified.
- Applying an ACL might have been unsuccessful due to lack of hardware resources.

To determine if a discrepancy exists between what was configured and what is active, run the `show access-list` command with the `configuration` parameter.

If the active ACLs and configured ACLs are not the same, the switch shows a warning message in the output of the show command:

```
! access-list ip MY_IP_ACL user configuration does not match active configuration.
! run 'access-list TYPE NAME reset' to reset access-list to match active
configuration.
```

If the configured ACL is processing, the switch shows an in-progress warning.

```
! access-list ip MY_IP_ACL user configuration currently being processed
! run 'access-list TYPE NAME reset' to reset access-list to match active
configuration.
```

If the switch shows a warning message or in-progress message, additional changes can be made until the error message is no longer shown in the show command, or you can run the `access-list {all|ip <ACL-NAME>|ipv6 <ACL-NAME>|mac <ACL-NAME>} reset` command. The `access-list reset` command changes the user-specified configuration to match the active configuration. For details, see access-list reset.

The `show running-config` command also shows a warning about ACLs that are in progress or failed.

Examples

On the HPE Aruba Networking 6400 Switch Series, interface identification differs.

Applying an ACL with TCP acknowledgments (ACKs) on ingress:

```
switch(config-acl)# 10 permit tcp 172.16.2.0/16 any ack
```

Showing the user-specified configuration:

```
switch(config)# do show access-list ip TEST_ACL
        10 permit tcp 172.16.2.0/16 any ack
    interface 1/1/1
    ! access-list ip TEST_ACL user configuration does not match active
configuration.
    ! run 'show access-list [commands]' to display active access-list
configuration.
        apply access-list ip TEST_ACL in

switch(config)# do show access-list commands
access-list ip TEST_ACL
    10 permit tcp 172.16.2.0/16 any ack
! access-list ip TEST_ACL user configuration does not match active configuration.
! run 'access-list all reset' to reset all access-lists to match active
configuration.

switch(config)# do show access-list commands configuration
access-list ip TEST_ACL
    10 permit tcp 172.16.2.0/16 any ack
! access-list ip TEST_ACL user configuration does not match active configuration.
! run 'access-list all reset' to reset all access-lists to match active
configuration.
interface 1/1/1
    apply access-list ip TEST_ACL in

switch(config)# do show access-list
Type       Name
```

```
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------------------
IPv4       TEST_ACL
        10 permit                          tcp
           172.16.2.0/16
           any
           ack
```

Resetting the user-specified configuration to match the active configuration:

```
switch(config)# access-list all reset
```

Showing the updated user-specified configuration:

```
 switch(config)# do show access-list commands configuration
    access-list ip TEST_ACL
        10 permit tcp 172.16.2.0/16 any ack
```

ACL commands

ACL application

ACLs can be applied as follows:

ACL type Direction	IPv4+6 In	IPv4+6 Out	MAC In	MAC Out
L2 interface (port)	Yes	Yes	Yes	Yes
L2 LAG	Yes	Yes	Yes	Yes
L3 interface (port)	Yes	Yes	Yes	Yes
L3 LAG	Yes	Yes	Yes	Yes
L3 interface (port) subinterface	Yes	Yes	Yes	Yes
L3 LAG subinterface	Yes	Yes	Yes	Yes
VLAN	Yes	Yes	Yes	Yes
Interface VLAN	Yes (routed)	Yes (routed)		
Management interface	Yes			
Control Plane (per VRF)	Yes			

The following match criteria is not supported. If this match criteria is attempted to be configured, an error message will be displayed and the action will not be completed.

```
TTL on IP ACLs
```

To apply IPv4 and/or IPv6 ACLs to the management interface, apply them to the Control Plane on the management VRF.

access-list copy

`access-list {ip|ipv6|mac} <ACL-NAME> copy <DESTINATION-ACL>`

Description

Copies an IPv4, IPv6, or MAC ACL to a new destination ACL or overwrites an existing ACL.

Parameter	Description
`{ip|ipv6|mac}`	Specifies the type of ACL.
<ACL-NAME>	Specifies the name of the ACL to be copied.
<DESTINATION-ACL>	Specifies the name of the destination ACL.

Examples

Copying *MY_IP_ACL* to *MY_IP_ACL2*:

```
switch(config)# access-list ip MY_IP_ACL copy MY_IP_ACL2
switch(config-acl-ip)# exit

switch(config)# do show access-list
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------------------
IPv4       MY_IP_ACL
         1 permit                          udp
           any
           172.16.1.0/255.255.255.0
         2 permit                          tcp
           172.16.2.0/255.255.0.0           >  1023
           any
         3 permit                          tcp
           172.26.1.0/255.255.255.0
           any
           dscp: AF11
           ack
           syn
         4 deny                            any
           any
           any
           Hit-counts: enabled
------------------------------------------------------------------------------
```

```
IPv4       MY_IP_ACL2
         1 permit                          udp
           any
           172.16.1.0/255.255.255.0
         2 permit                          tcp
           172.16.2.0/255.255.0.0           >  1023
           any
         3 permit                          tcp
           172.26.1.0/255.255.255.0
           any
           dscp: AF11
           ack
           syn
         4 deny                            any
           any
           any
           Hit-counts: enabled
```

Copying MY_IPV6_ACL to MY_IPV6_ACL2:

```
switch(config)# access-list ipv6 MY_IPV6_ACL copy MY_IPV6_ACL2
switch(config-acl-ip)# exit

switch(config)# do show access-list
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
--------------------------------------------------------------------------------
IPv6       MY_IPV6_ACL
         1 permit                          udp
           any
           2001::1/64
         2 Permit all TCP ephemeral ports
           permit                          tcp
           2001:2001::2:1                   >  1023
           any
         3 permit                          tcp
           2001:2011::1/64
           any
         4 deny                            any
           any
           any
           Hit-counts: enabled
--------------------------------------------------------------------------------
IPv6       MY_IPV6_ACL2
         1 permit                          udp
           any
           2001::1/64
         2 Permit all TCP ephemeral ports
           permit                          tcp
           2001:2001::2:1                   >  1023
           any
         3 permit                          tcp
           2001:2011::1/64
           any
         4 deny                            any
           any
```

```
          any
          Hit-counts: enabled
```

Copying MY_MAC_ACL to MY_MAC_ACL2:

```
switch(config)# access-list mac MY_MAC_ACL copy MY_MAC_ACL2
switch(config-acl-mac)# exit

switch(config)# do show access-list
Type       Name
  Sequence Comment
           Action                          EtherType
           Source MAC Address
           Destination MAC Address
           Additional Parameters
------------------------------------------------------------------------------
MAC        MY_MAC_ACL
         1 permit                          ipv6
           1122.3344.5566/ffff.ffff.0000
           any
         2 permit                          any
           aaaa.bbbb.cccc
           1111.2222.3333
           QoS Priority Code Point: 4
         3 Permit all vlan-1 tagged Appletalk traffic
           permit                          appletalk
           any
           any
           VLAN: 1
         4 deny                            any
           any
           any
           Hit-counts: enabled
------------------------------------------------------------------------------
MAC        MY_MAC_ACL2
         1 permit                          ipv6
           1122.3344.5566/ffff.ffff.0000
           any
         2 permit                          any
           aaaa.bbbb.cccc
           1111.2222.3333
           QoS Priority Code Point: 4
         3 Permit all vlan-1 tagged Appletalk traffic
           permit                          appletalk
           any
           any
           VLAN: 1
         4 deny                            any
           any
           any
           Hit-counts: enabled
Type       Name
  Sequence Comment
           Action                          EtherType
           Source MAC Address
           Destination MAC Address
           Additional Parameters
------------------------------------------------------------------------------
MAC        MY_MAC_ACL
         1 permit                          ipv6
           1122.3344.5566/ffff.ffff.0000
```

```
          any
        2 permit                          any
          aaaa.bbbb.cccc
          1111.2222.3333
          QoS Priority Code Point: 4
        3 Permit all vlan-1 tagged Appletalk traffic
          permit                          appletalk
          any
          any
          VLAN: 1
        4 deny                            any
          any
          any
          Hit-counts: enabled
------------------------------------------------------------------------------
MAC       MY_MAC_ACL2
        1 permit                          ipv6
          1122.3344.5566/ffff.ffff.0000
          any
        2 permit                          any
          aaaa.bbbb.cccc
          1111.2222.3333
          QoS Priority Code Point: 4
        3 Permit all vlan-1 tagged Appletalk traffic
          permit                          appletalk
          any
          any
          VLAN: 1
        4 deny                            any
          any
          any
          Hit-counts: enabled
```

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.

access-list ip

Syntax to create an IPv4 ACL and enter its context. Plus syntax to remove an ACL:

```
access-list ip <ACL-NAME>
no access-list ip <ACL-NAME>
```

Syntax (within the ACL context) for creating or removing ACEs for protocols **ah**, **gre**, **esp**, **igmp**, **ospf**, **pim** (**ip** is available as an alias for **any**):

```
[<SEQUENCE-NUMBER>]
{permit|deny}
{any|ip|ah|gre|esp|igmp|ospf|pim|<IP-PROTOCOL-NUM>}
{any|<SRC-IP-ADDRESS>[/{<PREFIX-LENGTH>|<SUBNET-MASK>}]|<ADDRESS-GROUP>}
{any|<DST-IP-ADDRESS>[/{<PREFIX-LENGTH>|<SUBNET-MASK>}]|<ADDRESS-GROUP>}
[dscp <DSCP-SPECIFIER>] [ecn <ECN-VALUE>] [ip-precedence <IP-PRECEDENCE-VALUE>]
```

```
[tos <TOS-VALUE>] [fragment] [vlan <VLAN-ID>] [ttl <TTL-VALUE>]
[count] [log]

no <SEQUENCE-NUMBER>
```

Syntax (within the ACL context) for creating or removing ACEs for protocols `sctp`, `tcp`, `udp`:

```
[<SEQUENCE-NUMBER>]
{permit|deny}
{sctp|tcp|udp}
{any|<SRC-IP-ADDRESS>[/{<PREFIX-LENGTH>|<SUBNET-MASK>}]|<ADDRESS-GROUP>}
[{eq|gt|lt} <PORT>|range <MIN-PORT> <MAX-PORT>|group <PORT-GROUP>]
{any|<DST-IP-ADDRESS>[/{<PREFIX-LENGTH>|<SUBNET-MASK>}]|<ADDRESS-GROUP>}
[{eq|gt|lt} <PORT>|range <MIN-PORT> <MAX-PORT>|group <PORT-GROUP>]
[urg] [ack] [psh] [rst] [syn] [fin] [established]
[dscp <DSCP-SPECIFIER>] [ecn <ECN-VALUE>] [ip-precedence <IP-PRECEDENCE-VALUE>]
[tos <TOS-VALUE>]  [fragment] [vlan <VLAN-ID>] [ttl <TTL-VALUE>]
[count] [log]

no <SEQUENCE-NUMBER>
```

Syntax (within the ACL context) for creating or removing ACEs for protocol `icmp`:

```
[<SEQUENCE-NUMBER>]
{permit|deny}
{icmp}
{any|<SRC-IP-ADDRESS>[/{<PREFIX-LENGTH>|<SUBNET-MASK>}]|<ADDRESS-GROUP>}
{any|<DST-IP-ADDRESS>[/{<PREFIX-LENGTH>|<SUBNET-MASK>}]|<ADDRESS-GROUP>}
[icmp-type {echo|echo-reply|<ICMP-TYPE-VALUE>}] [icmp-code <ICMP-CODE-VALUE>]
[dscp <DSCP-SPECIFIER>] [ecn <ECN-VALUE>] [ip-precedence <IP-PRECEDENCE-VALUE>]
[tos <TOS-VALUE>] [fragment] [vlan <VLAN-ID>] [ttl <TTL-VALUE>]
[count] [log]

no <SEQUENCE-NUMBER>
```

Syntax (within the ACL context) for ACE comments:

```
[<SEQUENCE-NUMBER>] comment <TEXT-STRING>

no <SEQUENCE-NUMBER> comment
```

Description

Creates an IPv4 Access Control List (ACL) comprised of one or more Access Control Entries (ACEs) ordered and prioritized by sequence number. The lowest sequence number is the highest prioritized ACE.

The **no** form of this command deletes the entire ACL, or deletes an ACE identified by sequence number, or deletes only the comment from the ACE identified by sequence number.

Parameter	Description
<ACL-NAME>	Specifies the name of this ACL.
<SEQUENCE-NUMBER>	Specifies a sequence number for the ACE. Range: 1 to 4294967295.
{permit|deny}	Specifies whether to permit or deny traffic matching this ACE.
<IP-PROTOCOL-NUM>	Specifies the protocol as its Internet Protocol number. For example, 2 corresponds to the IGMP protocol. Range: 0 to 255.
{any|*<SRC-IP-ADDRESS>*[/{*<PREFIX-LENGTH>*|*<SUBNET-MASK>*}]|*<ADDRESS-GROUP>*}	Specifies the source IPv4 address.

Parameter	Description
	■ **any** - specifies any source IPv4 address. ■ ***<SRC-IP-ADDRESS>*** - specifies the source IPv4 host address. ◦ ***<PREFIX-LENGTH>*** - specifies the address bits to mask (CIDR subnet mask notation). Range: 1 to 32. ◦ ***<SUBNET-MASK>*** - specifies the address bits to mask (dotted decimal notation). ■ ***<ADDRESS-GROUP>*** - specifies an IPv4 address group defined with **object-group ip address**.
{any|*<DST-IP-ADDRESS>*[/{*<PREFIX-LENGTH>*|*<SUBNET-MASK>*}]|*<ADDRESS-GROUP>*}	Specifies the destination IPv4 address. ■ **any** - specifies any destination IPv4 address. ■ ***<DST-IP-ADDRESS>*** - specifies the destination IPv4 host address. ◦ ***<PREFIX-LENGTH>*** - specifies the address bits to mask (CIDR subnet mask notation). Range: 1 to 32. ◦ ***<SUBNET-MASK>*** - specifies the address bits to mask (dotted decimal notation). ■ ***<ADDRESS-GROUP>*** - specifies an IPv4 address group that you defined earlier with `object-group ip address`.
[{eq|gt|lt} *<PORT>*|range *<MIN-PORT>* *<MAX-PORT>*|group *<PORT-GROUP>*]	Specifies the port, port range, or port group. Port numbers are in the range of 0 to 65535. ■ **eq *<PORT>*** - specifies the Layer 4 port. ■ **gt *<PORT>*** - specifies any Layer 4 port greater than the indicated port. ■ **lt *<PORT>*** - specifies any Layer 4 port less than the indicated port. ■ **range *<MIN-PORT>* *<MAX-PORT>*** - specifies the Layer 4 port range. ■ **group *<PORT-GROUP>*** - specifies the Layer 4 port group that you defined earlier with `object-group port`. **NOTE:** Upon application of the ACL, ACEs with L4 port ranges may consume more than one hardware entry.
`urg`	Specifies matching on the TCP Flag: **Urgent**.
`ack`	Specifies matching on the TCP Flag: **Acknowledgment**.
`psh`	Specifies matching on the TCP Flag: **Push buffered data to receiving application**.

Parameter	Description
`rst`	Specifies matching on the TCP Flag: **Reset the connection**.
`syn`	Specifies matching on the TCP Flag: **Synchronize sequence numbers**.
`fin`	Specifies matching on the TCP Flag: **Finish connection**.
`established`	Specifies matching on the TCP Flag: Established connection.
`[icmp-type {echo|echo-reply|` *`<ICMP-TYPE-VALUE>`*`}]`	Specifies the ICMP type. ■ **echo** - specifies an ICMP echo request packet. ■ **echo-reply** - specifies an ICMP echo reply packet. ■ ***<ICMP-TYPE-VALUE>*** - specifies an ICMP type value. Range: 0 to 255.
`[icmp-code` *`<ICMP-CODE-VALUE>`*`]`	Specifies the ICMP code value. Range: 0 to 255.
`dscp` *`DSCP-SPECIFIER>`*	Specifies the Differentiated Services Code Point (DSCP), either a numeric ***<DSCP-VALUE>*** (0 to 63) or one of these keywords: ■ **AF11** - DSCP 10 (Assured Forwarding Class 1, low drop probability) ■ **AF12** - DSCP 12 (Assured Forwarding Class 1, medium drop probability) ■ **AF13** - DSCP 14 (Assured Forwarding Class 1, high drop probability) ■ **AF21** - DSCP 18 (Assured Forwarding Class 2, low drop probability) ■ **AF22** - DSCP 20 (Assured Forwarding Class 2, medium drop probability) ■ **AF23** - DSCP 22 (Assured Forwarding Class 2, high drop probability) ■ **AF31** - DSCP 26 (Assured Forwarding Class 3, low drop probability) ■ **AF32** - DSCP 28 (Assured Forwarding Class 3, medium drop probability) ■ **AF33** - DSCP 30 (Assured Forwarding Class 3, high drop probability) ■ **AF41** - DSCP 34 (Assured Forwarding Class 4, low drop probability) ■ **AF42** - DSCP 36 (Assured Forwarding Class 4, medium drop probability) ■ **AF43** - DSCP 38 (Assured Forwarding Class 4, high drop probability) ■ **CS0** - DSCP 0 (Class Selector 0: Default) ■ **CS1** - DSCP 8 (Class Selector 1: Scavenger) ■ **CS2** - DSCP 16 (Class Selector 2: OAM) ■ **CS3** - DSCP 24 (Class Selector 3: Signaling)

Parameter	Description
	▪ **CS4** - DSCP 32 (Class Selector 4: Real time) ▪ **CS5** - DSCP 40 (Class Selector 5: Broadcast video) ▪ **CS6** - DSCP 48 (Class Selector 6: Network control) ▪ **CS7** - DSCP 56 (Class Selector 7) ▪ **EF** - DSCP 46 (Expedited Forwarding)
`ecn <ECN-VALUE>`	Specifies an Explicit Congestion Notification value. Range: 0 to 3.
`ip-precedence <IP-PRECEDENCE-VALUE>`	Specifies an IP precedence value. Range: 0 to 7.
`tos <TOS-VALUE>`	Specifies the Type of Service value. Range: 0 to 31.
`fragment`	Specifies a fragment packet.
`vlan <VLAN-ID>`	Specifies VLAN tag to match on. 802.1Q VLAN ID. **NOTE:** This parameter cannot be used in any ACL that will be applied to a VLAN.
`ttl <TTL-VALUE>`	Specifies a time-to-live (hop limit) value. Range: 0 to 255. Not supported for ACLs.
`count`	Keeps the hit counts of the number of packets matching this ACE.
`log`	Keeps a log of the number of packets matching this ACE. Works with both `permit` and `deny` actions. Works with ACLs applied on ingress, egress, or Control Plane.
`[<SEQUENCE-NUMBER>] comment <TEXT-STRING>`	Adds a comment to an ACE. The **no** form removes only the comment from the ACE.

Usage

- If the ***<IP-PROTOCOL-NUM>*** parameter is used instead of a protocol name, ensure that any needed ACE-definition parameters specific to the selected protocol are also provided.
- When using multiple ACL types (IPv4, IPv6, or MAC) with logging on the same interface, the first packet that matches an ACE with **log** option is logged. Until the log-timer wait-period is over, any packets matching other ACL types do not create a log. At the end of the wait-period, the switch creates a summary log for all the ACLs that were matched, regardless of type.

Examples

Creating an IPv4 ACL with four entries:

```
switch(config)# access-list ip MY_IP_ACL
switch(config-acl-ip)# 10 permit udp any 172.16.1.0/24
switch(config-acl-ip)# 20 permit tcp 172.16.2.0/16 gt 1023 any
switch(config-acl-ip)# 30 permit tcp 172.26.1.0/24 any syn ack dscp 10
switch(config-acl-ip)# 40 deny any any any count
```

```
switch(config-acl-ip)# exit

switch(config)# show access-list
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------------------
IPv4       MY_IP_ACL
        10 permit                          udp
           any
           172.16.1.0/255.255.255.0
        20 permit                          tcp
           172.16.2.0/255.255.0.0           >  1023
           any
        30 permit                          tcp
           172.26.1.0/255.255.255.0
           any
           dscp: AF11
           ack
           syn
        40 deny                            any
           any
           any
           Hit-counts: enabled
```

Adding a comment to an existing IPv4 ACE:

```
switch(config)# access-list ip MY_IP_ACL
switch(config-acl-ip)# 20 comment Permit all TCP ephemeral ports
switch(config-acl-ip)# exit

switch(config)# show access-list
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------------------
IPv4       MY_IP_ACL
        10 permit                          udp
           any
           172.16.1.0/255.255.255.0
        20 Permit all TCP ephemeral ports
           permit                          tcp
           172.16.2.0/255.255.0.0           >  1023
           any
        30 permit                          tcp
           172.26.1.0/255.255.255.0
           any
           dscp: AF11
           ack
           syn
        40 deny                            any
           any
           any
           Hit-counts: enabled
```

Removing a comment from an existing IPv4 ACE:

```
switch(config)# access-list ip MY_IP_ACL
switch(config-acl-ip)# no 20 comment
switch(config-acl-ip)# exit

switch(config)# show access-list
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------------------
IPv4       MY_IP_ACL
        10 permit                          udp
           any
           172.16.1.0/255.255.255.0
        20 permit                          tcp
           172.16.2.0/255.255.0.0           >  1023
           any
        30 permit                          tcp
           172.26.1.0/255.255.255.0
           any
           dscp: AF11
           ack
           syn
        40 deny                            any
           any
           any
           Hit-counts: enabled
```

Adding an ACE (insert line 25) to an existing IPv4 ACL:

```
switch(config)# access-list ip MY_IP_ACL
switch(config-acl-ip)# 25 permit icmp 172.16.2.0/16 any
switch(config-acl-ip)# exit

switch(config)# show access-list
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------------------
IPv4       MY_IP_ACL
        10 permit                          udp
           any
           172.16.1.0/255.255.255.0
        20 permit                          tcp
           172.16.2.0/255.255.0.0           >  1023
           any
        25 permit                          icmp
           172.16.2.0/255.255.0.0 any
        30 permit                          tcp
           172.26.1.0/255.255.255.0
           any
           dscp: AF11
           ack
           syn
        40 deny                            any
           any
```

```
           any
           Hit-counts: enabled
```

Replacing an ACE in an existing IPv4 ACL:

```
switch(config)# access-list ip MY_IP_ACL
switch(config-acl-ip)# 25 permit icmp 172.17.1.0/16 any
switch(config-acl-ip)# exit

switch(config)# show access-list
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------------------
IPv4       MY_IP_ACL
        10 permit                          udp
           any
           172.16.1.0/255.255.255.0
        20 permit                          tcp
           172.16.2.0/255.255.0.0           >  1023
           any
        25 permit                          icmp
           172.17.1.0/255.255.0.0
        30 permit                          tcp
           172.26.1.0/255.255.255.0
           any
           dscp: AF11
           ack
           syn
        40 deny                            any
           any
           any
           Hit-counts: enabled
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------------------
IPv4       MY_IP_ACL
        10 permit                          udp
           any
           172.16.1.0/255.255.255.0
        20 permit                          tcp
           172.16.2.0/255.255.0.0           >  1023
           any
        25 permit                          icmp
           172.17.1.0/255.255.0.0
        30 permit                          tcp
           172.26.1.0/255.255.255.0
           any
           dscp: AF11
           ack
           syn
        40 deny                            any
           any
           any
```

```
           Hit-counts: enabled
```

Removing an ACE from an IPv4 ACL:

```
switch(config)# access-list ip MY_IP_ACL
switch(config-acl-ip)# no 25
switch(config-acl-ip)# exit

switch(config)# show access-list
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------------------
IPv4       MY_IP_ACL
        10 permit                          udp
           any
           172.16.1.0/255.255.255.0
        20 permit                          tcp
           172.16.2.0/255.255.0.0           >  1023
           any
        30 permit                          tcp
           172.26.1.0/255.255.255.0
           any
           dscp: AF11
           ack
           syn
        40 deny                            any
           any
           any
           Hit-counts: enabled
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------------------
IPv4       MY_IP_ACL
        10 permit                          udp
           any
           172.16.1.0/255.255.255.0
        20 permit                          tcp
           172.16.2.0/255.255.0.0           >  1023
           any
        30 permit                          tcp
           172.26.1.0/255.255.255.0
           any
           dscp: AF11
           ack
           syn
        40 deny                            any
           any
           any
           Hit-counts: enabled
```

Copy an IPv4 ACL:

```
switch(config)# access-list ip MY_IP_ACL copy MY_IP_ACL2
switch(config)# show access-list
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------------------
IPv4       MY_IP_ACL
        10
           permit                          udp
           any
           172.16.1.0/255.255.255.0
        20
           permit                          tcp
           172.16.2.0/255.255.0.0           >  1023
           any
        30
           permit                          tcp
           172.26.1.0/255.255.255.0
           any
           dscp: AF11
           ack
           syn
        40
           deny                            any
           any
           any
           Hit-counts: enabled
------------------------------------------------------------------------------
IPv4       MY_IP_ACL2
        10
           permit                          udp
           any
           172.16.1.0/255.255.255.0
        20
           permit                          tcp
           172.16.2.0/255.255.0.0           >  1023
           any
        30
           permit                          tcp
           172.26.1.0/255.255.255.0
           any
           dscp: AF11
           ack
           syn
        40
           deny                            any
           any
           any
           Hit-counts: enabled switch(config)# access-list ip MY_IP_ACL copy MY_
IP_ACL2

switch(config)# show access-list
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------------------
```

```
IPv4       MY_IP_ACL
        10
           permit                          udp
           any
           172.16.1.0/255.255.255.0
        20
           permit                          tcp
           172.16.2.0/255.255.0.0           >  1023
           any
        30
           permit                          tcp
           172.26.1.0/255.255.255.0
           any
           dscp: AF11
           ack
           syn
        40
           deny                            any
           any
           any
           Hit-counts: enabled
-------------------------------------------------------------------------------
IPv4       MY_IP_ACL2
        10
           permit                          udp
           any
           172.16.1.0/255.255.255.0
        20
           permit                          tcp
           172.16.2.0/255.255.0.0           >  1023
           any
        30
           permit                          tcp
           172.26.1.0/255.255.255.0
           any
           dscp: AF11
           ack
           syn
        40
           deny                            any
           any
           any
           Hit-counts: enabled
```

Removing an IPv4 ACL:

```
switch(config)# no access-list ip MY_IP_ACL

switch(config)# show access-list
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
-------------------------------------------------------------------------------
IPv4       MY_IP_ACL2
         1 permit                          udp
           any
           172.16.1.0/255.255.255.0
         2 permit                          tcp
```

```
          172.16.2.0/255.255.0.0           >  1023
          any
        3 permit                           tcp
          172.26.1.0/255.255.255.0
          any
          dscp: AF11
          ack
          syn
        4 deny                             any
          any
          any
          Hit-counts: enabled
```

Command History

Release	Modification
10.12	Allow ACLs applied to the Control Plane to be logged.
10.07 or earlier	--

Command Information

Platforms	Command context	Authority
All platforms	`config` The **access-list ip *<ACL-NAME>*** command takes you into the named ACL context where you enter the ACEs.	Administrators or local user group members with execution rights for this command.

access-list ipv6

Syntax to create an IPv6 ACL and enter its context. Plus syntax to remove an ACL:

```
access-list ipv6 <ACL-NAME>
no access-list ipv6 <ACL-NAME>
```

Syntax (within the ACL context) for creating or removing ACEs for protocols **ah**, **gre**, **esp**, **ospf**, **pim** (**ipv6** is available as an alias for **any**):

```
  [<SEQUENCE-NUMBER>]
  {permit|deny}
  {any|ipv6|ah|gre|esp|ospf|pim|<IP-PROTOCOL-NUM>}
  {any|<SRC-IP-ADDRESS>[/<PREFIX-LENGTH>]|<ADDRESS-GROUP>}
  {any|<DST-IP-ADDRESS>[/<PREFIX-LENGTH>]|<ADDRESS-GROUP>}
  [dscp <DSCP-SPECIFIER>] [ecn <ECN-VALUE>] [ip-precedence <IP-PRECEDENCE-VALUE>]
  [tos <TOS-VALUE>] [fragment] [vlan <VLAN-ID>] [ttl <TTL-VALUE>] [count] [log]

  no <SEQUENCE-NUMBER>
```

Syntax (within the ACL context) for creating or removing ACEs for protocols `sctp`, `tcp`, `udp`:

```
  [<SEQUENCE-NUMBER>]
  {permit|deny}
  {sctp|tcp|udp}
  {any|<SRC-IP-ADDRESS>[/<PREFIX-LENGTH>}]|<ADDRESS-GROUP>}
  [{eq|gt|lt} <PORT>|range <MIN-PORT> <MAX-PORT>|group <PORT-GROUP>]
  {any|<DST-IP-ADDRESS>[/<PREFIX-LENGTH>]|<ADDRESS-GROUP>}
  [{eq|gt|lt} <PORT>|range <MIN-PORT> <MAX-PORT>|group <PORT-GROUP>]
  [urg] [ack] [psh] [rst] [syn] [fin] [established]
  [dscp <DSCP-SPECIFIER>] [ecn <ECN-VALUE>] [ip-precedence <IP-PRECEDENCE-VALUE>]
```

```
[tos <TOS-VALUE>] [fragment] [vlan <VLAN-ID>] [ttl <TTL-VALUE>] [count] [log]

no <SEQUENCE-NUMBER>
```

Syntax (within the ACL context) for creating or removing ACEs for protocol `icmpv6`:

```
[<SEQUENCE-NUMBER>]
{permit|deny}
{icmpv6}
{any|<SRC-IP-ADDRESS>[/<PREFIX-LENGTH>]|<ADDRESS-GROUP>}
{any|<DST-IP-ADDRESS>[/<PREFIX-LENGTH>]|<ADDRESS-GROUP>}
[icmp-type {echo|echo-reply|<ICMP-TYPE-VALUE>}] [icmp-code <ICMP-CODE-VALUE>]
[dscp <DSCP-SPECIFIER>][ecn <ECN-VALUE>] [ip-precedence <IP-PRECEDENCE-VALUE>]
[tos <TOS-VALUE>] [fragment] [vlan <VLAN-ID>] [ttl <TTL-VALUE>] [count] [log]

no <SEQUENCE-NUMBER>
```

Syntax (within the ACL context) for ACE comments:

```
[<SEQUENCE-NUMBER>] comment <TEXT-STRING>

no <SEQUENCE-NUMBER> comment
```

Description

Creates an IPv6 Access Control List (ACL). The ACL is made of one or more Access Control Entries (ACEs) ordered and prioritized by sequence number. The lowest sequence number is the highest prioritized ACE.

The **no** form of this command deletes the entire ACL, or deletes an ACE identified by sequence number, or deletes only the comment from the ACE identified by sequence number.

Parameter	Description
<ACL-NAME>	Specifies the name of this ACL.
<SEQUENCE-NUMBER>	Specifies a sequence number for the ACE. Range: 1 to 4294967295.
{permit|deny}	Specifies whether to permit or deny traffic matching this ACE.
<IP-PROTOCOL-NUM>	Specifies the protocol as its Internet Protocol number. For example, 2 corresponds to the IGMP protocol. Range: 0 to 255.
{any|*<SRC-IP-ADDRESS>*[/*<PREFIX-LENGTH>*]|*<ADDRESS-GROUP>*}	Specifies the source IPv6 address. ■ **any** - specifies any source IPv6 address. ■ ***<SRC-IP-ADDRESS>*** - specifies the source IPv6 host address. ◦ ***<PREFIX-LENGTH>*** - specifies the address bits to mask (CIDR subnet mask notation). Range: 1 to 128. ■ ***<ADDRESS-GROUP>*** - specifies an IPv6 address group that you defined earlier with **object-group ipv6 address**.
{any|*<DST-IP-ADDRESS>*[/*<PREFIX-LENGTH>*]|*<ADDRESS-GROUP>*}	Specifies the destination IPv6 address. ■ **any** - specifies any destination IPv6 address. ■ ***<DST-IP-ADDRESS>*** - specifies the destination IPv6 host address.

Parameter	Description
	◦ ***<PREFIX-LENGTH>*** - specifies the address bits to mask (CIDR subnet mask notation). Range: 1 to 128. ▪ ***<ADDRESS-GROUP>*** - specifies an IPv6 address group that you defined earlier with `object-group ipv6 address`.
`[{eq|gt|lt} <PORT>|range <MIN-PORT><MAX-PORT>|group <PORT-GROUP>]`	Specifies the port, port range, or port group. Port numbers are in the range of 0 to 65535. ▪ **eq *<PORT>*** - specifies the Layer 4 port. ▪ **gt *<PORT>*** - specifies any Layer 4 port greater than the indicated port. ▪ **lt *<PORT>*** - specifies any Layer 4 port less than the indicated port. ▪ **range *<MIN-PORT>* *<MAX-PORT>*** - specifies the Layer 4 port range. ▪ **group *<PORT-GROUP>*** - specifies the Layer 4 port group that you defined earlier with `object-group port`. **NOTE:** Upon application of the ACL, ACEs with L4 port ranges may consume more than one hardware entry.
`urg, ack, psh, rst, syn, fin, established`	These TCP flag-matching parameters are supported for both ingress and egress.
`[icmp-type {echo|echo-reply|<ICMP-TYPE-VALUE>}]`	Specifies the ICMP type. ▪ **echo** - specifies an ICMP echo request packet. ▪ **echo-reply** - specifies an ICMP echo reply packet. ▪ ***<ICMP-TYPE-VALUE>*** - specifies an ICMP type value. Range: 0 to 255.
`[icmp-code <ICMP-CODE-VALUE>]`	Specifies the ICMP code value. Range: 0 to 255.
`dscp DSCP-SPECIFIER>`	Specifies the Differentiated Services Code Point (DSCP), either a numeric ***<DSCP-VALUE>*** (0 to 63) or one of these keywords: ▪ **AF11** - DSCP 10 (Assured Forwarding Class 1, low drop probability) ▪ **AF12** - DSCP 12 (Assured Forwarding Class 1, medium drop probability) ▪ **AF13** - DSCP 14 (Assured Forwarding Class 1, high drop probability) ▪ **AF21** - DSCP 18 (Assured Forwarding Class 2, low drop probability) ▪ **AF22** - DSCP 20 (Assured Forwarding Class 2, medium drop probability) ▪ **AF23** - DSCP 22 (Assured Forwarding Class 2, high drop probability)

Parameter	Description
	■ **AF31** - DSCP 26 (Assured Forwarding Class 3, low drop probability) ■ **AF32** - DSCP 28 (Assured Forwarding Class 3, medium drop probability) ■ **AF33** - DSCP 30 (Assured Forwarding Class 3, high drop probability) ■ **AF41** - DSCP 34 (Assured Forwarding Class 4, low drop probability) ■ **AF42** - DSCP 36 (Assured Forwarding Class 4, medium drop probability) ■ **AF43** - DSCP 38 (Assured Forwarding Class 4, high drop probability) ■ **CS0** - DSCP 0 (Class Selector 0: Default) ■ **CS1** - DSCP 8 (Class Selector 1: Scavenger) ■ **CS2** - DSCP 16 (Class Selector 2: OAM) ■ **CS3** - DSCP 24 (Class Selector 3: Signaling) ■ **CS4** - DSCP 32 (Class Selector 4: Real time) ■ **CS5** - DSCP 40 (Class Selector 5: Broadcast video) ■ **CS6** - DSCP 48 (Class Selector 6: Network control) ■ **CS7** - DSCP 56 (Class Selector 7) ■ **EF** - DSCP 46 (Expedited Forwarding)
`ecn <ECN-VALUE>`	Specifies an Explicit Congestion Notification value. Range: 0- 3.
`ip-precedence <IP-PRECEDENCE-VALUE>`	Specifies an IP precedence value. Range: 0-7.
`tos <TOS-VALUE>`	Specifies the Type of Service value. Range: 0-31.
`fragment`	Specifies a fragment packet.
`vlan <VLAN-ID>`	Specifies VLAN tag to match on. 802.1Q VLAN ID. **NOTE:** This parameter cannot be used in any ACL that will be applied to a VLAN.
`ttl <TTL-VALUE>`	Not supported.
`count`	Keeps the hit counts of the number of packets matching this ACE.
`log`	Keeps a log of the number of packets matching this ACE. Works with both `permit` and `deny` actions. Works with ACLs applied on ingress, egress, or Control Plane.
`[<SEQUENCE-NUMBER>] comment <TEXT-STRING>`	Adds a comment to an ACE. The **no** form removes only the comment from the ACE.

Usage

- If the ***<IP-PROTOCOL-NUM>*** parameter is used instead of a protocol name, ensure that any needed ACE-definition parameters specific to the selected protocol are also provided.

- When using multiple ACL types (IPv4, IPv6, or MAC) with logging on the same interface, the first packet that matches an ACE with `log` option is logged. Until the log-timer wait-period is over, any packets matching other ACL types do not create a log. At the end of the wait-period, the switch creates a summary log all the ACLs that were matched, regardless of type.

Examples

Creating an IPv6 ACL with four entries:

```
switch(config)# access-list ipv6 MY_IPV6_ACL
switch(config-acl-ipv6)# 10 permit udp any 2001::1/64
switch(config-acl-ipv6)# 20 permit tcp 2001:2001::2:1/128 gt 1023 any
switch(config-acl-ipv6)# 30 permit tcp 2001:2011::1/64 any
switch(config-acl-ipv6)# 40 deny any any any count
switch(config-acl-ipv6)# exit

switch(config)# do show access-list
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
-------------------------------------------------------------------------------
IPv6       MY_IPV6_ACL
        10 permit                          udp
           any
           2001::1/64
        20 permit                          tcp
           2001:2001::2:1                   >  1023
           any
        30 permit                          tcp
           2001:2011::1/64
           any
        40 deny                            any
           any
           any
           Hit-counts: enabled
```

Adding a comment to an existing IPv6 ACE:

```
switch(config)# access-list ipv6 MY_IPV6_ACL
switch(config-acl-ipv6)# 20 comment Permit all TCP ephemeral ports
switch(config-acl-ipv6)# exit

switch(config)# do show access-list
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
-------------------------------------------------------------------------------
IPv6       MY_IPV6_ACL
        10 permit                          udp
           any
           2001::1/64
        20 Permit all TCP ephemeral ports
           permit                          tcp
           2001:2001::2:1                   >  1023
```

```
           any
        30 permit                          tcp
           2001:2011::1/64
           any
        40 deny                            any
           any
           any
           Hit-counts: enabled
```

Removing a comment from an existing IPv6 ACE:

```
switch(config)# access-list ipv6 MY_IPV6_ACL
switch(config-acl-ipv6)# no 20 comment
switch(config-acl-ipv6)# exit

switch(config)# do show access-list
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------------------
IPv6       MY_IPV6_ACL
        10 permit                          udp
           any
           2001::1/64
        20 permit                          tcp
           2001:2001::2:1                   >  1023
           any
        30 permit                          tcp
           2001:2011::1/64
           any
        40 deny                            any
           any
           any
           Hit-counts: enabled
```

Adding an ACE to an existing IPv6 ACL:

```
switch(config)# access-list ipv6 MY_IPV6_ACL
switch(config-acl-ipv6)# 25 permit icmpv6 2001::1/64 any
switch(config-acl-ipv6)# exit

switch(config)# do show access-list
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------------------
IPv6       MY_IPV6_ACL
        10 permit                          udp
           any
           2001::1/64
        20 permit                          tcp
           2001:2001::2:1                   >  1023
           any
```

```
        25 permit                          icmpv6
           2001::1/64
           any
        30 permit                          tcp
           2001:2011::1/64
           any
        40 deny                            any
           any
           any
           Hit-counts: enabled
```

Replacing an ACE in an existing IPv6 ACL:

```
switch(config)# access-list ipv6 MY_IPV6_ACL
switch(config-acl-ipv6)# 25 permit icmpv6 2001::2:1/64 any
switch(config-acl-ipv6)# exit

switch(config)# do show access-list
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------------------
IPv6       MY_IPV6_ACL
        10 permit                          udp
           any
           2001::1/64
        20 permit                          tcp
           2001:2001::2:1                   >  1023
           any
        25 permit                          icmpv6
           2001::2:1/64
           any
        30 permit                          tcp
           2001:2011::1/64
           any
        40 deny                            any
           any
           any
           Hit-counts: enabled

Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------------------
IPv6       MY_IPV6_ACL
        10 permit                          udp
           any
           2001::1/64
        20 permit                          tcp
           2001:2001::2:1                   >  1023
           any
        25 permit                          icmpv6
           2001::2:1/64
           any
        30 permit                          tcp
```

```
           2001:2011::1/64
           any
        40 deny                             any
           any
           any
           Hit-counts: enabled
```

Removing an ACE from an IPv6 ACL:

```
switch(config)# access-list ipv6 MY_IPV6_ACL
switch(config-acl-ipv6)# no 25
switch(config-acl-ipv6)# exit

switch(config)# do show access-list
Type       Name
  Sequence Comment
           Action                           L3 Protocol
           Source IP Address                Source L4 Port(s)
           Destination IP Address           Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------------------
IPv6       MY_IPV6_ACL
        10 permit                           udp
           any
           2001::1/64
        20 permit                           tcp
           2001:2001::2:1                    >  1023
           any
        30 permit                           tcp
           2001:2011::1/64
           any
        40 deny                             any
           any
           any
           Hit-counts: enabled

Type       Name
  Sequence Comment
           Action                           L3 Protocol
           Source IP Address                Source L4 Port(s)
           Destination IP Address           Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------------------
IPv6       MY_IPV6_ACL
        10 permit                           udp
           any
           2001::1/64
        20 permit                           tcp
           2001:2001::2:1                    >  1023
           any
        30 permit                           tcp
           2001:2011::1/64
           any
        40 deny                             any
           any
           any
           Hit-counts: enabled
```

Removing an IPv6 ACL:

```
switch(config)# no access-list ipv6 MY_IPV6_ACL

switch(config)# do show access-list
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------------------
IPv6       MY_IPV6_ACL2
         1 permit                          udp
           any
           2001::1/64
         2 Permit all TCP ephemeral ports
           permit                          tcp
           2001:2001::2:1                   >  1023
           any
         3 permit                          tcp
           2001:2011::1/64
           any
         4 deny                            any
           any
           any
           Hit-counts: enabled
```

Command History

Release	Modification
10.12	Allow ACLs applied to the Control Plane to be logged.
10.07 or earlier	--

Command Information

Platforms	Command context	Authority
All platforms	`config` The **access-list ipv6 <ACL-NAME>** command takes you into the named ACL context where you enter the ACEs.	Administrators or local user group members with execution rights for this command.

access-list log-timer

`access-list log-timer {default|<INTERVAL>}`

Description

Sets the log timer interval for all ACEs that have the **log** parameter configured.

Parameter	Description
`default`	Resets the log timer to its default 300 seconds.
<INTERVAL>	Specifies the log timer interval in seconds. Range: 5 to 300.

Usage

- ACL logging keeps a log of the number of packets matching this ACE. Works with both `permit` and `deny` actions. Works with ACLs applied on ingress, egress, or Control Plane.
- The first packet that matches an ACE with the **log** parameter within an ACL log timer window (configured with the **access-list log-timer** command) has its header contents extracted and sent to the configured logging destination, such as the console and syslog server. Each time the ACL log timer expires, a summary of all ACEs with **log** configured are sent to the logging destination. This capability allows throttling of logging ACL hits.
- If no further log messages are generated in the wait-period, the switch suspends the timer and resets itself to log as soon as a new match occurs.
- When using multiple ACL types (IPv4, IPv6, or MAC) with logging on the same interface, the first packet that matches an ACE with the `log` option is logged. Any packets, matching other ACL types, do not create a log until the log-timer wait-period is over. At the end of the wait-period, a summary log is made of all the ACLs that were matched, regardless of type.

Remarked ACL traffic may lose logging information when a QoS action or a classifier policy with remark is enabled. A classifier policy with remark takes precedence over QoS actions and QoS actions takes precedence over ACL remarked traffic.

- You may see a minor discrepancy between the ACL logging statistics and the hit counts statistics due to the time required to record the log message.

Examples

Although these examples use debug logging, you can alternatively use event logging.

On the HPE Aruba Networking 6400 Switch Series, interface identification differs.

Enabling debug logging for the ACL logging module:

```
switch# debug acl log severity info
switch# show debug
------------------------------------------------------------------
module sub_module severity vlan  port   ip     mac  instance vrf
------------------------------------------------------------------
acl    acl_log    info     ----- -----  -----  ---- -----    ---
```

Setting the debug destination to console with the minimum security level of info:

```
switch# debug destination console severity info
switch# show debug destination
------------------------------------------------------------------------
                show debug destination
------------------------------------------------------------------------
CONSOLE:info
```

Setting the access list log-timer to 30 seconds:

```
switch(config)# access-list log-timer 30
switch(config)# do show access-list log-timer
ACL log timer length (frequency): 30 seconds
```

Creating an IPv4 ACL with one entry with the log parameter:

```
switch(config)# access-list ip MY_IP_ACL
switch(config-acl-ip)# deny icmp 1.1.1.1 1.1.1.2 log
switch(config-acl-ip)# do show access-list
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------------------
IPv4       MY_IP_ACL
        10 deny                            icmp
           1.1.1.1
           1.1.1.2
           Logging: enabled
           Hit-counts: enabled
```

Enabling interface 1/1/1 and applying the ACL:

```
switch(config)# interface 1/1/1
switch(config-if)# no shutdown
switch(config-if)# no routing
switch(config-if)# apply access-list ip MY_IP_ACL in
switch(config-if)# do show running-config interface 1/1/1
interface 1/1/1
   no shutdown
   apply access-list ip MY_IP_ACL in
   no routing
   vlan access 1
   exit
```

Sending packets that will match the ACE and observe the ACL logging message on the console:

```
2017-10-10T20:13:36.044+00:00 ops-switchd[875]: debug|LOG_INFO|AMM|1/5|ACL|ACL_
LOG|
List MY_IP_ACL, seq# 10 denied icmp 1.1.1.1 -> 1.1.1.2 type 8 code 0,
on vlan 1, port 1/1/1, direction in
```

When the access list log-timer expires, the summary message is printed on the console. The number 30 is the number of packets received during the last access list log-timer window.

```
2017-10-10T20:14:06.051+00:00 ops-switchd[875]: debug|LOG_INFO|AMM|1/5|ACL|ACL_
LOG|
MY_IP_ACL on 1/1/1 (in): 30  10 deny icmp 1.1.1.1 1.1.1.2 log count
```

Resetting the ACL log timer to the default value:

```
switch(config)# access-list log-timer default
```

Command History

Release	Modification
10.12	Allow ACLs applied to the Control Plane to be logged.
10.09	<INTERVAL> parameter range changed to **5 to 300**. Was 30 to 300.
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.

access-list mac

```
access-list mac <ACL-NAME>
no access-list mac <ACL-NAME>

[<SEQUENCE-NUMBER>]
{permit|deny}
{any|<SRC-MAC-ADDRESS>[/<ETHERNET-MASK>}]}
{any|<DST-MAC-ADDRESS>[/<ETHERNET-MASK>}]}
{any|aarp|appletalk|arp|fcoe|fcoe-init|ip|ipv6|
      ipx-arpa|ipx-non-arpa|is-is|lldp|mpls-multicast|mpls-unicast|q-in-q|
      rbridge|trill|wake-on-lan|<NUMERIC-ETHERTYPE>}
[pcp <PCP-VALUE>] [vlan <VLAN-ID>] [count] [log]
no <SEQUENCE-NUMBER>

[<SEQUENCE-NUMBER>] comment <TEXT-STRING>
no <SEQUENCE-NUMBER> comment
```

Description

Creates a MAC Access Control List (ACL). The ACL is made of one or more Access Control Entries (ACEs) ordered and prioritized by sequence numbers. The lowest sequence number is the highest prioritized ACE.

The **no** form of this command deletes the entire ACL, or deletes an ACE identified by sequence number, or deletes only the comment from the ACE identified by sequence number.

Parameter	Description
<ACL-NAME>	Specifies the name of this ACL.
<SEQUENCE-NUMBER>	Specifies a sequence number for the ACE. Range: 1 to 4294967295.
{permit|deny}	Specifies whether to permit or deny traffic matching this ACE.
comment	Specifies storing the remaining entered text as an ACE comment.
{any|*<SRC-MAC-ADDRESS>* [/*<ETHERNET-MASK>*}]}	Specifies the source host MAC address (xxxx.xxxx.xxxx), OUI, or the keyword any. You can optionally include the following: *<ETHERNET-MASK>* - The address bits to mask (xxxx.xxxx.xxxx).
{any|*<DST-MAC-ADDRESS>* [/*<ETHERNET-MASK>*}]}	Specifies the destination host MAC address (xxxx.xxxx.xxxx), OUI, or the keyword any. You can optionally include the following: *<ETHERNET-MASK>* - The address bits to mask (xxxx.xxxx.xxxx).
{any|aarp|appletalk| ... |wake-on-lan|*<NUMERIC-ETHERTYPE>*	Specifics the protocol encapsulated in the Ethernet frame. The encapsulated protocol is identified by the EtherType Ethernet field. The EtherType is specified in one of the following three ways: ■ any - any EtherType. ■ *<NUMERIC-ETHERTYPE>* - the numerical EtherType protocol number. Range: 0x600 to 0xffff. ■ One of these EtherType protocol name keywords: ◦ aarp ◦ appletalk ◦ arp ◦ fcoe ◦ fcoe-init ◦ ip ◦ ipv6 ◦ ipx-arpa ◦ ipx-non-arpa ◦ is-is ◦ lldp ◦ mpls-multicast ◦ mpls-unicast ◦ q-in-q ◦ rbridge ◦ trill ◦ wake-on-lan
pcp *<PCP-VALUE>*	Specifies 802.1Q QoS Priority Code Point value. Range: 0 to 7.
vlan *<VID>*	Specifies a VLAN ID. The VLAN ID must exist. **NOTE:** This parameter cannot be used in any ACL that will be

Parameter	Description
	applied to a VLAN.
`count`	Keeps the hit counts of the number of packets matching this ACE.
`log`	Keeps a log of the number of packets matching this ACE. Works with both `permit` and `deny` actions. Works with ACLs applied on ingress or egress.

Usage

When using multiple ACL types (IPv4, IPv6, or MAC) with logging on the same interface, the first packet that matches an ACE with `log` option is logged. Until the log-timer wait-period is over, any packets matching other ACL types do not create a log. At the end of the wait-period, the switch creates a summary log all the ACLs that were matched, regardless of type.

Examples

Creating a MAC ACL with four entries:

```
switch(config)# access-list mac MY_MAC_ACL
switch(config-acl-ip)# 10 permit 1122.3344.5566/ffff.ffff.0000 any ipv6
switch(config-acl-ip)# 20 permit aaaa.bbbb.cccc 1111.2222.3333 any pcp 4
switch(config-acl-ip)# 30 permit any any appletalk vlan 40
switch(config-acl-ip)# 40 deny any any any count
switch(config-acl-ip)# exit

switch(config)# do show access-list
Type       Name
  Sequence Comment
           Action                          EtherType
           Source MAC Address
           Destination MAC Address
           Additional Parameters
------------------------------------------------------------------------------
MAC        MY_MAC_ACL
        10 permit                          ipv6
           1122.3344.5566/ffff.ffff.0000
           any
        20 permit                          any
           aaaa.bbbb.cccc
           1111.2222.3333
           QoS Priority Code Point: 4
        30 permit                          appletalk
           any
           any
           VLAN: 40
        40 deny                            any
           any
           any
           Hit-counts: enabled
```

Adding a comment to an existing MAC ACE:

```
switch(config)# access-list mac MY_MAC_ACL
switch(config-acl-ip)# 30 comment Permit all vlan-40 tagged Appletalk traffic
switch(config-acl-ip)# exit

switch(config)# do show access-list
Type       Name
  Sequence Comment
           Action                           EtherType
           Source MAC Address
           Destination MAC Address
           Additional Parameters
------------------------------------------------------------------------------
MAC        MY_MAC_ACL
        10 permit                           ipv6
           1122.3344.5566/ffff.ffff.0000
           any
        20 permit                           any
           aaaa.bbbb.cccc
           1111.2222.3333
           QoS Priority Code Point: 4
        30 Permit all vlan-40 tagged Appletalk traffic
           permit                           appletalk
           any
           any
           VLAN: 40
        40 deny                             any
           any
           any
           Hit-counts: enabled
```

Removing a comment from an existing MAC ACE:

```
switch(config)# access-list mac MY_MAC_ACL
switch(config-acl-mac)# no 30 comment
switch(config-acl-mac)# exit

switch(config)# do show access-list
Type       Name
  Sequence Comment
           Action                           EtherType
           Source MAC Address
           Destination MAC Address
           Additional Parameters
------------------------------------------------------------------------------
MAC        MY_MAC_ACL
        10 permit                           ipv6
           1122.3344.5566/ffff.ffff.0000
           any
        20 permit                           any
           aaaa.bbbb.cccc
           1111.2222.3333
           QoS Priority Code Point: 4
        30 permit                           appletalk
           any
           any
           VLAN: 1
        40 deny                             any
           any
           any
           Hit-counts: enabled
```

Adding an ACE to an existing MAC ACL:

```
switch(config)# access-list mac MY_MAC_ACL
switch(config-acl-ip)# 35 permit any aabb.cc11.1234 0xffee
switch(config-acl-ip)# exit

switch(config)# do show access-list
Type       Name
  Sequence Comment
           Action                          EtherType
           Source MAC Address
           Destination MAC Address
           Additional Parameters
-------------------------------------------------------------------------------
MAC        MY_MAC_ACL
        10 permit                          ipv6
           1122.3344.5566/ffff.ffff.0000
           any
        20 permit                          any
           aaaa.bbbb.cccc
           1111.2222.3333
           QoS Priority Code Point: 4
        30 permit                          appletalk
           any
           any
           VLAN: 1
        35 permit                          0xffee
           any
           aabb.cc11.1234
        40 deny                            any
           any
           any
           Hit-counts: enabled
```

Replacing an ACE in an existing MAC ACL:

```
switch(config)# access-list mac MY_MAC_ACL
switch(config-acl-ip)# 35 permit any aabb.cc11.1234 0xeeee
switch(config-acl-ip)# exit

switch(config)# do show access-list
Type       Name
  Sequence Comment
           Action                          EtherType
           Source MAC Address
           Destination MAC Address
           Additional Parameters
-------------------------------------------------------------------------------
MAC        MY_MAC_ACL
        10 permit                          ipv6
           1122.3344.5566/ffff.ffff.0000
           any
        20 permit                          any
           aaaa.bbbb.cccc
           1111.2222.3333
           QoS Priority Code Point: 4
        30 permit                          appletalk
           any
           any
           VLAN: 1
        35 permit                          0xeeee
```

```
           any
           aabb.cc11.1234
        40 deny                            any
           any
           any
           Hit-counts: enabled
```

Removing an ACE from an MAC ACL:

```
switch(config)# access-list mac MY_MAC_ACL
switch(config-acl-ip)# no 35
switch(config-acl-ip)# exit

switch(config)# do show access-list
Type       Name
  Sequence Comment
           Action                          EtherType
           Source MAC Address
           Destination MAC Address
           Additional Parameters
------------------------------------------------------------------------------
MAC        MY_MAC_ACL
        10 permit                          ipv6
           1122.3344.5566/ffff.ffff.0000
           any
        20 permit                          any
           aaaa.bbbb.cccc
           1111.2222.3333
           QoS Priority Code Point: 4
        30 permit                          appletalk
           any
           any
           VLAN: 1
        40 deny                            any
           any
           any
           Hit-counts: enabled
```

Removing a MAC ACL:

```
switch(config)# no access-list mac MY_MAC_ACL

switch(config)# do show access-list
Type       Name
  Sequence Comment
           Action                          EtherType
           Source MAC Address
           Destination MAC Address
           Additional Parameters
------------------------------------------------------------------------------
MAC        MY_MAC_ACL2
         1 permit                          ipv6
           1122.3344.5566/ffff.ffff.0000
           any
         2 permit                          any
           aaaa.bbbb.cccc
           1111.2222.3333
           QoS Priority Code Point: 4
```

```
        3 Permit all vlan-40 tagged Appletalk traffic
          permit                          appletalk
          any
          any
          VLAN: 1
        4 deny                            any
          any
          any
          Hit-counts: enabled
```

Command History

Release	Modification
10.07 or earlier	--

Command Information

Platforms	Command context	Authority
All platforms	`config` The `access-list mac <ACL-NAME>` command takes you into the named ACL context where you enter the ACEs.	Administrators or local user group members with execution rights for this command.

access-list resequence

`access-list {ip|ipv6|mac} <ACL-NAME> resequence <STARTING-SEQUENCE-NUMBER> <INCREMENT>`

Description

Resequences the ACE sequence numbers in an ACL.

Parameter	Description
`{ip|ipv6|mac}`	Specifies the ACL type.
<ACL-NAME>	Specifies the ACL name.
<STARTING-SEQUENCE-NUMBER>	Specifies the starting sequence number.
<INCREMENT>	Specifies the sequence number increment.

Examples

Resequencing an IPv4 ACL to start at 1 with an increment of 1:

```
switch(config)# access-list ip MY_IP_ACL resequence 1 1
switch(config-acl-ip)# exit

switch(config)# do show access-list
Type       Name
  Sequence Comment
```

```
            Action                          L3 Protocol
            Source IP Address               Source L4 Port(s)
            Destination IP Address          Destination L4 Port(s)
            Additional Parameters
------------------------------------------------------------------------------
IPv4        MY_IP_ACL
          1 permit                          udp
            any
            172.16.1.0/255.255.255.0
          2 permit                          tcp
            172.16.2.0/255.255.0.0           >  1023
            any
          3 permit                          tcp
            172.26.1.0/255.255.255.0
            any
            dscp: AF11
            ack
            syn
          4 deny                            any
            any
            any
            Hit-counts: enabled
```

Resequencing an IPv6 ACL to start at 1 with an increment of 1:

```
switch(config)# access-list ipv6 MY_IPV6_ACL resequence 1 1
switch(config-acl-ip)# exit

switch(config)# do show access-list
Type        Name
  Sequence  Comment
            Action                          L3 Protocol
            Source IP Address               Source L4 Port(s)
            Destination IP Address          Destination L4 Port(s)
            Additional Parameters
------------------------------------------------------------------------------
IPv6        MY_IPV6_ACL
          1 permit                          udp
            any
            2001::1/64
          2 Permit all TCP ephemeral ports
            permit                          tcp
            2001:2001::2:1                   >  1023
            any
          3 permit                          tcp
            2001:2011::1/64
            any
          4 deny                            any
            any
            any
            Hit-counts: enabled
Type        Name
  Sequence  Comment
            Action                          L3 Protocol
            Source IP Address               Source L4 Port(s)
            Destination IP Address          Destination L4 Port(s)
            Additional Parameters
------------------------------------------------------------------------------
IPv6        MY_IPV6_ACL
          1 permit                          udp
            any
```

```
          2001::1/64
        2 Permit all TCP ephemeral ports
          permit                          tcp
          2001:2001::2:1                   >  1023
          any
        3 permit                          tcp
          2001:2011::1/64
          any
        4 deny                            any
          any
          any
          Hit-counts: enabled
```

Resequencing a MAC ACL to start at 1 with an increment of 1:

```
switch(config)# access-list mac MY_MAC_ACL resequence 1 1
switch(config-acl-mac)# exit

switch(config)# do show access-list
Type       Name
  Sequence Comment
           Action                         EtherType
           Source MAC Address
           Destination MAC Address
           Additional Parameters
--------------------------------------------------------------------------------
MAC        MY_MAC_ACL
         1 permit                         ipv6
           1122.3344.5566/ffff.ffff.0000
           any
         2 permit                         any
           aaaa.bbbb.cccc
           1111.2222.3333
           QoS Priority Code Point: 4
         3 Permit all vlan-40 tagged Appletalk traffic
           permit                         appletalk
           any
           any
           VLAN: 1
         4 deny                           any
           any
           any
           Hit-counts: enabled
```

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.

access-list reset

```
access-list {all|ip <ACL-NAME>|ipv6 <ACL-NAME>|mac <ACL-NAME>} reset
```

Description

Changes the user-specified ACL configuration to match the active ACL configuration. Use this command when a discrepancy exists between what the user configured and what is active and accepted by the system.

Parameter	Description
`all|ip` *ACL-NAME*`>|ipv6` *<ACL-NAME>*`|mac` *<ACL-NAME>*	Specifies **one** of the following: ■ a reset of `all` ACLs. ■ a reset of a named IPv4 ACL. ■ a reset of a named IPv6 ACL. ■ a reset of a named MAC ACL.

Usage

The output of the **show access-list** command displays the active configuration of the product. The active configuration is the ACLs that have been configured and accepted by the system. The output of the **show access-list** command with the **configuration** parameter, displays the ACLs that have been configured. The output of this command may not be the same as what was programmed in hardware or what is active on the product.

If the active ACLs and user-configured ACLs are not the same, a warning message is displayed in the output of the show command. Modify the user-configured ACL until the warning message is no longer displayed or run the **access-list reset** command to change the user-specified configuration to match the active configuration.

Examples

On the HPE Aruba Networking 6400 Switch Series, interface identification differs.

Apply an ACL with TCP acknowledgments (ACKs) on ingress, which is unsupported by hardware:

```
switch(config-acl)# 10 permit tcp 172.16.2.0/16 any ack
```

Displaying the user-specified configuration:

```
switch(config)# do show access-list commands
! access-list ip TEST_ACL user configuration does not match active configuration.
! run 'access-list TYPE NAME reset' to reset access-list to match active
configuration.
access-list ip TEST_ACL
! access-list ip TEST_ACL user configuration does not match active configuration.
! run 'access-list TYPE NAME reset' to reset access-list to match active
configuration.
interface 1/1/1
    apply access-list ip TEST_ACL in

switch(config)# do show access-list commands configuration
! access-list ip TEST_ACL user configuration does not match active configuration.
! run 'access-list TYPE NAME reset' to reset access-list to match active
configuration.
access-list ip TEST_ACL
    10 permit tcp 172.16.2.0/255.255.0.0 any ack
```

```
! access-list ip TEST_ACL user configuration does not match active configuration.
! run 'access-list TYPE NAME reset' to reset access-list to match active
configuration.
interface 1/1/1
    apply access-list ip TEST_ACL in

switch(config)# do show access-list
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------------------
% Warning: TEST_ACL user configuration does not match active configuration.
%          run 'access-list TYPE NAME reset' to reset access-list to match active
configuration.
IPv4       TEST_ACL

switch(config)# do show access-list configuration
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------------------
% Warning: TEST_ACL user configuration does not match active configuration.
%          run 'access-list TYPE NAME reset' to reset access-list to match active
configuration.
IPv4       TEST_ACL
        10
           permit                          tcp
           172.16.2.0/255.255.0.0
           any
           ack

! access-list ip TEST_ACL user configuration does not match active configuration.
! run 'access-list TYPE NAME reset' to reset access-list to match active
configuration.
access-list ip TEST_ACL
! access-list ip TEST_ACL user configuration does not match active configuration.
! run 'access-list TYPE NAME reset' to reset access-list to match active
configuration.
interface 1/1/1
    apply access-list ip TEST_ACL in

switch(config)# do show access-list commands configuration
! access-list ip TEST_ACL user configuration does not match active configuration.
! run 'access-list TYPE NAME reset' to reset access-list to match active
configuration.
access-list ip TEST_ACL
    10 permit tcp 172.16.2.0/255.255.0.0 any ack
! access-list ip TEST_ACL user configuration does not match active configuration.
! run 'access-list TYPE NAME reset' to reset access-list to match active
configuration.
interface 1/1/1
    apply access-list ip TEST_ACL in

switch(config)# do show access-list
Type       Name
  Sequence Comment
```

```
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------------------
% Warning: TEST_ACL user configuration does not match active configuration.
%          run 'access-list TYPE NAME reset' to reset access-list to match active
configuration.
IPv4       TEST_ACL

switch(config)# do show access-list configuration
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------------------
% Warning: TEST_ACL user configuration does not match active configuration.
%          run 'access-list TYPE NAME reset' to reset access-list to match active
configuration.
IPv4       TEST_ACL
        10
           permit                          tcp
           172.16.2.0/255.255.0.0
           any
           ack
```

Resetting the user-specified configuration to match the active configuration.

```
switch(config)# access-list ip TEST_ACL reset
```

Displaying the updated user-specified configuration.

```
switch(config)# do show access-list commands
access-list ip TEST_ACL
interface 1/1/1
    apply access-list ip TEST_ACL in

switch(config)# do show access-list commands configuration
access-list ip TEST_ACL
interface 1/1/1
    apply access-list ip TEST_ACL in

switch(config)# do show access-list
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------------------
IPv4       TEST_ACL

switch(config)# do show access-list configuration
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
```

```
            Destination IP Address          Destination L4 Port(s)
            Additional Parameters
-------------------------------------------------------------------------------
IPv4        TEST_ACL
```

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.

access-list secure-update

```
access-list secure-update
no access list secure-update
```

Description

This command determines if access lists are updated using the secure-update feature. Secure-update is enabled by default.

When secure update is enabled and an ACL is updated or replaced, one or more override entries are installed in the TCAM table(s) containing the ACL that is being modified. As a result, all traffic of the same type as the currently configured ACL will be denied on the interfaces to which the ACL is applied. This ensures that traffic is not temporarily allowed while modifying an ACL. Upon completion of the update, the TCAM override entries are uninstalled and traffic resumes ACL matching.

The **no** version of this command disables this feature. If secure-update is disabled, there will be no override entry installed. This results in the faster modification of an ACL and ensures that there is no interruption to previously permitted traffic, but may temporarily allow previously denied traffic to pass through the switch. Once the ACL has been modified, traffic will be processed by the updated ACL.

Examples

Disabling secure update:

```
switch(config)# no access-list secure-update
```

Reenabling secure update:

```
switch(config)# access-list secure-update
```

Related Commands

Command	Description
`vsx-sync acl-secure-update`	If this setting is enabled and the primary VSX node has configurations with the access list secure-update feature enabled, this configuration can synchronize to the secondary peer. This setting is disabled by default. Refer to the *VSX Guide* for details.

Command History

Release	Modification
10.13	Command introduced

Command Information

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

apply access-list control-plane

```
apply access-list {ip|ipv6} <ACL-NAME> control-plane vrf <VRF-NAME>
no apply access-list {ip|ipv6} <ACL-NAME> control-plane vrf <VRF-NAME>
```

Description

Applies an ACL to the specified VRF.

The **no** form of this command removes application of the ACL from the specified VRF.

Parameter	Description
`ip|ipv6`	Specifies the ACL type: `ip` for IPv4, or`ipv6` for IPv6.
<ACL-NAME>	Specifies the ACL name.
`vrf` *<VRF-NAME>*	Specifies the VRF name.

Usage

Only one ACL per type (**ip**, or **ipv6**) may be applied to a Control Plane VRF at a time. Therefore, using the **apply access-list control-plane** command on a VRF with an already-applied ACL of the same type, will replace the applied ACL.

Examples

Applying **My_ip_ACL** to Control Plane traffic on the default VRF:

```
switch(config)# apply access-list ip My_ip_ACL control-plane vrf default
```

Replacing My_ip_ACL with **My_Replacement_ACL** on the default VRF:

```
switch(config)# apply access-list ip My_Replacement_ACL control-plane vrf default
```

Remove (unapply) the **My_Replacement_ACL** from the default VRF. Any other interfaces or VLANs with My_Replacement_ACL applied are unaffected.

```
switch(config)# no apply access-list ip My_Replacement_ACL control-plane vrf
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.

apply access-list (to interface or LAG)

`no apply access-list {ip | ipv6 | mac} <ACL-NAME> {in | out}`

Description

Applies an ACL to the interface (Individual front plane port) or Link Aggregation Group (LAG) identified by the current interface or LAG context.

The **no** form of this command removes application of the ACL from the current interface or LAG identified by the current interface or LAG context.

ACLs cannot be applied to an L3 port or subinterface on 6300 switch series: S3L75A, S3L76A, S3L77A.

Parameter	Description
`ip|ipv6|mac`	Specifies the ACL type: `ip` for IPv4, `ipv6` for IPv6, or `mac` for MAC ACL.
<ACL-NAME>	Specifies the ACL name.
in	Selects the inbound (ingress) traffic direction.
`out`	Selects the outbound (egress) traffic direction.

Usage

- Each ACL of a given type can be applied to the same interface or LAG once in each direction. Therefore, using the **apply access-list** command on an interface or LAG with an already-applied ACL of the same typewill replace the currently applied ACL.

- An ACL can be applied to an individual front plane port or to a Link Aggregation Group (LAG).
- A port that is a member of a LAG with an applied ACL cannot have a different ACL applied to that member port.
- When the port membership of a LAG with an applied ACL is changed, the LAG ACL is automatically applied or removed from that port depending on the modification type.
- This command is not supported on L3 interfaces for the products, S3L75A, S3L76A, and S3L77A.

Examples

On the HPE Aruba Networking 6400 Switch Series, interface identification differs.

Applying **My_IP_ACL** to ingress traffic on interface range 1/1/10 to 1/1/12:

```
switch(config)# int 1/1/10-1/1/12
switch((config-if-<1/1/10-1/1/12>)# apply access-list ip My_IP_ACL in
switch((config-if-<1/1/10-1/1/12>)# exit
```

Applying **MY_IP_ACL** to ingress traffic on LAG 100 and egress traffic on interface 1/1/2:

```
switch(config)# interface lag 100
switch(config-lag-if)# apply access-list ip MY_IP_ACL in
switch(config-lag-if)# exit

switch(config)# interface 1/1/2
switch(config-if)# apply access-list ip MY_IP_ACL out
switch(config-if)# exit
switch(config)#
```

Applying **MY_IPV6_ACL** to ingress traffic on interface 1/1/1 and to ingress traffic on LAG 100:

```
switch(config)# interface 1/1/1
switch(config-if)# apply access-list ipv6 MY_IPV6_ACL in
switch(config-if)# exit

switch(config)# interface lag 100
switch(config-lag-if)# apply access-list ipv6 MY_IPV6_ACL in
switch(config-lag-if)# exit
switch(config)#
```

Applying **MY_MAC_ACL** to ingress traffic on interface 1/1/1 and ingress traffic on interface 1/1/2:

```
switch(config)# interface 1/1/1
switch(config-if)# apply access-list mac MY_MAC_ACL in
switch(config-if)# exit

switch(config)# interface 1/1/2
switch(config-if)# apply access-list mac MY_MAC_ACL in
switch(config-if)# exit
switch(config)#
```

Replacing **MY_IP_ACL** with **MY_REPLACEMENT_ACL** on interface 1/1/2:

```
switch(config)# interface 1/1/2
switch(config-if)# apply access-list ip MY_REPLACEMENT_ACL out
switch(config-if)# exit
switch(config)#
```

Unapplying **MY_REPLACEMENT_ACL** from interface 1/1/2 (out):

```
switch(config)# interface 1/1/2
switch(config-if)# no apply access-list ip MY_REPLACEMENT_ACL out
switch(config-if)# exit
switch(config)#
```

Command History

Release	Modification
10.07 or earlier	--

Command Information

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

apply access-list (to interface VLAN)

```
apply access-list {ip|ipv6} <ACL-NAME> {routed-in|routed-out}
no apply access-list {ip|ipv6} <ACL-NAME> {routed-in|routed-out}
```

Description

Applies an ACL to the interface VLAN (or range of interface VLANs) identified by the current interface VLAN context. Using the apply access-list command on an interface VLAN interface with an already-applied ACL of the same direction and type will replace the currently-applied ACL.

The **no** form of this command removes application of the ACL from the interface VLAN (or range of interface VLANs) identified by the current interface VLAN context.

Parameter	Description
`ip|ipv6`	Specifies the ACL type: **ip** for IPv4, **ipv6** for IPv6.
<ACL-NAME>	Specifies the ACL name.
`routed-in`	Selects the routed inbound (routed ingress) traffic direction.
`routed-out`	Selects the routed outbound (routed egress) traffic direction.

Usage

- Each ACL of a given type can be applied to the same interface VLAN once in each direction. Therefore, using the **apply access-list** command on an interface VLAN with an already-applied ACL of the same direction and type, will replace the applied ACL.
- Applicable to the HPE Aruba Networking 6300 and 6400 Switch Series: When an ACL is applied to an interface VLAN, it will create hardware entries on all stack members (6300 switch) and line cards (6400 switch) regardless of whether an interface VLAN member exists on any specific stack member or line card.

Examples

Creating an IPv4 ACL and applying it to routed ingress traffic on interface VLAN vlan100:

```
switch(config)# access-list ip test
switch(config-acl-ip)# 10 permit any 1.1.1.2 2.2.2.2 count
switch(config-acl-ip)# 20 permit any 1.1.1.2 2.2.2.1 count
switch(config-acl-ip)# 30 permit any 2.2.2.2 1.1.1.2 count
switch(config-acl-ip)# 40 permit any 2.2.2.2 1.1.1.1 count
switch(config-acl-ip)# 50 permit any any any count
switch(config-acl-ip)# exit
switch(config)#
switch(config)# interface vlan100
switch(config-if-vlan)# apply access-list ip test routed-in
```

Applying My_ip_ACL to routed ingress traffic on interface VLAN 10:

```
switch(config)# interface vlan 10
switch(config-if-vlan)# apply access-list ip My_ip_ACL routed-in
```

Applying My_ipv6_ACL to routed ingress traffic on interface VLAN 10:

```
switch(config)# interface vlan 10
switch(config-if-vlan)# apply access-list ipv6 My_ip_ACL routed-in
```

Applying My_ip_ACL to routed ingress traffic on interface VLANs 20 to 25:

```
switch(config)# interface vlan 20-25
switch(config-if-vlan-<20-25>)# apply access-list ip My_ip_ACL routed-in
```

Replacing My_ipv6_ACL with My_Replacement_ACL on interface VLAN 10 (following the above examples):

```
switch(config)# interface vlan 10
switch(config-if-vlan)# apply access-list ipv6 My_Replacement_ACL routed-in
```

Removing (unapplying) My_Replacement_ACL on interface VLAN 10. Any other interfaces or VLANs with My_Replacement_ACL applied are not affected:

```
switch(config)# interface vlan 10
switch(config-if-vlan)# no apply access-list ipv6 My_Replacement_ACL routed-in
```

Removing (unapplying) My_ip_ACL on interface VLANs 20 to 25. Any other interfaces or VLANs with My_ip_ACL applied are not affected:

```
switch(config)# interface vlan 20-25
switch(config-if-vlan-<20-25>)# no apply access-list ip My_ip_ACL routed-in
```

Applying My_ip_ACL to routed egress traffic on interface VLAN 30:

```
switch(config)# interface vlan 30
switch(config-if-vlan)# apply access-list ip My_ip_ACL routed-out
```

Applying My_ip_ACL to routed egress traffic on interface VLANs 40 to 50:

```
switch(config)# interface vlan 40-50
switch(config-if-vlan-<40-50>)# apply access-list ip My_ip_ACL routed-out
```

Command History

Release	Modification
10.07 or earlier	--

Command Information

Platforms	Command context	Authority
6300 6400 8100 8360	config-if-vlan	Administrators or local user group members with execution rights for this command.

apply access-list (to L3 VNI)

```
apply access-list {ip|ipv6} <ACL-NAME> {routed-in}
no apply access-list {ip|ipv6} <ACL-NAME> {routed-in}
```

Description

Applies an ACL to the current L3 VNI. Only one direction (`routed-in`) and one type (IPv4/IPv6) of an ACL may be applied to an L3 VNI at a time, thus the **apply** command on an L3 VNI with an already applied ACL of the same direction and type replaces the currently-applied ACL.

The **no** form of this command removes application of the ACL from the L3 VNI identified by the current L3 VNI context.

ACLs cannot be applied to an L3 port or subinterface on 6300 switch series: S3L75A, S3L76A, S3L77A.

Parameter	Description
ip|ipv6	Specifies the ACL type: **ip** for IPv4 or **ipv6** for IPv6.

Parameter	Description
<ACL-NAME>	Specifies the ACL name.
`routed-in`	Selects the routed-inbound (routed ingress) traffic direction.

Usage

- Each ACL of a given type can be applied to the same L3 VNI interface once in each direction. Therefore, using the **apply access-list** command on an L3 VNI interface with an already-applied ACL of the same type, will replace the applied ACL.
- For HPE Aruba Networking 6300 and 6400 Switch Series: When an ACL is applied to an L3 VNI interface, it will create hardware entries on all stack members (6300 switch) and line cards (6400 switch) regardless of whether an L3 VNI interface member exists on any specific stack member or line card.
- This command is not supported on L3 interfaces for the products, S3L75A, S3L76A, and S3L77A.

Examples

Applying My_ip_ACL to routed ingress traffic on VNI 10:

```
switch(config)# interface vxlan 1
switch(config-vxlan-if)# vni 10
switch(config-vni-10)# vrf red
switch(config-vni-10)# routing
switch(config-vni-10)# apply access-list ip My_ip_ACL routed-in
switch(config-vni-10)# exit
switch(config-vxlan-if)# exit
switch(config)#
```

Applying My_ipv6_ACL to routed ingress traffic on VNI 10:

```
switch(config)# interface vxlan 1
switch(config-vxlan-if)# vni 10
switch(config-vni-10)# vrf red
switch(config-vni-10)# routing
switch(config-vni-10)# apply access-list ipv6 My_ipv6_ACL routed-in
switch(config-vni-10)# exit
switch(config-vxlan-if)# exit
switch(config)#
```

Replacing **My_ipv6_ACL** with **My_Replacement_ACL** on VNI 10 (following the preceding examples):

```
switch(config)# interface vxlan 1
switch(config-vxlan-if)# vni 10
switch(config-vni-10)# apply access-list ipv6 My_Replacement_ACL routed-in
switch(config-vni-10)# exit
switch(config-vxlan-if)# exit
switch(config)#
```

Removing **My_Replacement_ACL** on interface **VNI 10**. Any other interfaces, VLANs, or VNIs with **My_ip_ACL** applied are not affected:

```
switch(config)# interface vxlan 1
switch(config-vxlan-if)# vni 10
switch(config-vni-10)# no apply access-list ipv6 My_Replacement_ACL routed-in
switch(config-vni-10)# exit
switch(config-vxlan-if)# exit
switch(config)#
```

Command History

Release	Modification
10.14	Added support for L3 VNI ACLs.
10.07 or earlier	--

Command Information

Platforms	Command context	Authority
6300 6400 6400v2 8100 8360 8360v2	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.

apply access-list (to subinterface)

```
apply access-list {ip|ipv6|mac} <ACL-NAME> {in|out}
no apply access-list {ip|ipv6|mac} <ACL-NAME> {in|out}
```

Description

Applies an ACL to the current port or LAG subinterface context or subinterface context range.

The **no** form of this command removes application of the ACL from the current port or LAG subinterface context or subinterface context range.

ACLs cannot be applied to an L3 port or subinterface on 6300 switch series: S3L75A, S3L76A, S3L77A.

An ACL cannot be applied to the parent interface of one or more subinterfaces. This also means that a subinterface cannot be added to an interface if there is an ACL applied.

ACE VLAN IDs cannot be added to ACLs applied to subinterfaces. This also means that an ACL with an ACE matching on a VLAN ID cannot be applied to a subinterface.

Parameter	Description
`ip|ipv6|mac`	Specifies the ACL type: **ip** for IPv4, **ipv6** for IPv6, or **mac** for MAC ACL.

Parameter	Description
<ACL-NAME>	Specifies the ACL name.
`in|out`	Selects the traffic direction.

Usage

- Each ACL of a given type can be applied to the same subinterface once in each direction. Therefore, using the **apply access-list** command on a subinterface with an already-applied ACL of the same type and direction will replace the currently applied ACL.
- In the case of a failed ACL application to a subinterface during switch reboot or hotswap, the subinterface will be shut down. Fixing the failure will cause the subinterface to come back up.
- In the case of a failed ACL application to an added subinterface LAG member(s), the entire LAG subinterface will be shut down. Fixing the failure will cause the LAG subinterface to come back up. For this case to occur, the ACL must already be successfully applied to existing subinterface LAG members. This is done to prevent traffic from circumventing the ACL by passing through new LAG members where the ACL was not successfully applied. This only occurs when the LAG spans more than one line card or stack member.
- This command is not supported on L3 interfaces for the products, S3L75A, S3L76A, and S3L77A.

Examples

On the HPE Aruba Networking 6400 Switch Series, interface identification differs.

Applying My_ip_ACL to ingress traffic on subinterface 1/1/1.10:

```
switch(config)# interface 1/1/1.10
switch(config-subif)# apply access-list ip My_ip_ACL in
```

Applying My_ip_ACL_egr to egress traffic on subinterface 1/1/2.8:

```
switch(config)# interface 1/1/2.8
switch(config-subif)# apply access-list ip My_ip_ACL_egr out
```

Applying My_ipv6_ACL to ingress traffic on subinterface 1/1/1.10:

```
switch(config)# interface 1/1/1.10
switch(config-subif)# apply access-list ipv6 My_ipv6_ACL in
```

Applying My_ip_ACL to ingress traffic on subinterface range 1/1/1.11 to 1/1/1.15:

```
switch(config)# interface 1/1/1.11-1/1/1.15
switch(config-subif-<1/1/1.11-1/1/1.15>)# apply access-list ip My_ip_ACL in
```

Replacing My_ipv6_ACL with My_Replacement_ACL on subinterface 1/1/1.10 (following the above examples):

```
switch(config)# interface 1/1/1.10
switch(config-subif)# apply access-list ipv6 My_Replacement_ACL in
```

Removing (unapplying) My_Replacement_ACL on subinterface 1/1/1.10. Any other interfaces or VLANs with My_Replacement_ACL applied are not affected.

```
switch(config)# interface 1/1/1.10
switch(config-subif)# no apply access-list ipv6 My_Replacement_ACL in
```

Removing (unapplying) My_ip_ACL on subinterface 1/1/1.11 to 1/1/1.15. Any other interfaces or VLANs with My_ip_ACL applied are not affected.

```
switch(config)# interface 1/1/1.11-1/1/1.15
switch(config-subif-<1/1/1.11-1/1/1.15>)# no apply access-list ip My_ip_ACL in
```

Applying My_ip_ACL to ingress traffic on subinterface lag1.10:

```
switch(config)# interface lag1.10
switch(config-subif)# apply access-list ip My_ip_ACL in
```

Removing (unapplying) My_ip_ACL from subinterface lag1.10:

```
switch(config)# interface lag1.10
switch(config-subif)# no apply access-list ip My_ip_ACL in
```

Applying My_ip_ACL_egr to egress traffic on subinterface lag1.4:

```
switch(config)# interface lag1.4
switch(config-subif)# apply access-list ip My_ip_ACL_egr out apply access-list ip
My_ip_ACL_egr out
```

Command History

Release	Modification
10.10	Added subinterface egress support for interfaces and LAGs.
10.08	Command introduced.

Command Information

Platforms	Command context	Authority
6300 6400 8100 8360	config-subif	Administrators or local user group members with execution rights for this command.

apply access-list (to VLAN)

```
apply access-list {ip|ipv6|mac} <ACL-NAME> {in|out}
no apply access-list {ip|ipv6|mac} <ACL-NAME> {in|out}
```

Description

Applies an ACL to the VLAN identified by the current VLAN context.

The **no** form of this command removes application of the ACL from the VLAN identified by the current VLAN context.

Parameter	Description
`ip|ipv6|mac`	Specifies the ACL type: **ip** for IPv4, **ipv6** for IPv6, or **mac** for MAC ACL.
<ACL-NAME>	Specifies the ACL name.
`in`	Selects the inbound (ingress) traffic direction.
`out`	Selects the outbound (egress) traffic direction. **NOTE:** For HPE Aruba Networking 6000 and 6100 Switch series, the outbound (egress) traffic direction is supported only for MAC ACLs.

Usage

- Each ACL of a given type can be applied to the same VLAN once in each direction. Therefore, using the **apply access-list** command on a VLAN with an already-applied ACL of the same type, will replace the applied ACL.
- Applicable to the HPE Aruba Networking 6300 and 6400 Switch Series: When an ACL is applied to a VLAN, it will create hardware entries on all stack members (6300 switch) and line cards (6400 switch) regardless of whether a VLAN member exists on any specific stack member or line card.

Examples

Applying My_ip_ACL to ingress traffic on VLAN range 20 to 25:

```
switch(config)# vlan 20-25
switch(config-vlan-<20-25>)# apply access-list ip My_ip_ACL in
```

Applying My_ip_ACL to egress traffic on VLAN range 40 to 50:

```
switch(config)# vlan 40-50.
switch(config-vlan-<40-50>)# apply access-list ip My_ip_ACL out
```

Applying My_ip_ACL to ingress traffic on VLAN 10:

```
switch(config)# vlan 10
switch(config-vlan-10)# apply access-list ip My_ip_ACL in
```

Applying My_ipv6_ACL to ingress traffic on VLAN 10:

```
switch(config)# vlan 10
switch(config-vlan-10)# apply access-list ipv6 My_ipv6_ACL in
```

Applying My_mac_ACL to ingress traffic on VLAN 10:

```
switch(config)# vlan 10
switch(config-vlan-10)# apply access-list mac My_mac_ACL in
```

Replacing My_ipv6_ACL with My_Replacement_ACL on VLAN 10 (following the preceding examples):

```
switch(config)# vlan 10
switch(config-vlan-10)# apply access-list ipv6 My_Replacement_ACL in
```

Removing (unapplying, Specifies the ACL type: **ip** for IPv4, **ipv6** for IPv6, or **mac** for MAC ACL.) several ACLs on VLAN 10:

```
switch(config)# vlan 10
switch(config-vlan-10)# no apply access-list ipv6 My_Replacement_ACL in
switch(config-vlan-10)# no apply access-list mac My_mac_ACL in
```

Command History

Release	Modification
10.07 or earlier	--

Command Information

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

clear access-list hitcounts

```
clear access-list hitcounts { all | [{ip|ipv6|mac} <ACL-NAME>]
                  [interface <IF-NAME>| vlan <VLAN-ID>] [in|out|routed-in|routed-out] }
```

Description

Clears the hit counts for ACLs with ACEs that include the `count` keyword.

Parameter	Description
`all`	Selects all ACLs.
`ip|ipv6|mac`	Specifies the ACL type: `ip` for IPv4, `ipv6` for IPv6, or `mac` for MAC.
<ACL-NAME>	Specifies the ACL name.

Parameter	Description
`interface <IF-NAME>`	Specifies the interface name (port or LAG). For ingress ACLs you may optionally include a **subinterface ID <SUB-INT>** in the range 1 to 4094 in the form **<IF-NAME>.<SUB-INT>**, for example **1/1/4.1**.
`vlan <VLAN-ID>`	Specifies the VLAN.
`in`	Selects the inbound (ingress) traffic direction.
`out`	Selects the outbound (egress) traffic direction.
`routed-in|routed-out`	Selects the routed traffic direction on which the ACL is applied. **NOTE:** This is only available for IPv4 and IPv6 ACLs applied to interface VLANs. - **routed-in** selects the routed inbound (routed ingress) traffic direction. - **routed-out** selects the routed outbound (routed egress) traffic direction.

Examples

On the HPE Aruba Networking 6400 Switch Series, interface identification differs.

Clearing the hit counts for My_ip_ACL applied to port 1/1/2 (egress):

```
switch# clear access-list hitcounts ip My_ip_ACL interface 1/1/2 out
```

Clearing the hit counts for My_ip_ACL applied to VLAN 10 (ingress):

```
switch# clear access-list hitcounts ip My_ip_ACL vlan 10 in
```

Clearing the hit counts for My_ip_ACL applied to subinterface 1/1/4.1 (ingress):

```
switch# clear access-list hitcounts ip My_ip_ACL interface 1/1/4.1 in
```

Clearing the hit counts for all ACLs:

```
switch# clear access-list hitcounts all
```

Command History

Release	Modification
10.08	Added subinterface information.
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.

clear access-list hitcounts control-plane

`clear access-list hitcounts [{ip|ipv6} <ACL-NAME>] control-plane vrf <VRF-NAME>`

Description

Clears the hit counts for ACLs applied to the Control Plane VRF.

Parameter	Description
`ip|ipv6`	Specifies the ACL type: **ip** for IPv4, or **ipv6** for IPv6.
<ACL-NAME>	Specifies the ACL name.
`vrf` *<VRF-NAME>*	Specifies the VRF name.

Examples

Clearing the hit counts for an IPv4 ACL applied to the Control Plane `default` VRF:

```
switch# clear access-list hitcounts ip My_ipv4_ACL control-plane vrf default
```

Clearing the hit counts for an IPv6 ACL applied to the Control Plane `default` VRF:

```
switch# clear access-list hitcounts ipv6 My_ipv6_ACL control-plane vrf default
```

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.

object-group address resequence

`object-group {ip|ipv6} address <OBJECT-GROUP-NAME> resequence <STARTING-SEQUENCE-NUMBER> <INCREMENT>`

Description

Reorders the sequence numbers in an address object group.

Parameter	Description
`ip|ipv6`	Specifies the object group IP address type, either `ip` or `ipv6`.
<OBJECT-GROUP-NAME>	Specifies the address object group name.
<STARTING-SEQUENCE-NUMBER>	Specifies the starting sequence number.
<INCREMENT>	Specifies the sequence number increment.

Examples

Resequencing address object group my_ipv4_addr_group to use sequence numbers 5, 10, 15 and so on:

```
switch(config)# object-group address my_ipv4_addr_group resequence 5 5
switch(config)#
```

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.

object-group address reset

`object-group {ip|ipv6} address <OBJECT-GROUP-NAME> reset`

Description

Resets the user configuration back to the active configuration. This command takes immediate effect, it is not saved in the user configuration. Use this command if misconfiguration of an address object group has occurred.

Parameter	Description
`ip|ipv6`	Specifies the object group IP address type, either `ip` or `ipv6`.
<OBJECT-GROUP-NAME>	Specifies the address object group name.

Examples

Resetting IPv4 address object group my_ipv4_group:

```
switch(config)# object-group ip address my_ip_group reset
switch(config)#
```

Resetting IPv6 address object group my_ipv6_group:

```
switch(config)# object-group ipv6 address my_ipv6_group reset
switch(config)#
```

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.

object-group all reset

`object-group all reset`

Description

Resets the user configuration back to the active configuration for all object types (address and port). This command takes immediate effect, it is not saved in the user configuration. Use this command if misconfiguration of address object groups and port object groups has occurred. Individual address and port object groups can be reset respectively with the **object-group address reset** and **object-group port** reset commands.

Examples

Resetting the user configuration for all object types (address and port):

```
switch(config)# object-group all reset
switch(config)#
```

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.

object-group ip address

Syntax to create an IPv4 address object group and enter its context:

```
object-group ip address <OBJECT-GROUP-NAME>
no object-group ip address <OBJECT-GROUP-NAME>
```

Syntax (within the address object-group context) for creating or removing IPv4 address entries and to specify the network to be tagged as intranet:

```
[vrf <VRF-NAME>] [<SEQUENCE-NUMBER>]  <IP-ADDRESS>[/{<PREFIX-LENGTH>|<SUBNET-MASK>}]

  no <SEQUENCE-NUMBER>
```

Description

Creates an IPv4 address object group comprised of one or more address entries. Address groups are used solely as a shorthand way of specifying groups of addresses in the ACEs that make up ACLs. IPv4 address groups can be used only in the **access-list ip** command. Entering **object-group ip address** with an existing address group name, enables you to modify an existing address group.

The **no** form of this command deletes the entire address group or deletes a particular address group entry identified by sequence number.

Parameter	Description
<OBJECT-GROUP-NAME>	Specifies the address object group name.
<VRF-NAME>	Specifies the name of the network to be tagged from GBP and non-GBP fabric as intranet.
<SEQUENCE-NUMBER>	Specifies a sequence number for the address entry. Range: 1 to 4294967295. When omitted, a sequence number 10 larger than the current highest sequence number is auto-assigned. Default auto-assigned sequence numbers are 10, 20, 30, and so on.
*<IP-ADDRESS>***[/{***<PREFIX-LENGTH>***|***<SUBNET-MASK>***}]**	Specifies the IPv4 address. ▪ ***<IP-ADDRESS>*** - specifies the IPv4 host address. ▪ ***<PREFIX-LENGTH>*** - specifies the address bits to mask (CIDR subnet mask notation). Range: 1 to 32. ▪ ***<SUBNET-MASK>*** - specifies the address bits to mask (dotted decimal notation).

Examples

Creating an IPv4 address group with two entries:

```
switch(config)# object-group ip address my_ipv4_addr_group
switch(config-addrgroup-ip)# 10 192.168.0.1
switch(config-addrgroup-ip)# 20 192.168.0.2
switch(config-addrgroup-ip)# exit
switch(config)# show object-group
Type       Name
  Sequence L4 Port(s)/IP Address
------------------------------------------------------------------------------
IPv4       my_ipv4_addr_group
```

```
        10 192.168.0.1
        20 192.168.0.2
```

Adding an entry to an existing IPv4 address group:

```
switch(config)# object-group ip address my_ipv4_addr_group
switch(config-addrgroup-ip)# 30 192.168.0.3
switch(config-addrgroup-ip)# exit
switch(config)# show object-group
Type       Name
  Sequence L4 Port(s)/IP Address
-------------------------------------------------------------------------------
IPv4       my_ipv4_addr_group
        10 192.168.0.1
        20 192.168.0.2
        30 192.168.0.3
```

Specifying the network to be tagged as intranet:

```
switch(config)# object-group ip address net_group
switch(config-addrgroup-ip)# vrf red
switch(config-addrgroup-ip)# 10 7.7.7.0/24
switch(config-addrgroup-ip)# 20 8.8.8.0/24
```

Enabling VSX synchronization:

```
object-group ip address obj1
vsx-sync
!
vrf VRF_1
!
10 5.5.5.5
20 6.6.6.0/255.255.255.0
30 7.7.0.0/255.255.0.0
40 20.0.0.10
```

Removing an entry (20) from an existing IPv4 address group:

```
switch(config)# object-group ip address my_ipv4_addr_group
switch(config-addrgroup-ip)# no 20
switch(config-addrgroup-ip)# exit
switch(config)# show object-group
Type       Name
  Sequence L4 Port(s)/IP Address
-------------------------------------------------------------------------------
IPv4       my_ipv4_addr_group
        10 192.168.0.1
        30 192.168.0.3
```

Removing an IPv4 address group:

```
switch(config)# no object-group ip address my_ipv4_addr_group
switch(config)# show object-group
No object group found.
```

Command History

Release	Modification
10.13	The **vrf** parameter was introduced for 8360 Switch series.
10.07 or earlier	--

Command Information

Platforms	Command context	Authority
All platforms	`config` The **object-group ip address** command takes you into the named address group context (with prompt **switch (config-addrgroup-ip)#**) where you enter the addresses.	Administrators or local user group members with execution rights for this command.

object-group ipv6 address

Syntax to create an IPv6 address object group and enter its context:

```
object-group ipv6 address <OBJECT-GROUP-NAME>
no object-group ipv6 address <OBJECT-GROUP-NAME>
```

Syntax (within the address object-group context) for creating or removing IPv6 address entries and to specify the network to be tagged as intranet:

```
   [vrf <VRF-NAME>] [<SEQUENCE-NUMBER>]  <IP-ADDRESS>[/{<PREFIX-LENGTH>|<SUBNET-MASK>}]

  no <SEQUENCE-NUMBER>
```

Description

Creates an IPv6 address object group comprised of one or more address entries. Address groups are used solely as a shorthand way of specifying groups of addresses in the ACEs that make up ACLs. IPv6 address groups can be used only in the `access-list ipv6` command. Entering `object-group ipv6 address` with an existing address group name, enables you to modify an existing address group.

The **no** form of this command deletes the entire address group or deletes a particular address group entry identified by sequence number.

Parameter	Description
<OBJECT-GROUP-NAME>	Specifies the address object group name.
<VRF-NAME>	Specifies the name of the network to be tagged from GBP and non-GBP fabric as intranet.
<SEQUENCE-NUMBER>	Specifies a sequence number for the address entry. Range: 1 to 4294967295. When omitted, a sequence number 10 larger than the current highest sequence number is auto-assigned. Default auto-assigned sequence numbers are 10, 20, 30, and so on.

Parameter	Description
<IP-ADDRESS>[/{*<PREFIX-LENGTH>*|*<SUBNET-MASK>*}]	Specifies the IPv6 address. ■ *<IP-ADDRESS>* - specifies the IPv6 host address. ◦ *<PREFIX-LENGTH>* - specifies the address bits to mask (CIDR subnet mask notation). Range: 1 to 128. ◦ *<SUBNET-MASK>* - specifies the address bits to mask (dotted decimal notation).

Examples

Creating an IPv6 address group with two entries:

```
switch(config)# object-group ipv6 address my_ipv6_addr_group
switch(config-addrgroup-ipv6)# 10 1000::1
switch(config-addrgroup-ipv6)# 20 1000::2
switch(config-addrgroup-ipv6)# exit
switch(config)# show object-group
Type       Name
  Sequence L4 Port(s)/IP Address
------------------------------------------------------------------------------
IPv6       my_ipv6_addr_group
        10 1000::1
        20 1000::2
```

Adding an entry to an existing IPv6 address group:

```
switch(config)# object-group ipv6 address my_ipv6_addr_group
switch(config-addrgroup-ipv6)#
switch(config-addrgroup-ipv6)# 30 1000::3
switch(config-addrgroup-ipv6)# exit
switch(config)# show object-group
Type       Name
  Sequence L4 Port(s)/IP Address
------------------------------------------------------------------------------
IPv6       my_ipv6_addr_group
        10 1000::1
        20 1000::2
        30 1000::3
```

Specifying the network to be tagged as intranet:

```
switch(config)# object-group ipv6 address net_group
switch(config-addrgroup-ip)# vrf red
switch(config-addrgroup-ip)# 10 1000::1
switch(config-addrgroup-ip)# 20 1000::2
```

Removing an entry (20) from an existing IPv6 address group:

```
switch(config)# object-group ipv6 address my_ipv6_addr_group
switch(config-addrgroup-ipv6)# no 20
```

```
switch(config-addrgroup-ipv6)# exit
switch(config)# show object-group
Type       Name
  Sequence L4 Port(s)/IP Address
-------------------------------------------------------------------------------
IPv6       my_ipv6_addr_group
        10 1000::1
        30 1000::3
```

Removing an IPv6 address group:

```
switch(config)# no object-group ipv6 address my_ipv6_addr_group
switch(config)# show object-group
No object group found.
```

Command History

Release	Modification
10.13	The **vrf** parameter was introduced for 8360 Switch series.
10.07 or earlier	--

Command Information

Platforms	Command context	Authority
All platforms	`config` The **object-group ipv6 address** command takes you into the named address group context (with prompt **switch (config-addrgroup-ipv6)#**) where you enter the addresses.	Administrators or local user group members with execution rights for this command.

object-group port

Syntax to create a Layer 4 port object group and enter its context:

`object-group port <OBJECT-GROUP-NAME>`

`no object-group port <OBJECT-GROUP-NAME>`

Syntax (within the port object-group context) for creating or removing Layer 4 port entries:

`[<SEQUENCE-NUMBER>] { {eq|gt|lt} <PORT>|range <MIN-PORT> <MAX-PORT> }`

`no <SEQUENCE-NUMBER>`

Description

Creates a Layer 4 port object group comprised of one or more port entries. Port groups are used solely as a shorthand way of specifying groups of ports in the ACEs that make up ACLs. Layer 4 port groups can be used only in the **access-list ip** and **access-list ipv6** commands. Entering **object-group port** with an existing port group name, enables you to modify an existing port group.

The **no** form of this command deletes the entire port group or deletes a particular port group entry identified by sequence number.

Parameter	Description
<OBJECT-GROUP-NAME>	Specifies the port object group name.
<SEQUENCE-NUMBER>	Specifies a sequence number for the port entry. Range: 1 to 4294967295. When omitted, a sequence number 10 larger than the current highest sequence number is auto-assigned. Default auto-assigned sequence numbers are 10, 20, 30, and so on.
{ {eq|gt|lt} *<PORT>*|**range** *<MIN-PORT><MAX-PORT>* **}**	Specifies the port or port range. Port numbers are in the range of 0 to 65535. ▪ **eq *<PORT>*** - specifies the Layer 4 port. ▪ **gt *<PORT>*** - specifies any Layer 4 port greater than the indicated port. ▪ **lt *<PORT>*** - specifies any Layer 4 port less than the indicated port. ▪ **range *MIN-PORT> <MAX-PORT>*** - specifies the Layer 4 port range. **NOTE:** When ACLs using ACEs defined with port groups are applied, the same number of hardware resources are consumed as when the ports are specified directly in the ACEs and not in a group. Keep this in mind when creating port groups that include many ports. Although hardware resource consumption is the same, with or without port groups used, it may not be immediately obvious that some port groups that you have defined, include many ports. It is recommended that you name port groups in a manner that reminds you that a group includes many ports.

Examples

Creating a port group with two entries to cover port 80 plus ports 0 through 50:

```
switch(config)# object-group port my_port_group
switch(config-portgroup)# 10 eq 80
switch(config-portgroup)# 20 range 0 50
switch(config-portgroup)# exit
switch(config)# show object-group
Type       Name
```

```
  Sequence L4 Port(s)/IP Address
-------------------------------------------------------------------------------
Port       my_port_group
        10 eq 80
        20 range 0 50
```

Adding an entry for ports greater than 65525 (covers ports 65526 through 65535):

```
switch(config)# object-group port my_port_group
switch(config-portgroup)# 30 gt 65525
switch(config-portgroup)# exit
switch(config)# show object-group
Type       Name
  Sequence L4 Port(s)/IP Address
-------------------------------------------------------------------------------
Port       my_port_group
        10 eq 80
        20 range 0 50
        30 gt 65525
```

Removing an entry (#20) from the port group:

```
switch(config)# object-group port my_port_group
switch(config-portgroup)# no 20
switch(config-portgroup)# exit
switch(config)# show object-group
Type       Name
  Sequence L4 Port(s)/IP Address
-------------------------------------------------------------------------------
Port       my_port_group
        10 eq 80
        30 gt 65525
```

Removing the port group:

```
switch(config)# no object-group port my_port_group
switch(config)# show object-group
No object group found.
```

Command History

Release	Modification
10.07 or earlier	--

Command Information

Platforms	Command context	Authority
All platforms	`config` The **object-group ip port** command takes you into the named port group context (with	Administrators or local user group members with execution rights for this command.

Platforms	Command context	Authority
	prompt **switch(config-portgroup)#**) where you specify the ports.	

object-group port resequence

`object-group port <OBJECT-GROUP-NAME> resequence <STARTING-SEQUENCE-NUMBER> <INCREMENT>`

Description

Reorders the sequence numbers in a port object group.

Parameter	Description
<OBJECT-GROUP-NAME>	Specifies the port object group name.
<STARTING-SEQUENCE-NUMBER>	Specifies the starting sequence number.
<INCREMENT>	Specifies the sequence number increment.

Examples

Resequencing port object group my_port_group to use sequence numbers 110, 120, 130 and so on:

```
switch(config)# object-group port my_port_group resequence 110 10
switch(config)#
```

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.

object-group port reset

`object-group port <OBJECT-GROUP-NAME> reset`

Description

Resets the user configuration back to the active configuration. This command takes immediate effect, it is not saved in the user configuration. Use this command if misconfiguration of a port object group has occurred.

Parameter	Description
<OBJECT-GROUP-NAME>	Specifies the port object group name.

Examples

Resetting port object group my_port_group:

```
switch(config)# object-group port my_port_group reset
switch(config)#
```

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 access-list

```
show access-list [interface <IF-NAME> | vlan <VLAN-ID> | vni <VNI-ID> | interface vlan
<VLAN-ID> | interface lag <LAG-ID>] [in|out|routed-in|routed-out][ip|ipv6|mac] [<ACL-
NAME>] [commands] [configuration]
show access-list [ip|ipv6] [<ACL-NAME>] control-plane [vrf <VRF-NAME>] [commands]
[configuration]

show access-list [ip|ipv6|mac] [<ACL-NAME>] control-plane [vrf <VRF-NAME>] [commands]
[configuration] [vsx-peer]
```

Description

Shows information about your defined ACLs and where they have been applied. When **show access-list** is entered without parameters, information for all ACLs is shown. The parameters filter the list of ACLs for which information is shown.

Available filtering includes:

- The content of a specific ACL.
- All ACLs of a specific type.
- The ACL applied in a particular direction.
- The ACL applied to a specific interface (port or split port or LAG).
- The ACL applied to a specific subinterface (port or LAG).
- The ACL applied to a specific VLAN.
- The ACL applied to a specific VNI.
- The ACL applied to specific interface VLAN (routed-in or routed-out).
- The control-plane ACL applied to a specific VRF.

Parameter	Description
`interface <IF-NAME>`	Specifies the interface name (port or LAG). For ingress ACLs you may optionally include a subinterface ID `<SUB-INT>` in the range 1 to 4094 in the form `<IF-NAME>.<SUB-INT>`, for example `1/1/4.1`.
`vlan <VLAN-ID>`	Specifies the VLAN.
`vni <VNI-ID>`	Specifies the ID of the VNI.
`interface vlan <VLAN-ID>`	Specifies a valid 802.1Q VLAN ID. Range: 1 to 4094.
`interface lag <LAG-ID>`	Specifies a valid LAG ID. Range: 1 to 256.
`control-plane vrf <VRF-NAME>`	Specifies the VRF of the control plane ACL.
`in`	Selects the inbound (ingress) traffic direction.
`out`	Selects the outbound (egress) traffic direction.
`routed-in`	Selects the routed inbound (routed ingress) traffic direction. **NOTE**: This is only available for IPv4 and IPv6 ACLs applied to interface VLANs.
`routed-out`	Selects the routed outbound (routed egress) traffic direction. **NOTE**: This is only available for IPv4 and IPv6 ACLs applied to interface VLANs.
`ip|ipv6|mac`	Specifies the ACL type: ▪ **ip** for IPv4, ▪ **ipv6** for IPv6, or ▪ **mac** for MAC.
`<ACL-NAME>`	Specifies the ACL name.
`commands`	Specifies that the ACL definition is to be shown as the commands and parameters used to create it rather than in tabular form.
`configuration`	Specifies that the user-configured ACLs be shown as entered, even if the ACLs are not active due to ACE-definition command issues or hardware issues. This parameter is useful if there is a mismatch between the entered configuration and the previous successfully programmed (active) ACLs configuration.
`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.

Examples

Creating an IPv4 ACL, applying it to an interface VLAN (routed in), and then showing ACL information filtered for that interface VAN:

```
switch(config)# access-list ip test
switch(config-acl-ip)# 10 permit any 1.1.1.2 2.2.2.2 count
switch(config-acl-ip)# 20 permit any 1.1.1.2 2.2.2.1 count
switch(config-acl-ip)# 30 permit any 2.2.2.2 1.1.1.2 count
switch(config-acl-ip)# 40 permit any 2.2.2.2 1.1.1.1 count
switch(config-acl-ip)# 50 permit any any any count
switch(config-acl-ip)# exit
switch(config)#
switch(config)# interface vlan100
switch(config-if-vlan)# apply access-list ip test routed-in
switch(config-if-vlan)# exit
switch(config)# show access-list interface vlan100 ip routed-in

Direction
Type       Name
  Sequence Comment
           Ac  L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------------------
Routed Inbound
IPv4       test
        10
           permit                          any
           1.1.1.2
           2.2.2.2
           Hit-counts: enabled
        20
           permit                          any
           1.1.1.2
           2.2.2.1
           Hit-counts: enabled
        30
           permit                          any
           2.2.2.2
           1.1.1.2
           Hit-counts: enabled
        40
           permit                          any
           2.2.2.2
           1.1.1.1
           Hit-counts: enabled
        50
           permit                          any
           any
           any
           Hit-counts: enabled
------------------------------------------------------------------------------
```

Showing an IPv4 ACL:

```
switch# show access-list ip MY_ACL
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------------------
IPv4       MY_ACL
```

```
        10 permit                          udp
           any
           172.16.1.0/255.255.255.0
        20 permit                          tcp
           172.16.2.0/255.255.0.0          >  1023
           any
        30 permit                          tcp
           172.26.1.0//255.255.255.0
           any
           syn
           ack
           dscp 10
        40 deny                            any
           any
           any
           Hit-counts: enabled
------------------------------------------------------------------------------
```

Showing an IPv4 ACL as commands:

```
switch# show access-list ip MY_ACL commands
access-list ip MY_ACL
    10 permit udp any 172.16.1.0/255.255.255.0
    20 permit tcp 172.16.2.0/255.255.0.0 gt 1023 any
    30 permit tcp 172.26.1.0/255.255.255.0 any syn ack dscp 10
    40 deny any any any count
```

Showing a MAC ACL applied to subinterface 1/1/2.1, inbound:

```
switch# show access-list interface 1/1/2.1 mac in
Direction
Type       Name
  Sequence Comment
           Action                          EtherType
           Source MAC Address
           Destination MAC Address
           Additional Parameters
------------------------------------------------------------------------------
Inbound
MAC        My_mac_ACL
        10
           permit                          ipv6
           1122.3344.5566/ffff.ffff.0000
           any
        20
           permit                          any
           aaaa.bbbb.cccc
           1111.2222.3333
           QoS Priority Code Point: 4
        30
           deny                            any
           any
           any
           Hit-counts: enabled
------------------------------------------------------------------------------
```

Showing IPv4 ACLs applied to VLAN 10, inbound:

```
switch# show access-list vlan 10 ip in
Type       Name
  Sequence Comment
           Action                           L3 Protocol
           Source IP Address                Source L4 Port(s)
           Destination IP Address           Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------------------
IPv4       My_ip_ACL
        10 permit                           udp
           any
           172.16.1.0/255.255.255.0
        20 permit                           tcp
           172.16.2.0/255.255.0.0           >  1023
           any
        30 permit                           tcp
           172.26.1.0//255.255.255.0
           any
           syn
           ack
           dscp 10
        40 deny                             any
           any
           any
           Hit-counts: enabled
------------------------------------------------------------------------------
```

Showing IPv6 ACLs applied to LAG 128, inbound:

```
switch# show access-list interface lag128 ipv6 in
Type       Name
  Sequence Comment
           Action                           L3 Protocol
           Source IP Address                Source L4 Port(s)
           Destination IP Address           Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------------------
IPv6       MY_IPV6_ACL
        10 permit                           udp
           any
           2001::1/64
        20 permit                           tcp
           2001:2001::2:1/128               >  1023
           any
        30 permit                           tcp
           2001:2011::1/64
        40 deny                             any
           any
           any
           Hit-counts: enabled
------------------------------------------------------------------------------
```

Showing an IPv6 ACL as commands:

```
switch# show access-list ipv6 MY_IPV6_ACL commands
access-list ipv6 MY_IPV6_ACL
    10 permit udp any 2001::1/64
    20 permit tcp 2001:2001::2:1/128 gt 1023 any
    40 deny any any any count
```

Showing a MAC ACL:

```
switch# show access-list mac MY_MAC_ACL
Type       Name
  Sequence Comment
           Action                          EtherType
           Source MAC Address
           Destination MAC Address
           Additional Parameters
--------------------------------------------------------------------------------
MAC        MY_MAC_ACL
        10 permit                          ipv6
           1122.3344.5566/ffff.ffff.0000
           any
        20 permit                          any
           aaaa.bbbb.cccc
           1111.2222.3333
           QoS Priority Code Point: 4
        30 deny                            any
           any
           any
           Hit-counts: enabled
--------------------------------------------------------------------------------
```

Showing a MAC ACL as commands:

```
switch# show access-list mac MY_MAC_ACL commands
access-list mac MY_MAC_ACL
    10 permit 1122.3344.5566/ffff.ffff.0000 any ipv6
    20 permit aaaa.bbbb.cccc 1111.2222.3333 any pcp 4
    30 deny any any any count
```

Command History

Release	Modification
10.14	Added support for L3VNI ACLs.
10.08	Added subinterface information and examples.
10.07 or earlier	Command introduced.

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 access-list control-plane

```
show access-list [ip|ipv6] [<ACL-NAME>] control-plane [vrf <VRF-NAME>]
                 [commands] [configuration][vsx-peer]
```

Description

Shows information about your defined ACLs that have been applied to the Control Plane. When **show access-list control-plane** is entered without parameters, information for all ACLs applied to the Control Plane is shown. The parameters filter the list of ACLs for which information is shown.

Available filtering includes:

- The content of a specific ACL that has been applied to the Control Plane.
- All ACLs of a specific type that have been applied to the Control Plane.
- All ACLs applied to the Control Plane for a specific VRF.

Parameter	Description
`ip|ipv6`	Specifies the ACL type: `ip` for IPv4, or`ipv6` for IPv6.
<ACL-NAME>	Specifies the ACL name.
`vrf` *<VRF-NAME>*	Specifies the VRF name.
`[commands]`	Specifies that the ACL definition is to be shown as the commands and parameters used to create it rather than in tabular form.
`[configuration]`	Specifies that the user-configured ACLs be shown as entered, even if the ACLs are not active due to ACE-definition command issues or hardware issues. This parameter is useful if there is a mismatch between the entered configuration and the previous successfully programmed (active) ACLs configuration.
`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.

Examples

Showing an IPv4 ACL applied to the Control Plane `default` VRF:

```
switch# show access-list ip My_ipv4_ACL control-plane vrf default
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------------------
IPv4       My_ipv4_ACL
        10 permit                          udp
           any
           172.16.1.0/24
        20 permit                          tcp
           172.16.2.0/16                    >  1023
           any
        30 permit                          tcp
           172.26.1.0/24
           any
           syn
           ack
           dscp 10
        40 deny                            any
           any
```

```
           any
           Hit-counts: enabled
------------------------------------------------------------------------------
```

Showing an IPv6 ACL applied to the Control Plane `default` VRF:

```
switch# show access-list ipv6 My_ipv6_ACL control-plane vrf default
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------------------
IPv6       My_ipv6_ACL
        10 permit                          udp
           any
           2001::1/64
        20 permit                          tcp
           2001:2001::2:1/128               >  1023
           any
        30 permit                          tcp
           2001:2011::1/64
        40 deny                            any
           any
           any
           Hit-counts: enabled
------------------------------------------------------------------------------
```

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 access-list hitcounts

```
For 6300, 6400, 8320, 8325, 8325H, 8325P, 9300 and 9300 Switch series:
show access-list hitcounts { [{ip|ipv6|mac} <ACL-NAME>] [interface <IF-NAME> | vlan
<VLAN-ID> | vni <VNI-ID> | interface vlan <VLAN-ID> | interface lag <LAG-ID>]
[in|out|routed-in|routed-out]} [vsx-peer] }
For 6300, 6400, 8100 and 8360 Switch series:
show access-list hitcounts { [{ip|ipv6|mac} <ACL-NAME>] [interface <IF-NAME> | vlan
<VLAN-ID> | vni <VNI-ID>] [in|out|routed-in|routed-out]} [vsx-peer] }
For 6300, 6400, 8100 and 8360 Switch series:
show access-list hitcounts [{ip|ipv6} <acl-name>] control-plane vrf <VRF-NAME>
```

Description

Shows the hit count of the number of times an ACL has matched a packet or frame for ACEs with the **count** keyword. For ACEs without the **count** keyword, a dash is shown in place of a hit count.

Parameter	Description
`ip|ipv6|mac`	Specifies the ACL type: **ip** for IPv4, **ipv6** for IPv6, or **mac** for MAC.
<ACL-NAME>	Specifies the ACL name.
`interface` *<IF-NAME>*	Specifies the interface name (port or split port or LAG). For ingress ACLs you may optionally include a subinterface ID **<SUB-INT>** in the range 1 to 4094 in the form **<IF-NAME>.<SUB-INT>**, for example **1/1/4.1**.
`vlan` *<VLAN-ID>*	Specifies the VLAN.
`vni` *<VNI-ID>*	Specifies the ID of the VNI.
`interface vlan` *<VLAN-ID>*	Specifies a valid 802.1Q VLAN ID. Range: 1 to 4094.
`interface lag` *<LAG-ID>*	Specifies a valid LAG ID. Range: 1 to 256.
`control-plane vrf` *<VRF-NAME>*	Specifies the VRF of the control plane ACL.
`in`	Selects the inbound (ingress) traffic direction.
`out`	Selects the outbound (egress) traffic direction.
`routed-in`	Selects the routed inbound (routed ingress) traffic direction.
`routed-out`	Selects the routed outbound (routed egress) traffic direction.
`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

- ACL hit counts are aggregated across all:
  - Physical interfaces to which the ACL is applied to on ingress.
  - Physical interfaces to which the ACL is applied to on egress.
  - VLANs to which the ACL is applied to on ingress.
  - VLANs to which the ACL is applied to on egress.
  - Interface VLANs to which the IPv4 or IPv6 ACL is applied on routed ingress.
  - Interface VLANs to which the IPv4 or IPv6 ACL is applied on routed egress.
  - L3 VNI ACLs with interface VLANs applied on routed ingress.
- If an ACL with an ACE with the **count** keyword is applied to multiple physical interfaces or VLANs, the hit counts are aggregated. There is one aggregation for physical interfaces and another for VLANs.
- If an ACL with an ACE with the **count** keyword is applied to multiple subinterfaces, the hit counts are aggregated.
- Accumulated hit counts for an applied ACL are cleared upon any modification of the ACL.

Examples

On the HPE Aruba Networking 6400 Switch Series, interface identification differs.

Showing the hit counts for **My_ip_ACL** applied to port 1/1/2:

```
switch# show access-list hitcounts ip My_ip_ACL interface 1/1/2
Statistics for ACL My_ip_ACL (ipv4):
interface 1/1/1-1/1/2,lag1 (out):
     Matched Packets  Configuration
                   -  10 permit udp any 172.16.1.0/255.255.255.0
                   0  20 permit tcp 172.16.2.0/255.255.0.0 gt 1023 any count
                   -  30 permit tcp 172.26.1.0/255.255.255.0 any dscp AF11 ack syn
                   0  implicit deny any any any count
```

Showing the hit counts for **My_ip_ACL** applied to VLAN 10:

```
switch# show access-list hitcounts ip My_ip_ACL vlan 10
Statistics for ACL My_ip_ACL (ipv4):
vlan 10,20-100,300 (in):
     Matched Packets  Configuration
                   -  10 permit udp any 172.16.1.0/255.255.255.0
                   0  20 permit tcp 172.16.2.0/255.255.0.0 gt 1023 any count
                   -  30 permit tcp 172.26.1.0/255.255.255.0 any dscp AF11 ack syn
                   0  implicit deny any any any count
```

Showing the hit counts for ACLs applied to subinterfaces:

```
switch# show access-list hitcounts ip My_ip_ACL interface 1/1/4.1
Statistics for ACL My_ip_ACL (ipv4):
interface 1/1/4.1,1/1/10.10 (in):
     Matched Packets  Configuration
                   -  10 permit udp any 172.16.1.0/255.255.255.0
                   0  20 permit tcp 172.16.2.0/255.255.0.0 gt 1023 any count
                   -  30 permit tcp 172.26.1.0/255.255.255.0 any dscp AF11 ack syn
                   0  implicit deny any any any count

switch# show access-list hitcounts ip My_ip_ACL2 interface lag1.3
Statistics for ACL My_ip_ACL2 (ipv4):
interface lag1.3-lag1.4 (in):
     Matched Packets  Configuration
                   0  10 deny icmp any 192.168.42.1 count
                3884  100 permit any any any count
                   0  implicit deny any any any count
```

Showing the hit counts for **My_ip_ACL** applied to interface VLAN 10:

```
switch# show access-list hitcounts ip My_ip_ACL vlan 10
Statistics for ACL My_ip_ACL (ipv4):
interface vlan 10,20,30 (routed-in):
     Matched Packets  Configuration
                   -  10 permit udp any 172.16.1.0/255.255.255.0
                   0  20 permit tcp 172.16.2.0/255.255.0.0 gt 1023 any count
                   -  30 permit tcp 172.26.1.0/255.255.255.0 any dscp AF11 ack syn
                   0  implicit deny any any any count
```

Showing the hit counts for My_ip_ACL applied on any interface and direction:

```
switch# show access-list hitcounts ip My_ip_ACL vlan 10
switch# show access-list hitcounts ip My_ip_ACL
Statistics for ACL My_ip_ACL (ipv4):
interface 1/1/1 (in):
     Matched Packets  Configuration
                   -  10 permit udp any 172.16.1.0/255.255.255.0
                   0  20 permit tcp 172.16.2.0/255.255.0.0 gt 1023 any count
                   -  30 permit tcp 172.26.1.0/255.255.255.0 any dscp AF11 ack syn
                   0  implicit deny any any any count

interface 1/1/1-1/1/2,lag1 (out):
     Matched Packets  Configuration
                   -  10 permit udp any 172.16.1.0/255.255.255.0
                   0  20 permit tcp 172.16.2.0/255.255.0.0 gt 1023 any count
                   -  30 permit tcp 172.26.1.0/255.255.255.0 any dscp AF11 ack syn
                   0  implicit deny any any any count

interface 1/1/4.1,1/1/10.10 (in):
     Matched Packets  Configuration
                   -  10 permit udp any 172.16.1.0/255.255.255.0
                   0  20 permit tcp 172.16.2.0/255.255.0.0 gt 1023 any count
                   -  30 permit tcp 172.26.1.0/255.255.255.0 any dscp AF11 ack syn
                   0  implicit deny any any any count

interface 1/1/4.1 (out):
     Matched Packets  Configuration
                   -  10 permit udp any 172.16.1.0/255.255.255.0
                   0  20 permit tcp 172.16.2.0/255.255.0.0 gt 1023 any count
                   -  30 permit tcp 172.26.1.0/255.255.255.0 any dscp AF11 ack syn
                   0  implicit deny any any any count

interface vlan 10,20,30 (routed-in):
     Matched Packets  Configuration
                   -  10 permit udp any 172.16.1.0/255.255.255.0
                   0  20 permit tcp 172.16.2.0/255.255.0.0 gt 1023 any count
                   -  30 permit tcp 172.26.1.0/255.255.255.0 any dscp AF11 ack syn
                   0  implicit deny any any any count

interface vlan 80-85 (routed-out):
     Matched Packets  Configuration
                   -  10 permit udp any 172.16.1.0/255.255.255.0
                   0  20 permit tcp 172.16.2.0/255.255.0.0 gt 1023 any count
                   -  30 permit tcp 172.26.1.0/255.255.255.0 any dscp AF11 ack syn
                   0  implicit deny any any any count

vlan 10,20-100,300 (in):
     Matched Packets  Configuration
                   -  10 permit udp any 172.16.1.0/255.255.255.0
                   0  20 permit tcp 172.16.2.0/255.255.0.0 gt 1023 any count
                   -  30 permit tcp 172.26.1.0/255.255.255.0 any dscp AF11 ack syn
                   0  implicit deny any any any count
vlan 2-5 (out):
     Matched Packets  Configuration
                   -  10 permit udp any 172.16.1.0/255.255.255.0
                   0  20 permit tcp 172.16.2.0/255.255.0.0 gt 1023 any count
                   -  30 permit tcp 172.26.1.0/255.255.255.0 any dscp AF11 ack syn
                   0  implicit deny any any any count

vrf blue,default,red (control-plane):
     Matched Packets  Configuration
                   -  10 permit udp any 172.16.1.0/255.255.255.0
                   0  20 permit tcp 172.16.2.0/255.255.0.0 gt 1023 any count
```

```
                    -  30 permit tcp 172.26.1.0/255.255.255.0 any dscp AF11 ack syn
                    0  implicit deny any any any count
```

Showing hit counts for **My_ip_ACL** applied to L3 VNIs.

```
switch# show access-list hitcounts ip My_ip_ACL vni 10
Statistics for ACL My_ip_ACL (ipv4):
vni 10 (routed-in):
     Matched Packets  Configuration
                    -  10 permit udp any 172.16.1.0/255.255.255.0
                    0  20 permit tcp 172.16.2.0/255.255.0.0 gt 1023 any count
                    -  30 permit tcp 172.26.1.0/255.255.255.0 any dscp AF11 ack syn
                    0  implicit deny any any any count
```

Removing hit counts for **My_ip_ACL** applied on L3 VNIs.

```
switch# clear access-list hitcounts ip My_ip_ACL vni 10 routed-in
```

Command History

Release	Modification
10.14	Added support for L3 VNI ACLs.
10.08	Added subinterface information and examples.
10.07 or earlier	Updated command output to use interface and VLAN ranges to reflect aggregation.

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 access-list hitcounts control-plane

`show access-list hitcounts [{ip|ipv6} <ACL-NAME>] control-plane vrf <VRF-NAME> [vsx-peer]`

Description

Shows the hit count of the number of times an ACL (applied to the Control Plane) has matched a packet for ACEs with the `count` keyword. For ACEs without the `count` keyword, a dash is shown in place of a hit count.

Parameter	Description
`ip|ipv6`	Specifies the ACL type: **ip** for IPv4, or **ipv6** for IPv6.
<ACL-NAME>	Specifies the ACL name.

Parameter	Description
`vrf <VRF-NAME>`	Specifies the VRF name.
`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

- ACL hit counts are aggregated across all VRFs to which the ACL is applied to on ingress.
- Accumulated hit counts for an applied ACL are cleared upon any modification of the ACL.

Examples

Showing the hit counts for an IPv4 ACL applied to the Control Plane default VRF:

```
switch# show access-list hitcounts ip My_ipv4_ACL control-plane vrf default
Statistics for ACL My_ip_ACL (ipv4):
vrf default (control-plane):
     Matched Packets  Configuration
                   -  10 permit udp any 172.16.1.0/255.255.255.0
                   0  20 permit tcp 172.16.2.0/255.255.0.0 gt 1023 any count
                   -  30 permit tcp 172.26.1.0/255.255.255.0 any dscp AF11 ack syn
                   0  implicit deny any any any count
```

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 access-list secure-update

`show access-list secure-update`

Description

Use this command to determine if access lists are updated using the secure-update feature. Secure update is enabled by default.

Examples

Displaying the status of the access list secure-update feature when that feature is enabled:

```
switch(config)# show access-list secure-update
Access-list secure-update is enabled
```

Displaying the status of the access list secure-update feature when that feature is disabled:

```
switch(config)# show access-list secure-update
Access-list secure-update is disabled
```

Related Commands

Command	Description
`access-list secure-update`	This command determines if access lists are updated using the secure-update feature. Secure-update is enabled by default.

Command History

Release	Modification
10.13	Command introduced

Command Information

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

show capacities

`show capacities <FEATURE> [vsx-peer]`

Description

Shows system capacities and their values for all features or a specific feature.

Parameter	Description
<FEATURE>	Specifies a feature. For example, **aaa** or **vrrp**.
`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

Capacities are expressed in user-understandable terms. Thus they may not map to a specific hardware or software resource or component. They are not intended to define a feature exhaustively.

Examples

Showing all available capacities for BGP:

```
switch# show capacities bgp

System Capacities: Filter BGP
Capacities Name                                                                    Value
--------------------------------------------------------------------------------------
-
Maximum number of AS numbers in as-path attribute
32
...
```

Showing all available capacities for mirroring:

```
switch# show capacities mirroring

System Capacities: Filter Mirroring
Capacities Name                                                                    Value
--------------------------------------------------------------------------------------
-
Maximum number of Mirror Sessions configurable in a system
4
Maximum number of enabled Mirror Sessions in a system
4
```

Showing all available capacities for MSTP:

```
switch# show capacities mstp

System Capacities: Filter MSTP
Capacities Name                                                                    Value
--------------------------------------------------------------------------------------
-
Maximum number of mstp instances configurable in a system
64
```

Showing all available capacities for VLAN count:

```
switch# show capacities vlan-count

System Capacities: Filter VLAN Count
Capacities Name                                                                    Value
--------------------------------------------------------------------------------------
-
Maximum number of VLANs supported in the system
4094      /switch# show capacities vlan-count

System Capacities: Filter VLAN Count
Capacities Name                                                                    Value
--------------------------------------------------------------------------------------
-
Maximum number of VLANs supported in the system
4094
```

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.

show capacities-status

```
show capacities-status <FEATURE> [vsx-peer]
```

Description

Shows system capacities status and their values for all features or a specific feature.

Parameter	Description
<FEATURE>	Specifies the feature, for example **aaa** or **vrrp** for which to display capacities, values, and status. Required.
`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.

Examples

Showing the system capacities status for all features:

```
                switch# show capacities-status

System Capacities Status
Capacities Status Name                                                          Value
Maximum
--------------------------------------------------------------------------------
-------
Number of active gateway mac addresses in a system                                 0
    16
Number of aspath-lists configured                                                  0
    64
Number of community-lists configured                                               0
    64
...
```

Showing the system capacities status for BGP:

```
switch# show capacities-status bgp

System Capacities Status: Filter BGP
Capacities Status Name                                                  Value  Maximum
--------------------------------------------------------------------------------
--
```

```
Number of aspath-lists configured                                  0      64
Number of community-lists configured                               0      64
Number of neighbors configured across all VRFs                     0      50
Number of peer groups configured across all VRFs                   0      25
Number of prefix-lists configured                                  0      64
Number of route-maps configured                                    0      64
Number of routes in BGP RIB                                        0      256000
Number of route reflector clients configured across all VRFs       0      16
```

Showing the system capacities status for L3:

```
switch# show capacities-status l3

System Capacities Status: Filter L3 resources
Capacities Status Name                                                Value
Maximum
-------------------------------------------------------------------------------
--
Number of IP neighbor (IPv4+IPv6) entries                              4
49152
Number of IP Directed Broadcast neighbor entries                       0
4096
Number of IPv6 Long Prefix Routes currently configured                 3
5000
Number of IPv6 neighbor(ND) entries                                    4
49152
Number of L3 Groups for IP Tunnels and ECMP Groups currently configured 1
2047
Number of L3 Destinations for Routes, Nexthops in ECMP groups and
      Tunnels currently configured                                     4
2045
Number of routes (IPv4+IPv6) currently configured                      5
65536
Number of IPv4 routes currently configured                             0
65536
Number of IPv6 routes currently configured with prefix 0-64            4
13312
Number of IPv6 routes currently configured with prefix 65-127          2
510
```

```
switch# show capacities-status l3

System Capacities Status: Filter L3 resources
Capacities Status Name                                                Value
Maximum
-------------------------------------------------------------------------------
--
Number of IP neighbor (IPv4+IPv6) entries                              4
49152
Number of IP Directed Broadcast neighbor entries                       0
4096
Number of IPv6 Long Prefix Routes currently configured                 3
5000
Number of IPv6 neighbor(ND) entries                                    4
49152
Number of L3 Groups for IP Tunnels and ECMP Groups currently configured 1
2047
Number of L3 Destinations for Routes, Nexthops in ECMP groups and
```

```
      Tunnels currently configured                                    4
2045
Number of routes (IPv4+IPv6) currently configured                     5
65536
Number of IPv4 routes currently configured                            0
65536
Number of IPv6 routes currently configured with prefix 0-64           4
13312
Number of IPv6 routes currently configured with prefix 65-127         2
510
```

Command History

Release	Modification
10.13	Updated to show newly supported configuration of IPv6 routes on the ASIC.
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.

show object-group

`show object-group [{ip|ipv6} address | port] [<OBJECT-GROUP-NAME>] [commands] [configuration]`

Description

Shows information about your defined object groups. When **show object-group** is entered without parameters, information for all object groups is shown. The parameters filter the list of object groups for which information is shown.

Parameter	Description
`[{ip|ipv6} address | port]`	Specifies the object group type, either **address** for an IP address, or **port**.
<OBJECT-GROUP-NAME>	Specifies the object group name.
`[commands]`	Specifies that the object group definition is to be shown as the commands and parameters used to create it rather than in tabular form.
`[configuration]`	Specifies that the user-configured object groups be shown as configured. The output of the command with this parameter may not be the same as what is active on the switch due to a misconfigured object group. See *Examples* in this topic.
`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

Parameter	Description
	VSX peer switch is not displayed. This parameter is available on switches that support VSX.

Examples

Showing configured object groups:

```
switch# show object-group
Type       Name
  Sequence L4 Port(s)/IP Address
------------------------------------------------------------------------------
IPv4       my_address_group
        10 192.168.0.1
        20 192.168.0.3
Port       my_port_group
        10 eq 80
        20 gt 65525
switch#
switch# show object-group commands
object-group ip address my_address_group
    10 192.168.0.1
    20 192.168.0.3
object-group port my_port_group
    10 eq 80
    20 gt 65525
```

Showing a misconfigured object group:

```
switch# show object-group
Type       Name
  Sequence L4 Port(s)/IP Address
------------------------------------------------------------------------------
! object-group ip address My_ip_object_group user configuration does not match
! the active hardware configuration. Run 'object-group ip address NAME reset'
! to reset the object group to match the active hardware configuration.
IPv4       my_address_group
switch#
switch#
Type       Name
  Sequence L4 Port(s)/IP Address
------------------------------------------------------------------------------
! object-group ip address My_ip_object_group user configuration does not match
! the active hardware configuration. Run 'object-group ip address NAME reset'
! to reset the object group to match the active hardware configuration.
IPv4       my_address_group
switch#
switch# show object-group configuration
Type       Name
  Sequence L4 Port(s)/IP Address
------------------------------------------------------------------------------
! object-group ip address My_ip_object_group user configuration does not match
! the active hardware configuration. Run 'object-group ip address NAME reset'
! to reset the object group to match the active hardware configuration.
IPv4       my_address_group
        10 192.168.0.1
        20 192.168.0.3
switch#
```

```
switch# show object-group commands
! object-group ip address My_ip_object_group user configuration does not match
! the active hardware configuration. Run 'object-group ip address NAME reset'
! to reset the object group to match the active hardware configuration.
switch#
switch# show object-group commands configuration
! object-group ip address My_ip_object_group user configuration does not match
! the active hardware configuration. Run 'object-group ip address NAME reset'
! to reset the object group to match the active hardware configuration.
object-group ip address my_address_group
    10 192.168.0.1
    20 192.168.0.3
```

Resetting a misconfigured object group:

```
switch(config)# object-group all reset
switch(config)# exit
switch# show object-group
Type       Name
  Sequence L4 Port(s)/IP Address
-------------------------------------------------------------------------------
IPv4       my_address_group
switch#
switch# show object-group configuration
Type       Name
  Sequence L4 Port(s)/IP Address
-------------------------------------------------------------------------------
IPv4       my_address_group
```

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.

ACL configuration examples

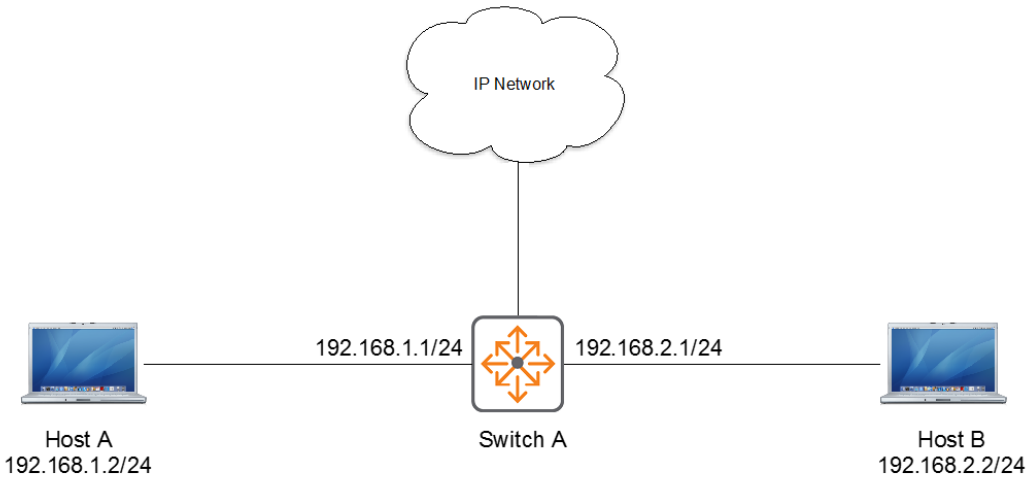
This chapter shows examples for defining and applying IPv4 and IPv6 ACLs.

IPv4 ACL example overview

On the HPE Aruba Networking 6400 Switch Series, interface identification differs.

This example:

- Defines and applies an ACL to interface 1/1/1 on Switch A (see image in this topic) so that Host A is not able to send traffic to Host B, but it can communicate with all other devices in the network.
- Counts blocked packets.



Defining and applying an IPv4 ACL

On the HPE Aruba Networking 6400 Switch Series, interface identification differs.

Procedure

1. Begin defining an IPv4 ACL named FILTER_TO_HOST_B:

   ```
   switch(config)# access-list ip FILTER_TO_HOST_B
   ```

2. Add an ACE that denies access from IP address 192.168.1.2 (Host A) to 192.168.2.2 (Host B):

   ```
   switch(config-acl-ip)# deny any 192.168.1.2 192.168.2.2 log
   ```

3. Add an ACE that allows access from all other IP addresses:

   ```
   switch(config-acl-ip)# permit any any any
   ```

4. Exit the ACL definition:

   ```
   switch(config-acl-ip)# exit
   ```

5. Enter the context of the interface to which you will apply the ACL:

```
switch(config)# interface 1/1/1
```

6. Apply the FILTER_TO_HOST_B ACL to inbound (ingress) traffic:

```
switch(config-if)# apply access-list ip FILTER_TO_HOST_B in
```

7. Show your ACL:

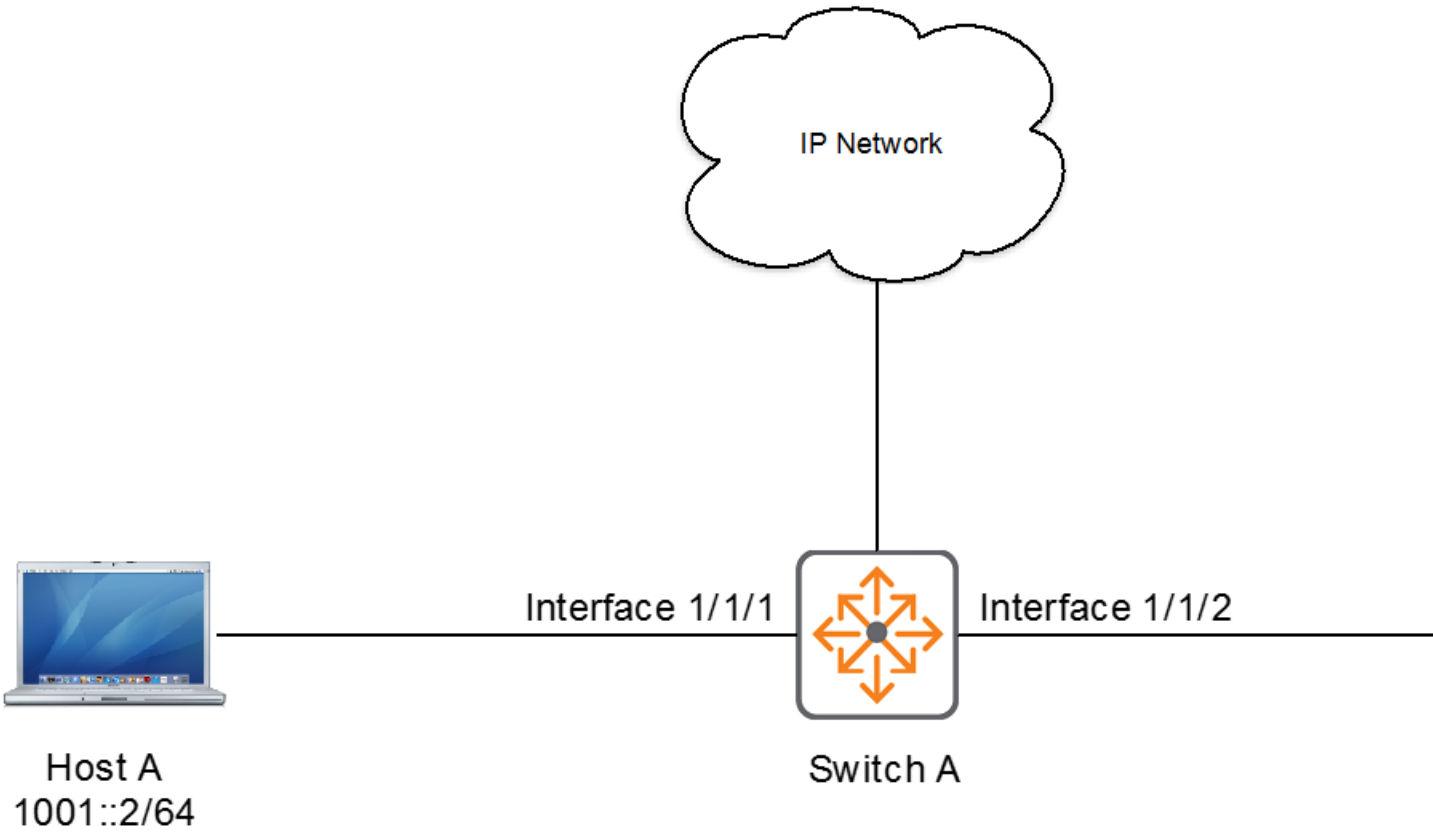
```
switch(config-if)# exit
switch# show access-list ip FILTER_TO_HOST_B
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------------------
---
IPv4       FILTER_TO_HOST_B
        10
           deny                            any
           192.168.1.2
           192.168.2.2
           Logging: enabled
           Hit-counts: enabled
        20
           permit                          any
           any
           any
------------------------------------------------------------------------------
---
```

IPv6 ACL example overview

On the HPE Aruba Networking 6400 Switch Series, interface identification differs.

This example:

- Defines and applies an ACL to interface 1/1/1 on Switch A (see image in this topic) so that Host A is not able to send traffic to Host B, but it can communicate with all other devices in the network.
- Counts blocked packets.



Defining and applying an IPv6 ACL

On the HPE Aruba Networking 6400 Switch Series, interface identification differs.

Procedure

1. Begin defining an IPv6 ACL named V6_INPUT_FILTER:

   ```
   switch(config)# access-list ipv6 V6_INPUT_FILTER
   ```

2. Add an ACE that denies access to an IP addresses 1001::2 through 2001::2 (includes Host B):

   ```
   switch(config-acl-ipv6)# deny any 1001::2 2001::2 log
   ```

3. Add an ACE that allows access from all other IP addresses:

   ```
   switch(config-acl-ipv6)# permit any any any
   ```

4. Exit the ACL definition:

   ```
   switch(config-acl-ipv6)# exit
   ```

5. Enter the interface to which you will apply the ACL:

   ```
   switch(config)# interface 1/1/1
   ```

6. Apply the V6_INPUT_FILTER ACL to inbound (ingress) traffic:

   ```
   switch(config-if)# apply access-list ipv6 V6_INPUT_FILTER in
   ```

7. Show your ACL:

```
switch(config-if)# exit
switch# show access-list interface 1/1/1
Direction
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------------------
Inbound
IPv6       V6_INPUT_FILTER
        10
           deny                            any
           1001::2
           2001::2
           Logging: enabled
           Hit-counts: enabled
        20
           permit                          any
           any
           any
------------------------------------------------------------------------------
```

Chapter 4
Classifier policies

Classifier policies let a network administrator define sets of rules based on network traffic addressing or other header content, and use these rules to restrict or alter the passage of traffic through the switch. Choosing the rule criteria is called Classification, and one such rule, or list, is called a policy. Classification is achieved by creating a traffic class. The types of classes (IPv4, and IPv6) are each focused on relevant frame/packet characteristics. Classes can be configured to match or ignore almost any frame or packet header field. Network traffic passing through a switch can be classified based on many different frame/packet characteristics including, but not limited to:

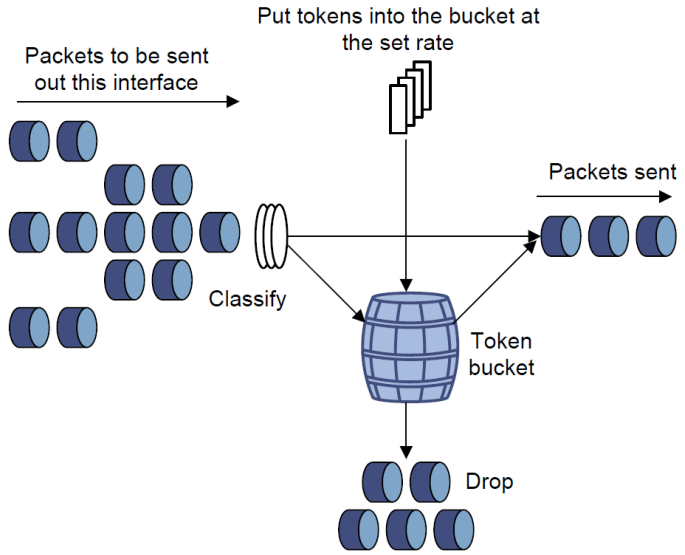
- Frame ingress VLAN ID
- Source and/or destination IPv4, or IPv6 address
- Layer 2 (EtherType) and Layer 3 (IP) protocol
- Layer 4 application ports

A policy contains one or more policy entries, which are listed according to priority by sequence number. A single policy entry contains a class and corresponding policy action. Policy action is taken on traffic matched by its corresponding class. A policy can be applied to an individual front plane port, a Link Aggregation Group (LAG) interface, or a VLAN.

See also ACL and Policy hardware resource considerations.

Traffic policing

Traffic policing supports policing of the inbound traffic. A typical application of traffic policing is to supervise the specification of traffic entering a network and limit it within a reasonable range. Another application is to "discipline" the extra traffic to prevent aggressive use of network resources by an application. For example, you can limit bandwidth for HTTP packets to less than 50% of the total. If the traffic of a session exceeds the limit, traffic policing can drop the packets or reset the IP precedence of the packets. In the following illustrated example, outbound traffic is policed:



Traffic policing is widely used in policing traffic entering the ISP networks. It can classify the policed traffic and take predefined policing actions on each packet depending on the evaluation result:

- Forwarding the packet if the evaluation result is "conforming."
- Dropping the packet if the evaluation result is "excess."
- Forwarding the packet with its precedence remarked when the evaluation result is "conforming."

Types of policy actions

The policy actions are broadly classified in the following categories:

- Remark actions
- Police actions
- Other actions

Each policy entry can have a combination of policy actions from these multiple categories, which are executed in the order of configuration.

Remark actions

This category contains the following actions:

- **Priority Code Point (PCP):** 3-bit field in layer 2 802.1Q header refers to a class of service and maps to a frame priority level.
- **IP precedence:** 3-bit field in IP header which denotes the importance or priority of the datagram.
- **IP Differentiated Services Code Point (DSCP):** 6-bit field in IP header for packet classification.
- **Local Priority:** Change the internal priority used to queue the packets for transmission. Local priority can be used to rewrite the priority of traffic classes local to the system based on the QoS mapping settings without changing the IP header or the 802.1Q header. Remark actions other than local priority only change packets as they leave the switch. The local priority action can be combined with the other remark actions to remark packets and change the internal priority to reflect the new priority.

Police actions

Traffic policing meters inbound traffic on an interface or VLAN based on the following traffic parameters:

- Committed information rate (CIR): Bandwidth limit for guaranteed traffic.
- Committed burst size (CBS): Maximum packet size permitted for bursts of data that exceed the CIR.

Based on these parameters, packets are dropped when traffic exceeds the bandwidth limit (CIR) and the burst size for guaranteed traffic (CBS).

Other actions

Other actions include Drop: Drop the packet, and Mirror: Mirror the packets to a specified mirroring session. For details, see the *Monitoring Guide*.

How policy matching works

A policy can be applied to an interface or VLAN to affect/control traffic arriving on that interface or VLAN (inbound (ingress)). A single policy entry matches on one or more characteristics of the particular traffic type and has a configured action to continue through the switch. This matching occurs by beginning with the entry with the lowest sequence number. The entry is then compared against the incoming frame to its particular match characteristics. If there is a match, the action is taken.

If there is no match, the match characteristics of the next sequence are compared to the relevant frame/packet details. If there is a match, the specified actions are taken. This process continues until a match is found; otherwise, the packet is permitted to flow through the switch unaltered. The "implicit permit" behavior of policy matching differs from the "implicit deny" behavior of ACL matching.

Active class configuration versus user-specified configuration

The output of the **show class** command displays the active class configurations. Active class configurations are the classes that have been configured and accepted by the system.

The output of the **show class** command with the **configuration** parameter, displays the classes that have been configured by the user.

Discrepancies might occur between the active class configurations and the user-specified configurations. In the user-specified class configurations, unsupported command parameters may have been configured, or class can be modified after policy application and may have been unsuccessful due to lack of hardware resources.

To determine if a discrepancy exists between what was configured and what is active, run any variant of the **show class** command. If the active classes and configured classes are not the same, a warning message is displayed.

```
! class MY_CLASS user configuration does not match active configuration.
! run 'class TYPE NAME reset' to reset class to match active configuration.
```

If the configured class is processing and you entered the `show class` command with parameters, the following in-progress message is displayed:

```
! class ip MY_CLASS user configuration currently being processed
! run 'class TYPE NAME reset' to reset class to match active configuration.
```

If the configured class is processing and you entered the `show class` command without parameters, the following in-progress message is displayed:

```
% Warning: MY_CLASS user configuration currently being processed
% run 'class TYPE NAME reset' to reset class to match active configuration.
```

If the warning message or in-progress message is displayed, additional changes may be made until the error message is no longer displayed. Or you can use the **class {all|ip *<class-name>*|ipv6 *<class-name>*|mac *<class-name>*} reset** command to change the user-specified configuration to match the active configuration.

The **show running-config** command also shows a warning about classes that are in progress or failed.

Example

Resetting the user-specified class configuration to the active configuration:

```
switch(config)# class all reset
```

Active policy configuration versus user-specified configuration

The output of the **show policy** command displays the active policy configurations. Active policy configurations are the policies that have been configured and accepted by the system. With applied policies, the active configuration displays the interfaces on which the policies have successfully been programmed in hardware.

The output of the **show policy** command with the **configuration** parameter, displays the policies that have been configured by the user.

Discrepancies might exist between the active policy configurations and the user-specified configurations. In the user-specified policy configurations, unsupported command parameters might have been configured, or an application of a policy might have been unsuccessful because of a lack of hardware resources.

To determine if a discrepancy exists between the configuration and what is active, run any variant of the **show policy** command. If the active policies and configured policies are not the same, a warning message is displayed in the output of the **show** command.

```
! policy MY_POLICY user configuration does not match active configuration.
! run 'policy NAME reset' to reset policy to match active configuration.
```

The switch displays an **in progress** message while it processes the configured policy:

```
! policy MY_POLICY user configuration currently being processed
! run 'policy NAME reset' to reset policy to match active configuration.
```

If the warning message or in progress message is displayed, additional changes may be made until the error message is no longer displayed. Or you can use the **policy *<policy-name>* reset** command to change the user-specified configuration to match the active configuration.

Example

Resetting `MY_POLICY`:

```
switch(config)# policy MY_POLICY reset
```

Considerations for when a policy is applied per interface

This section is only applicable to polices applied to physical interfaces and LAGs using the **per-interface** parameter.

The **reset** command (mentioned in the previous section) is not useful if one or more unique instances of a policy created using the **per-interface** parameter fail to update in hardware even though the parent policy does update. If this occurs, you can make additional changes to the policy and its applications to correct the discrepancy until the error messages are no longer displayed. Alternatively consider using command **checkpoint-rollback** as described in the *AOS-CX Fundamentals Guide*.

Policies using the **per-interface** parameter have slightly different warning and in-progress messages due to unique instances of the policy being created and applied to individual physical interfaces and LAGs.

For example, this is how the warning messages will appear if the unique instances of the policy for interfaces 1/1/2-1/1/3 fail to update while the unique instances of the policy for interfaces 1/1/1,1/1/4 successfully update.

```
switch(config)# show policy commands
! policy my_policy user configuration does not match active configuration on
interface 1/1/2 for ingress.
! policy my_policy user configuration does not match active configuration on
interface 1/1/3 for ingress.
policy my_policy
    10 class ip my_ip_class action drop
interface 1/1/1
    apply policy my_policy in per-interface
! policy my_policy user configuration does not match active configuration.
interface 1/1/2
    apply policy my_policy in per-interface
! policy my_policy user configuration does not match active configuration.
interface 1/1/3
    apply policy my_policy in per-interface
interface 1/1/4
    apply policy my_policy in per-interface


switch(config)# show policy
           Name
  Sequence Comment
           Class Type
                    action
-------------------------------------------------------------------------------
% Warning: my_policy user configuration does not match active configuration on
interface 1/1/2 for ingress.
% Warning: my_policy user configuration does not match active configuration on
interface 1/1/3 for ingress.
           my_policy
        10
```

```
          my_ip_class ipv4
                   drop
```

This is how the in-progress messages will appear if the child policies for interfaces 1/1/2-1/1/3 are currently updating while the child policies for interfaces 1/1/1,1/1/4 have successfully updated.

```
switch(config)# show policy commands
! policy my_policy user configuration currently being processed on interface 1/1/2
for ingress.
! policy my_policy user configuration currently being processed on interface 1/1/3
for ingress.
! run 'show policy [commands]' to display active policy configuration.
policy my_policy
    10 class ip my_ip_class action drop
interface 1/1/1
    apply policy my_policy in per-interface
! policy my_policy user configuration currently being processed
! run 'show policy [commands]' to display active policy configuration.
interface 1/1/2
    apply policy my_policy in per-interface
! policy my_policy user configuration currently being processed
! run 'show policy [commands]' to display active policy configuration.
interface 1/1/3
    apply policy my_policy in per-interface
interface 1/1/4
    apply policy my_policy in per-interface

switch(config)# show policy
           Name
  Sequence Comment
           Class Type
                    action
-------------------------------------------------------------------------------
% Warning: my_policy user configuration currently being processed on interface
1/1/2 for ingress.
% Warning: my_policy user configuration currently being processed on interface
1/1/3 for ingress.
%          run 'show policy [commands]' to display active policy configuration.
           my_policy
        10
           my_ip_class ipv4
                    drop
```

This is how the warning messages will appear if the child policies for interfaces 1/1/2-1/1/3 failed to apply or replace while the child policies for interfaces 1/1/1,1/1/4 have successfully applied or replaced.

```
switch(config)# show policy commands
policy my_policy
    10 class ip my_ip_class action drop
interface 1/1/1
    apply policy my_policy in per-interface
! policy my_policy user configuration does not match active configuration.
! run 'policy NAME reset' to reset policy to match active configuration.
interface 1/1/2
    apply policy my_policy in per-interface
! policy my_policy user configuration does not match active configuration.
! run 'policy NAME reset' to reset policy to match active configuration.
interface 1/1/3
    apply policy my_policy in per-interface
```

```
interface 1/1/4
    apply policy my_policy in per-interface

switch(config)# show policy
           Name
  Sequence Comment
           Class Type
                    action
------------------------------------------------------------------------------
           my_policy
        10
           my_ip_class ipv4
                    drop
```

Classifier policy commands

Classifier policy application

Classifier policies can be applied as follows ("Rt-In" = "Routed-In"):

Policy type Direction	IPv4+6 In	IPv4+6 Rt-In	IPv4+6 Out	MAC In	MAC Out
L2 interface (port)	Yes		Yes	Yes	Yes
L2 LAG	Yes		Yes	Yes	Yes
L3 interface (port)	Yes	Yes	Yes	Yes	Yes
L3 LAG	Yes	Yes	Yes	Yes	Yes
L3 interface (port) subinterface	Yes		Yes		
L3 LAG subinterface	Yes		Yes		
VLAN	Yes		Yes	Yes	Yes
Interface VLAN		Yes (PBR)			

The following match criteria is not supported. If this match criteria is attempted to be configured, an error message will be displayed and the action will not be completed.

```
PCP on MAC classes
```

apply policy (config-if, config-lag-if, config-if-vlan, config-vlan)

Context config-if, config-lag-if:

```
apply policy <POLICY-NAME> {in|out|routed-in} [per-interface]
no apply policy <POLICY-NAME> {in|out|routed-in} [per-interface]
```

Context config-vlan:

```
apply policy <POLICY-NAME> {in|out}
no apply policy <POLICY-NAME> {in|out}
```

Context config-if-vlan:

```
apply policy <POLICY-NAME> routed-in
no apply policy <POLICY-NAME> routed-in
```

Description

Applies a policy to the current physical interface port or LAG or VLAN context. Subinterfaces are supported on interfaces and LAGs.

Only one direction of a policy can be applied to an interface or VLAN at a time, thus using the apply command on an interface or VLAN with an already-applied policy of the same direction will replace the currently applied policy.

The VLAN context supports the **in** and **out** directions, which apply to both bridged and routed traffic. The Interface VLAN context only supports the **routed-in** direction which applies only to routed traffic.

The **no** form of this command removes a policy from the interface or VLAN specified by the current context.

Parameter	Description
<POLICY-NAME>	Specifies the policy to apply.
`in`	Selects the inbound (ingress) traffic direction.
`out`	Selects the outbound (egress) traffic direction.
`routed-in`	Selects routed in traffic.
`per-interface`	Specifies that unique instances of the policy be applied to each interface or LAG rather than the default of sharing the policy across all interfaces and LAGs.

Usage (applies to *config-if*, *config-lag-if* contexts)

- The subinterface can optionally be specified after the interface or LAG, preceded by a period. For example, **1/1/1.10** or **lag 125.4**.
- When **per-interface** is included, unique instances of the policy are applied to each physical interface port or LAG rather than the default of sharing the policy across all interfaces and LAGs. The unique instance of a policy has a parent-child relationship with the policy from which it was created. The **per-interface** option is useful when you want unique policers to be created for each interface or LAG rather than using shared policers. It is also useful when you want the statistics (hit counts and conform rate) to be specific to an interface or LAG rather than being aggregated. Because **per-interface** creates more hardware instances of a policy, resource consumption may increase significantly. It is recommended that you use **show resources** to monitor resource utilization as configuration is applied.

Usage (applies to config-vlan context)

- Only one policy type may be applied to a VLAN at a time. Therefore, using the **apply policy** command on a VLAN with an already-applied policy of the same type, will replace the applied policy.

- HPE Aruba Networking 6400 Switch series only: When a policy is applied to a VLAN, it will create hardware entries on all line cards and stack members regardless of whether a VLAN member exists on any specific line card.

Examples

On the HPE Aruba Networking 6400 Switch Series, interface identification differs.

Applying a policy to an interface (ingress):

```
switch(config)# interface 1/1/1
switch(config-if)# apply policy MY_POLICY1 in
```

Applying a policy to an interface (ingress) specifying **per-interface**:

```
switch(config)# interface 1/1/2
switch(config-if)# apply policy MY_POLICY1 in per-interface
```

Applying a policy to an interface (egress):

```
switch(config)# interface 1/1/2
switch(config-if)# apply policy MY_POLICY2 out
```

Applying a policy to an interface (egress) specifying `per-interface`:

```
switch(config)# interface 1/1/2
switch(config-if)# apply policy MY_POLICY2 out per-interface
```

Applying a policy to an interface range (ingress):

```
switch(config)# interface 1/1/3-1/1/6
switch(config-if-<1/1/2-1/1/5>)# apply policy MY_POLICY3 in
```

Applying a policy to an interface range (ingress) specifying **per-interface**:

```
switch(config)# interface 1/1/7-1/1/9
switch(config-if-<1/1/2-1/1/5>)# apply policy MY_POLICY4 in per-interface
```

Removing a policy from an interface (ingress):

```
switch(config)# interface 1/1/1
switch(config-if)# no apply policy MY_POLICY1 in
```

Removing a policy from an interface range (ingress):

```
switch(config)# interface 1/1/3-1/1/6
switch(config-if-<1/1/3-1/1/6>)# no apply policy MY_POLICY3 in
```

Applying a policy to a subinterface (ingress):

```
switch(config)# interface 1/1/1.10
switch(config-if)# apply policy MY_POLICY1 in
```

Applying a policy to a subinterface (egress):

```
switch(config)# interface 1/1/2.8
switch(config-if)# apply policy MY_POLICY1_egr out
```

Applying a policy to a LAG (ingress):

```
switch(config)# interface lag 100
switch(config-lag-if)# apply policy MY_POLICY5 in
```

Applying a policy to a LAG (ingress) specifying **per-interface**:

```
switch(config)# interface lag 200
switch(config-lag-if)# apply policy MY_POLICY5 in per-interface
```

Removing a policy from a LAG (ingress):

```
switch(config)# interface lag 100
switch(config-lag-if)# no apply policy MY_POLICY5 in
```

Applying a policy to a LAG subinterface (ingress):

```
switch(config)# interface lag 125.4
switch(config-lag-if)# apply policy MY_POLICY5 in
```

Applying a policy to a LAG subinterface (egress):

```
switch(config)# interface lag 150.8
switch(config-lag-if)# apply policy MY_POLICY5 out
```

Applying a policy to a VLAN (ingress):

```
switch(config)# vlan 1
switch(config-vlan)# apply policy MY_POLICY6 in
```

Applying a policy to a VLAN (egress):

```
switch(config)# vlan 1
switch(config-vlan)# no apply policy my_policy out
```

Applying a policy to multiple VLANs (ingress):

```
switch(config)# vlan 10,20
switch(config-vlan-<10,20>)# apply policy MY_POLICY7 in
```

Applying a policy to an interface VLAN routed (ingress):

```
switch(config)# vlan 1
switch(config-if-vlan)# apply policy MY_POLICY8 routed-in
```

Applying a policy to an interface VLAN range routed (ingress):

```
switch(config)# vlan 2-5
switch(config-if-vlan-<2-5>)# apply policy MY_POLICY8 routed-in
```

Removing a policy from a VLAN (ingress):

```
switch(config)# vlan 1
switch(config-vlan)# no apply policy MY_POLICY6 in
```

Removing a policy from multiple VLANs (ingress):

```
switch(config)# vlan 10,20
switch(config-vlan-<10,20>)# no apply policy MY_POLICY7 in
```

Removing a policy from an interface VLAN routed (ingress):

```
switch(config)# vlan 1
switch(config-if-vlan)# no apply policy MY_POLICY8 routed-in
```

Removing a policy from an interface VLAN range routed (ingress):

```
switch(config)# vlan 2-5
switch(config-if-vlan-<2-5>)# no apply policy MY_POLICY8 routed-in
```

Command History

Release	Modification
10.10	Added subinterface egress support for interfaces and LAGs.
10.08	Added **[per-interface]** parameter.
10.07 or earlier	--

Command Information

Platforms	Command context	Authority
All platforms	config-if	Administrators or local user group members with execution

Platforms	Command context	Authority

	`config-lag-if`
	`config-vlan`
	`config-if-vlan`
		rights for this command.

apply policy

```
apply policy <POLICY-NAME> {in}
no apply policy <POLICY-NAME> {in}
```

Description

Applies a policy to the global config context.

Only one policy can be globally applied at a time. Applying a policy globally again, replaces the previous globally applied policy.

The **no** form of this command removes application of the global policy.

Parameter	Description
<POLICY-NAME>	Specifies the policy to apply.
`in`	Selects the inbound (ingress) traffic direction.

Examples

Applying policy global1 to the global config context:

```
switch(config)# apply policy global1 in
```

Removing application of policy global1 from the global config context:

```
switch(config)# no apply policy global1 in
```

Command History

Release	Modification
10.07 or earlier	--

Command Information

Platforms	Command context	Authority
6300 6400 8100 8360	`config`	Administrators or local user group members with execution rights for this command.

class copy

```
class {ip|ipv6|mac} <CLASS-NAME> copy <DESTINATION-CLASS>
```

Description

Copies a class to a new destination class or overwrites an existing class. Copying a class copies all entries as well.

Parameter	Description
{ip|ipv6|mac**}** *<CLASS-NAME>*	Specifies the type and name of the class to be copied.
<DESTINATION-CLASS>	Specifies the name of the destination class.

Examples

Copying an IPv4 class. Copying a class with entries copies all its entries as well:

```
switch(config)# class ip MY_IP_CLASS copy MY_IP_CLASS2
switch(config)# do show class
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
-------------------------------------------------------------------------------
IPv4       MY_IP_CLASS
       11  ignore                          udp
           any
           any
       21  match                           tcp
           192.168.0.1
           192.168.0.2
-------------------------------------------------------------------------------
IPv4       MY_IP_CLASS2
       11  ignore                          udp
           any
           any
       21  match                           tcp
           192.168.0.1
           192.168.0.2
```

Copying an IPv6 class:

```
switch(config)# class ipv6 MY_IPV6_CLASS copy MY_IPV6_CLASS2
switch(config)# do show class
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
-------------------------------------------------------------------------------
IPv6       MY_IPV6_CLASS
         2 ignore                          udp
           any
           any
-------------------------------------------------------------------------------
IPv6       MY_IPV6_CLASS2
         2 ignore                          udp
           any
```

```
           any
```

Copying a MAC class:

```
switch(config)# class mac MY_MAC_CLASS copy MY_MAC_CLASS2
switch(config)# do show class
Type       Name
  Sequence Comment
           Action                          EtherType
           Source MAC Address
           Destination MAC Address
           Additional Parameters
-------------------------------------------------------------------------------
MAC        MY_MAC_CLASS
         2 ignore                          arp
           any
           any
-------------------------------------------------------------------------------
MAC        MY_MAC_CLASS2
         2 ignore                          arp
           any
           any
```

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 ip

Syntax to create an IPv4 class and enter its context. Plus syntax to remove a class:

```
class ip <CLASS-NAME>
no class ip <CLASS-NAME>
```

Syntax (within the class context) for creating or removing class entries for protocols **ah**, **gre**, **esp**, **igmp**, **ospf**, **pim** (**ip** is available as an alias for **any**):

```
  [<SEQUENCE-NUMBER>]
  {match|ignore}
  {any|ip|ah|gre|esp|igmp|ospf|pim|<IP-PROTOCOL-NUM>}
  {any|<SRC-IP-ADDRESS>[/{<PREFIX-LENGTH>|<SUBNET-MASK>}]}
  {any|<DST-IP-ADDRESS>[/{<PREFIX-LENGTH>|<SUBNET-MASK>}]}
  [dscp <DSCP-SPECIFIER>] [ecn <ECN-VALUE>] [ip-precedence <IP-PRECEDENCE-VALUE>]
  [tos <TOS-VALUE>] [fragment] [vlan <VLAN-ID>] [ttl <TTL-VALUE>] [count]

  no <SEQUENCE-NUMBER>
```

Syntax (within the class context) for creating or removing class entries for protocols **sctp**, **tcp**, **udp**:

```
  [<SEQUENCE-NUMBER>]
  {match|ignore}
  {sctp|tcp|udp}
```

```
{any|<SRC-IP-ADDRESS>[/{<PREFIX-LENGTH>|<SUBNET-MASK>}]}
[{eq|gt|lt} <PORT>|range <MIN-PORT> <MAX-PORT>]
{any|<DST-IP-ADDRESS>[/{<PREFIX-LENGTH>|<SUBNET-MASK>}]}
[{eq|gt|lt} <PORT>|range <MIN-PORT> <MAX-PORT>]
[cwr][ece] [urg] [ack] [psh] [rst] [syn] [fin] [established]
[dscp <DSCP-SPECIFIER>] [ecn <ECN-VALUE>] [ip-precedence <IP-PRECEDENCE-VALUE>]
[tos <TOS-VALUE>]  [fragment] [vlan <VLAN-ID>] [ttl <TTL-VALUE>] [count]

no <SEQUENCE-NUMBER>
```

Syntax (within the class context) for creating or removing class entries for protocol **icmp**:

```
[<SEQUENCE-NUMBER>]
{match|ignore}
{icmp}
{any|<SRC-IP-ADDRESS>[/{<PREFIX-LENGTH>|<SUBNET-MASK>}]}
{any|<DST-IP-ADDRESS>[/{<PREFIX-LENGTH>|<SUBNET-MASK>}]}
[icmp-type {echo|echo-reply|<ICMP-TYPE-VALUE>}] [icmp-code <ICMP-CODE-VALUE>]
[dscp <DSCP-SPECIFIER>] [ecn <ECN-VALUE>] [ip-precedence <IP-PRECEDENCE-VALUE>]
[tos <TOS-VALUE>] [fragment] [vlan <VLAN-ID>] [ttl <TTL-VALUE>] [count]

no <SEQUENCE-NUMBER>
```

Syntax (within the class context) for class entry comments:

```
[<SEQUENCE-NUMBER>] comment <TEXT-STRING>

no <SEQUENCE-NUMBER> comment
```

Description

Creates or modifies an IPv4 traffic class to match specified packets. Class is composed of one or more class entries ordered and prioritized by sequence numbers. With this command, the class can classify traffic based on IPv4 header information.

The **no** form of the command can be used to delete either an IPv4 traffic class (use **no** with the class command) or an individual IPv4 traffic class entry (use **no** with the sequence number).

Parameter	Description
`ip`	Specifies create or modify an IPv4 class.
`<CLASS-NAME>`	Specifies the name of this class.
`<SEQUENCE-NUMBER>`	Specifies a sequence number for the class entry. Optional. Range: 1-4294967295.
`{match|ignore}`	Creates a rule to match or ignore specified packets.
`<IP-PROTOCOL-NUM>`	Specifies the protocol as its Internet Protocol number. For example, 2 corresponds to the IGMP protocol. Range: 0 to 255.
`{any|<SRC-IP-ADDRESS>` `[/{<PREFIX-LENGTH>|<SUBNET-MASK>}]}`	Specifies the source IPv4 address. ■ **any** - specifies any source IPv4 address. ■ **<SRC-IP-ADDRESS>** - specifies the source IPv4 host address. ◦ **<PREFIX-LENGTH>** - specifies the address bits to mask (CIDR subnet mask notation). Range: 1 to 32. ◦ **<SUBNET-MASK>** - specifies the address

Parameter	Description
	bits to mask (dotted decimal notation).
{any|*<DST-IP-ADDRESS>* [/{*<PREFIX-LENGTH>*|*<SUBNET-MASK>*}]}	Specifies the destination IPv4 address. ■ **any** - specifies any destination IPv4 address. ■ **<DST-IP-ADDRESS>** - specifies the destination IPv4 host address. ◦ **<PREFIX-LENGTH>** - specifies the address bits to mask (CIDR subnet mask notation). Range: 1 to 32. ◦ **<SUBNET-MASK>** - specifies the address bits to mask (dotted decimal notation).
[{eq|gt|lt} *<PORT>*|range *<MIN-PORT><MAX-PORT>*]	Specifies the port or port range. Port numbers are in the range of 0 to 65535. ■ **eq <PORT>** - specifies the Layer 4 port. ■ **gt <PORT>** - specifies any Layer 4 port greater than the indicated port. ■ **lt <PORT>** - specifies any Layer 4 port less than the indicated port. ■ **range *<MIN-PORT>* *<MAX-PORT>*** - specifies the Layer 4 port range.
cwr	Specifies matching on the TCP Flag CWR : Congestion Window Reduced
ece	Specifies matching on the TCP Flag ECE : Explicit Congestion Notification [ECN]- Echo
urg	Specifies matching on the TCP Flag: Urgent.
ack	Specifies matching on the TCP Flag: Acknowledgment.
psh	Specifies matching on the TCP Flag: Push buffered data to receiving application.
rst	Specifies matching on the TCP Flag: Reset the connection.
syn	Specifies matching on the TCP Flag: Synchronize sequence numbers.
fin	Specifies matching on the TCP Flag: Finish connection.
established	Specifies matching on the TCP Flag: Established connection.
dscp *<DSCP-SPECIFIER>*	Specifies the Differentiated Services Code Point (DSCP), either a numeric **<DSCP-VALUE>** (0 to 63) or one of these keywords:

Parameter	Description
	▪ **AF11** - DSCP 10 (Assured Forwarding Class 1, low drop probability) ▪ **AF12** - DSCP 12 (Assured Forwarding Class 1, medium drop probability) ▪ **AF13** - DSCP 14 (Assured Forwarding Class 1, high drop probability) ▪ **AF21** - DSCP 18 (Assured Forwarding Class 2, low drop probability) ▪ **AF22** - DSCP 20 (Assured Forwarding Class 2, medium drop probability) ▪ **AF23** - DSCP 22 (Assured Forwarding Class 2, high drop probability) ▪ **AF31** - DSCP 26 (Assured Forwarding Class 3, low drop probability) ▪ **AF32** - DSCP 28 (Assured Forwarding Class 3, medium drop probability) ▪ **AF33** - DSCP 30 (Assured Forwarding Class 3, high drop probability) ▪ **AF41** - DSCP 34 (Assured Forwarding Class 4, low drop probability) ▪ **AF42** - DSCP 36 (Assured Forwarding Class 4, medium drop probability) ▪ **AF43** - DSCP 38 (Assured Forwarding Class 4, high drop probability) ▪ **CS0** - DSCP 0 (Class Selector 0: Default) ▪ **CS1** - DSCP 8 (Class Selector 1: Scavenger) ▪ **CS2** - DSCP 16 (Class Selector 2: OAM) ▪ **CS3** - DSCP 24 (Class Selector 3: Signaling) ▪ **CS4** - DSCP 32 (Class Selector 4: Realtime) ▪ **CS5** - DSCP 40 (Class Selector 5: Broadcast video) ▪ **CS6** - DSCP 48 (Class Selector 6: Network control) ▪ **CS7** - DSCP 56 (Class Selector 7) ▪ **EF** - DSCP 46 (Expedited Forwarding)
`ecn <ECN-VALUE>`	Specifies an Explicit Congestion Notification value. Range: 0 to 3.
`ip-precedence <IP-PRECEDENCE-VALUE>`	Specifies an IP precedence value. Range: 0 to 7.
`tos <TOS-VALUE>`	Specifies the Type of Service value. Range: 0 to 31.
`fragment`	Specifies a fragment packet.
`vlan <VLAN-ID>`	Specifies VLAN tag to match on. 802.1Q VLAN ID. **NOTE:**

Parameter	Description
	This parameter cannot be used in any class that will be applied to a VLAN.
`ttl <TTL-VALUE>`	Specifies a time-to-live (hop limit) value. Range: 0 to 255.
`count`	Keeps the hit counts of the number of packets matching this class entry.
`[<SEQUENCE-NUMBER>] comment <TEXT-STRING>`	Adds a comment to a class entry. The **no** form removes only the comment from the class entry.

Usage

- Entering an existing **<CLASS-NAME>** value will cause the existing class to be modified, with any new **<SEQUENCE-NUMBER>** value creating an additional class entry, and any existing **<SEQUENCE-NUMBER>** value replacing the existing class entry with the same sequence number.
- If no sequence number is specified, a new class entry will be appended to the end of the class with a sequence number equal to the highest class entry currently in the list plus 10.
- If the **<IP-PROTOCOL-NUM>** parameter is used instead of a protocol name, ensure that any needed class entry-definition parameters specific to the selected protocol are also provided.

Examples

Creating an IPv4 class with three entries:

```
switch(config)# class ip MY_IP_CLASS
switch(config-class-ip)# 10 match icmp any any10 match icmp any any
switch(config-class-ip)# 20 ignore udp any any
switch(config-class-ip)# 30 match tcp 192.168.0.1 192.168.0.2
switch(config-class-ip)# exit

switch(config)# do show class
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
-------------------------------------------------------------------------------
IPv4       MY_IP_CLASS
        10 match                           icmp
           any
           any
        20 ignore                          udp
           any
           any
        30 match                           tcp
           192.168.0.1
           192.168.0.2
```

Adding a comment to an existing IPv4 class entry:

```
switch(config)# class ip MY_IP_CLASS
switch(config-class-ip)# 30 comment myipClass
switch(config-class-ip)# exit

switch(config)# do show class
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------------------
IPv4       MY_IP_CLASS
        10 match                           icmp
           any
           any
        20 ignore                          udp
           any
           any
        30 myipClass
           match                           tcp
           192.168.0.1
           192.168.0.2
```

Removing a comment from an existing IPv4 class entry:

```
switch(config)# class ip MY_IP_CLASS
switch(config-class-ip)# no 30 comment
switch(config-class-ip)# exit

switch(config)# do show class
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------------------
IPv4       MY_IP_CLASS
        10 match                           icmp
           any
           any
        20 ignore                          udp
           any
           any
        30 match                           tcp
           192.168.0.1
           192.168.0.2

Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------------------
IPv4       MY_IP_CLASS
        10 match                           icmp
           any
           any
        20 ignore                          udp
```

```
           any
           any
        30 match                           tcp
           192.168.0.1
           192.168.0.2
```

Replacing an IPv4 class entry in an existing class:

```
switch(config)# class ip MY_IP_CLASS
switch(config-class-ip)# 10 match igmp any any
switch(config-class-ip)# exit

switch(config)# do show class
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
-------------------------------------------------------------------------------
IPv4       MY_IP_CLASS
        10 match                           igmp
           any
           any
        20 ignore                          udp
           any
           any
        30 match                           tcp
           192.168.0.1
           192.168.0.2
```

Removing an IPv4 class entry:

```
switch(config)# class ip MY_IP_CLASS
switch(config-class-ip)# no 10
switch(config-class-ip)# exit

switch(config)# do show class
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
-------------------------------------------------------------------------------
IPv4       MY_IP_CLASS
       20  ignore                          udp
           any
           any
       30  match                           tcp
           192.168.0.1
           192.168.0.2
```

Removing an IPv4 class. Removing a class with entries removes all its entries as well. If a class associated with a policy entry (or multiple policy entries) is removed, the corresponding entries are also removed.

The corresponding entries are only removed if the class is unused by all policy entries.

```
switch(config)# no class ip MY_IP_CLASS

switch(config)# do show class
No Class found.
```

Command History

Release	Modification
10.07 or earlier	--

Command Information

Platforms	Command context	Authority
All platforms	`config` **The class ip <CLASS-NAME> command takes you into the config-class-ipconfig-class-ip context where you enter the class entries.**	Administrators or local user group members with execution rights for this command.

class ipv6

Syntax to create an IPv6 class and enter its context. Plus syntax to remove a class:

```
class ipv6 <CLASS-NAME>
no class ipv6 <CLASS-NAME>
```

Syntax (within the class context) for creating or removing class entries for protocols `ah`, `gre`, `esp`, `igmp`, `ospf`, `pim` (`ipv6` is available as an alias for `any`):

```
  [<SEQUENCE-NUMBER>]
  {match|ignore}
  {any|ipv6|ah|gre|esp|igmp|ospf|pim|<IP-PROTOCOL-NUM>}
  {any|<SRC-IP-ADDRESS>[/{<PREFIX-LENGTH>|<SUBNET-MASK>}]}
  {any|<DST-IP-ADDRESS>[/{<PREFIX-LENGTH>|<SUBNET-MASK>}]}
  [dscp <DSCP-SPECIFIER>] [ecn <ECN-VALUE>] [ip-precedence <IP-PRECEDENCE-VALUE>]
  [tos <TOS-VALUE>] [fragment] [vlan <VLAN-ID>] [ttl <TTL-VALUE>] [count]

  no <SEQUENCE-NUMBER>
```

Syntax (within the class context) for creating or removing class entries for protocols `sctp`, `tcp`, `udp`:

```
  [<SEQUENCE-NUMBER>]
  {match|ignore}
  {sctp|tcp|udp}
  {any|<SRC-IP-ADDRESS>[/{<PREFIX-LENGTH>|<SUBNET-MASK>}]}
  [{eq|gt|lt} <PORT>|range <MIN-PORT> <MAX-PORT>]
  {any|<DST-IP-ADDRESS>[/{<PREFIX-LENGTH>|<SUBNET-MASK>}]}
  [{eq|gt|lt} <PORT>|range <MIN-PORT> <MAX-PORT>]
  [urg] [ack] [psh] [rst] [syn] [fin] [established]
  [dscp <DSCP-SPECIFIER>] [ecn <ECN-VALUE>]  [ip-precedence <IP-PRECEDENCE-VALUE>]
  [tos <TOS-VALUE>]  [fragment] [vlan <VLAN-ID>] [ttl <TTL-VALUE>] [count]

  no <SEQUENCE-NUMBER>
```

Syntax (within the class context) for creating or removing class entries for protocol `icmpv6`:

```
[<SEQUENCE-NUMBER>]
{permit|deny}
{icmpv6}
{any|<SRC-IP-ADDRESS>[/{<PREFIX-LENGTH>|<SUBNET-MASK>}]}
{any|<DST-IP-ADDRESS>[/{<PREFIX-LENGTH>|<SUBNET-MASK>}]}
[icmp-type {echo|echo-reply|<ICMP-TYPE-VALUE>}] [icmp-code <ICMP-CODE-VALUE>]
[dscp <DSCP-SPECIFIER>] [ecn <ECN-VALUE>]  [ip-precedence <IP-PRECEDENCE-VALUE>]
[tos <TOS-VALUE>] [fragment] [vlan <VLAN-ID>] [ttl <TTL-VALUE>] [count]

no <SEQUENCE-NUMBER>
```

Syntax (within the class context) for class entry comments:

```
[<SEQUENCE-NUMBER>] comment <TEXT-STRING>

no <SEQUENCE-NUMBER> comment
```

Description

Creates or modifies an IPv6 traffic class to match specified packets. Class is composed of one or more class entries ordered and prioritized by sequence numbers. With this command, each class can classify traffic based on IPv6 header information.

The **no** form of the command deletes either an IPv6 traffic class (use **no** with the class command) or an individual IPv6 traffic class entry (use **no** with the sequence number).

Parameter	Description
`ipv6`	Specifies create or modify an IPv6 class.
<CLASS-NAME>	Specifies the name of this class.
<SEQUENCE-NUMBER>	Specifies a sequence number for the class entry. Optional. Range: 1-4294967295.
`{match|ignore}`	Creates a rule to match or ignore specified packets.
<IP-PROTOCOL-NUM>	Specifies the protocol as its Internet Protocol number. For example, 2 corresponds to the IGMP protocol. Range: 0 to 255.
`{any|`*<SRC-IP-ADDRESS>*`[/{`*<PREFIX-LENGTH>*`|`*<SUBNET-MASK>*`}]}`	Specifies the source IPv6 address. ■ **any** - specifies any source IPv6 address. ■ **<SRC-IP-ADDRESS>** - specifies the source IPv4 host address. ◦ **<PREFIX-LENGTH>** - specifies the address bits to mask (CIDR subnet mask notation). Range: 1 to 32. ◦ **<SUBNET-MASK>** - specifies the address bits to mask (dotted decimal notation).
`{any|`*<DST-IP-ADDRESS>*`[/{`*<PREFIX-LENGTH>*`|`*<SUBNET-MASK>*`}]}`	Specifies the destination IPv4 address. ■ **any** - specifies any destination IPv6 address. ■ **<DST-IP-ADDRESS>** - specifies the destination IPv6 host address. ◦ **<PREFIX-LENGTH>** - specifies the address bits to mask (CIDR subnet mask notation). Range: 1 to 32.

Parameter	Description
	◦ **<SUBNET-MASK>** - specifies the address bits to mask (dotted decimal notation).
`[{eq|gt|lt} <PORT>|range <MIN-PORT><MAX-PORT>]`	Specifies the port or port range. Port numbers are in the range of 0 to 65535. ▪ **eq <PORT>** - specifies the Layer 4 port. ▪ **gt <PORT>** - specifies any Layer 4 port greater than the indicated port. ▪ **lt <PORT>** - specifies any Layer 4 port less than the indicated port. ▪ **range <MIN-PORT> <MAX-PORT>** - specifies the Layer 4 port range.
`cwr`	Specifies matching on the TCP Flag CWR : Congestion Window Reduced
`ece`	Specifies matching on the TCP Flag ECE : Explicit Congestion Notification [ECN]- Echo
`urg`	Specifies matching on the TCP Flag: Urgent.
`ack`	Specifies matching on the TCP Flag: Acknowledgment.
`psh`	Specifies matching on the TCP Flag: Push buffered data to receiving application.
`rst`	Specifies matching on the TCP Flag: Reset the connection.
`syn`	Specifies matching on the TCP Flag: Synchronize sequence numbers.
`fin`	Specifies matching on the TCP Flag: Finish connection.
`established`	Specifies matching on the TCP Flag: Established connection.
`dscp <DSCP-SPECIFIER>`	Specifies the Differentiated Services Code Point (DSCP), either a numeric **<DSCP-VALUE>** (0 to 63) or one of these keywords: ▪ **AF11** - DSCP 10 (Assured Forwarding Class 1, low drop probability) ▪ **AF12** - DSCP 12 (Assured Forwarding Class 1, medium drop probability) ▪ **AF13** - DSCP 14 (Assured Forwarding Class 1, high drop probability) ▪ **AF21** - DSCP 18 (Assured Forwarding Class 2, low drop probability) ▪ **AF22** - DSCP 20 (Assured Forwarding Class 2, medium drop probability) ▪ **AF23** - DSCP 22 (Assured Forwarding Class 2, high

Parameter	Description
	drop probability) ■ **AF31** - DSCP 26 (Assured Forwarding Class 3, low drop probability) ■ **AF32** - DSCP 28 (Assured Forwarding Class 3, medium drop probability) ■ **AF33** - DSCP 30 (Assured Forwarding Class 3, high drop probability) ■ **AF41** - DSCP 34 (Assured Forwarding Class 4, low drop probability) ■ **AF42** - DSCP 36 (Assured Forwarding Class 4, medium drop probability) ■ **AF43** - DSCP 38 (Assured Forwarding Class 4, high drop probability) ■ **CS0** - DSCP 0 (Class Selector 0: Default) ■ **CS1** - DSCP 8 (Class Selector 1: Scavenger) ■ **CS2** - DSCP 16 (Class Selector 2: OAM) ■ **CS3** - DSCP 24 (Class Selector 3: Signaling) ■ **CS4** - DSCP 32 (Class Selector 4: Real time) ■ **CS5** - DSCP 40 (Class Selector 5: Broadcast video) ■ **CS6** - DSCP 48 (Class Selector 6: Network control) ■ **CS7** - DSCP 56 (Class Selector 7) ■ **EF** - DSCP 46 (Expedited Forwarding)
`ecn <ECN-VALUE>`	Specifies an Explicit Congestion Notification value. Range: 0 to 3.
`ip-precedence <IP-PRECEDENCE-VALUE>`	Specifies an IP precedence value. Range: 0 to 7.
`tos <TOS-VALUE>`	Specifies the Type of Service value. Range: 0 to 31.
`fragment`	Specifies a fragment packet.
`vlan <VLAN-ID>`	Specifies VLAN tag to match on. 802.1Q VLAN ID. **NOTE:** This parameter cannot be used in any class that will be applied to a VLAN.
`ttl <TTL-VALUE>`	Specifies a time-to-live (hop limit) value. Range: 0 to 255.
`count`	Keeps the hit counts of the number of packets matching this class entry.
`[<SEQUENCE-NUMBER>] comment <TEXT-STRING>`	Adds a comment to a class entry. The **no** form removes only the comment from the class entry.

Usage

- If you enter an existing **<CLASS-NAME>** value, the existing class is modified with any new **<SEQUENCE-NUMBER>** value. This action creates an additional class entry. Any existing **<SEQUENCE-NUMBER>** value replaces the existing class entry with the same sequence number.

- If no sequence number is specified, a new class entry is appended to the end of the class with a sequence number equal to the highest class entry currently in the list plus 10.
- If the **<IP-PROTOCOL-NUM>** parameter is used instead of a protocol name, ensure that any needed class entry-definition parameters specific to the selected protocol are also provided.

Examples

Creating an IPv6 class with two entries:

```
switch(config)# class ipv6 MY_IPV6_CLASS
switch(config-class-ipv6)# 10 match icmpv6 any any
switch(config-class-ipv6)# 20 ignore udp any any
switch(config-class-ipv6)# exit

switch(config)# do show class
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------------------
IPv6       MY_IPV6_CLASS
        10 match                           icmpv6
           any
           any
        20 ignore                          udp
           any
           any
```

Adding a comment to an existing IPv6 class entry:

```
switch(config)# class ipv6 MY_IPV6_CLASS
switch(config-class-ipv6)# 10 match icmpv6 any any
switch(config-class-ipv6)# 20 ignore udp any any
switch(config-class-ipv6)# 20 comment myipv6class
switch(config-class-ipv6)# exit

switch(config)# do show class
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------------------
IPv6       MY_IPV6_CLASS
        10 match                           icmpv6
           any
           any
        20 myipv6class
           ignore                          udp
           any
           any
```

Removing a comment from an existing IPv6 class entry:

```
switch(config)# class ipv6 MY_IPV6_CLASS
switch(config-class-ipv6)# no 20 comment
switch(config-class-ipv6)# exit

switch(config)# do show class
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
-------------------------------------------------------------------------------
IPv6       MY_IPV6_CLASS
        10 match                           icmpv6
           any
           any
        20 ignore                          udp
           any
           any

Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
-------------------------------------------------------------------------------
IPv6       MY_IPV6_CLASS
        10 match                           icmpv6
           any
           any
        20 ignore                          udp
           any
           any
```

Replacing an IPv6 class entry in an existing IPv6 class:

```
switch(config)# class ipv6 MY_IPV6_CLASS
switch(config-class-ipv6)# 10 match any any 1020::
switch(config-class-ipv6)# exit

switch(config)# do show class
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
-------------------------------------------------------------------------------
IPv6       MY_IPV6_CLASS
        10 match                           any
           any
           1020::
        20 ignore                          udp
           any
           any
```

Removing an IPv6 class entry:

```
switch(config)# class ipv6 MY_IPV6_CLASS
switch(config-class-ipv6)# no 10
switch(config-class-ipv6)# exit

switch(config)# do show class
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------------------
IPv6       MY_IPV6_CLASS
        20 ignore                          udp
           any
           any
```

Removing an IPv6 class. Removing a class with entries removes all its entries as well. If a class associated with a policy entry (or multiple policy entries) is removed, the corresponding entries are also removed.

The corresponding entries are only removed if the class is unused by all policy entries.

```
switch(config)# no class ipv6 MY_IPV6_CLASS

switch(config)# do show class
No Class found.
```

Command History

Release	Modification
10.07 or earlier	--

Command Information

Platforms	Command context	Authority
All platforms	`config` The **class ipv6 <CLASS-NAME>** command takes you into the **config-class-ipv6** command context where you enter the class entries.	Administrators or local user group members with execution rights for this command.

class mac

```
class mac <CLASS-NAME>

    [<SEQUENCE-NUMBER>]
    {match|ignore}
    {any|<SRC-MAC-ADDRESS>[/<ETHERNET-MASK>}]}
    {any|<DST-MAC-ADDRESS>[/<ETHERNET-MASK>}]}
    {any|aarp|appletalk|arp|fcoe|fcoe-init|ip|ipv6|ipx-arpa|ipx-non-arpa|is-is|
          lldp|mpls-multicast|mpls-unicast|q-in-q|rbridge|trill|wake-on-lan|
          <NUMERIC-ETHERTYPE>}
```

```
[pcp <PCP-VALUE>] [vlan <VLAN-ID>] [count]

[<SEQUENCE-NUMBER>] comment <TEXT-STRING>
```

Description

Creates or modifies a MAC traffic class to match specified packets. Class is composed of one or more class entries ordered and prioritized by sequence numbers. With this command, each class can classify traffic based on MAC header information.

The **no** form of the command can be used to delete either a MAC traffic class (use **no** with the class command) or an individual MAC traffic class entry (use **no** with the sequence number).

Parameter	Description
`mac`	Specifies create or modify a MAC class.
<CLASS-NAME>	Specifies the name of this class.
<SEQUENCE-NUMBER>	Specifies a sequence number for the class entry. Optional. Range: 1-4294967295.
`{match|ignore}`	Creates a rule to match or ignore specified packets.
`comment`	Stores the remaining entered text as a class comment.
`{any|`*<SRC-MAC-ADDRESS>* `[/`*<ETHERNET-MASK>*`}]}`	Specifies the source host MAC address (xxxx.xxxx.xxxx), OUI, or the keyword **any**. You can optionally include the following: **<ETHERNET-MASK>** - The address bits to mask (xxxx.xxxx.xxxx).
`{any|`*<DST-MAC-ADDRESS>* `[/`*<ETHERNET-MASK>*`}]}`	Specifies the destination host MAC address (xxxx.xxxx.xxxx), OUI, or the keyword **any**. You can optionally include the following: **<ETHERNET-MASK>** - The address bits to mask (xxxx.xxxx.xxxx).
`Protocol`	Select an ethertype protocol from the following (enter one only): ■ **any** - Any ethertype protocol ■ **<NUMERIC-ETHERTYPE>** - Enter an EtherType protocol number. Range: 0x600-0xffff. ■ Or enter an EtherType protocol name from the following list: ◦ **aarp** ◦ **appletalk** ◦ **arp** ◦ **fcoe** ◦ **fcoe-init** ◦ **ip** ◦ **ipv6** ◦ **ipx-arpa** ◦ **ipx-non-arpa** ◦ **is-is** ◦ **lldp** ◦ **mpls-multicast**

Parameter	Description
	◦ **mpls-unicast** ◦ **q-in-q** ◦ **rbridge** ◦ **trill** ◦ **wake-on-lan**
`pcp <PCP-VALUE>`	Not supported.
`vlan <VLAN-ID>`	Specifies matching on a VLAN ID. Enter a VLAN ID or the VLAN name, if configured. **NOTE:** This parameter cannot be used in any class that will be applied to a VLAN.
`count`	Keeps the hit counts of the number of packets matching this class entry.

Examples

Creating a MAC class:

```
switch(config)# class mac MY_MAC_CLASS
switch(config-class-mac)# match any any lldp
switch(config-class-mac)# ignore any any arp
switch(config-class-mac)# exit
switch(config)# do show class
Type       Name
  Sequence Comment
           Action                          EtherType
           Source MAC Address
           Destination MAC Address
           Additional Parameters
--------------------------------------------------------------------------------
MAC        MY_MAC_CLASS
        10 match                           lldp
           any
           any
        20 ignore                          arp
           any
           any
```

Adding a comment to an existing MAC class entry:

```
switch(config)# class mac MY_MAC_CLASS
switch(config-class-mac)# 10 comment MY_CLASS_ENTRY10 comment MY_CLASS_ENTRY
switch(config-class-mac)# exit
switch(config)# do show class
Type       Name
  Sequence Comment
           Action                          EtherType
           Source MAC Address
           Destination MAC Address
```

```
           Additional Parameters
--------------------------------------------------------------------------------
MAC        MY_MAC_CLASS
        10 MY_CLASS_ENTRY
           match                           lldp
           any
           any
        20 ignore                          arp
           any
           any
```

Removing a comment from an existing MAC class entry:

```
switch(config)# class mac MY_MAC_CLASS
switch(config-class-mac)# no 10 comment MY_CLASS_ENTRY
switch(config-class-mac)# exit
switch(config)# do show class
Type       Name
  Sequence Comment
           Action                          EtherType
           Source MAC Address
           Destination MAC Address
           Additional Parameters
--------------------------------------------------------------------------------
MAC        MY_MAC_CLASS
        10 match                           lldp
           any
           any
        20 ignore                          arp
           any
           any
```

Replacing a MAC class entry in an existing MAC class:

```
switch(config)# class mac MY_MAC_CLASS
switch(config-class-mac)# 10 match any any any
switch(config-class-mac)# exit
switch(config)# do show class
Type       Name
  Sequence Comment
           Action                          EtherType
           Source MAC Address
           Destination MAC Address
           Additional Parameters
--------------------------------------------------------------------------------
MAC        MY_MAC_CLASS
        10 match                           any
           any
           any
        20 ignore                          arp
           any
           any
```

Removing a MAC class entry:

```
switch(config)# class mac MY_MAC_CLASS
switch(config-class-mac)# no 1
```

```
switch(config-class-mac)# exit
switch(config)# do show class
Type       Name
  Sequence Comment
           Action                           EtherType
           Source MAC Address
           Destination MAC Address
           Additional Parameters
--------------------------------------------------------------------------------
MAC        MY_MAC_CLASS
         2 ignore                           arp
           any
           any
```

Removing a MAC class. Removing a class with entries removes all its entries as well. If a class associated with a policy entry (or multiple policy entries) is removed, the corresponding entries are also removed.

The corresponding entries are only removed if the class is unused by all policy entries.

```
switch(config)# no class mac MY_MAC_CLASS
switch(config)# do show class
No Class found.
```

Command History

Release	Modification
10.07 or earlier	--

Command Information

Platforms	Command context	Authority
6300 6400 8100 8360	`config` The **class mac <CLASS-NAME>** command takes you into the **config-class-mac** context where you enter the class entries.	Administrators or local user group members with execution rights for this command.

class resequence

`class {ip|ipv6|mac} <CLASS-NAME> resequence <STARTING-SEQUENCE-NUMBER> <INCREMENT>`

Description

Resequence numering in an IPv4, or IPv6, or MAC class.

Parameter	Description
{ip|ipv6|mac**}** *<CLASS-NAME>*	Specifies the class where you want to resequence class entries.
<STARTING-SEQUENCE-NUMBER>	Specifies the sequence number to start resequencing from.
<INCREMENT>	Specifies how much to increment the sequence numbers by.

Examples

Resequencing an IPv4 class:

```
switch(config)# class ip MY_IP_CLASS resequence 1 10
switch(config)# do show class
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
-------------------------------------------------------------------------------
IPv4       MY_IP_CLASS
         1 match                           igmp
           any
           any
        11 ignore                          udp
           any
           any
        21 match                           tcp
           192.168.0.1
           192.168.0.2
```

Resequencing an IPv6 class:

```
switch(config)# class ipv6 MY_IPV6_CLASS resequence 1 1
switch(config-class-ipv6)# exit
switch(config)# do show class
Type       Name
  Sequence Comment
           Action                          L3 Protocol
           Source IP Address               Source L4 Port(s)
           Destination IP Address          Destination L4 Port(s)
           Additional Parameters
-------------------------------------------------------------------------------
IPv6       MY_IPV6_CLASS
         1 match                           any
           any
           1020::
         2 ignore                          udp
           any
           any
```

Resequencing a MAC class:

```
switch(config)# class mac MY_MAC_CLASS resequence 1 1
switch(config)# do show class
Type       Name
```

```
  Sequence Comment
           Action                              EtherType
           Source MAC Address
           Destination MAC Address
           Additional Parameters
------------------------------------------------------------------------------
MAC        MY_MAC_CLASS
         1 match                               any
           any
           any
         2 ignore                              arp
           any
           any
```

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 reset

`class { all | ip <CLASS-NAME> | ipv6 <CLASS-NAME> |mac <CLASS-NAME> } reset`

Description

Changes the user-specified class configuration to match the active class configuration. Use this command when there is a discrepancy between what the user configured and what is active and accepted by the system.

Parameter	Description
`{ all | ip <CLASS-NAME>| ipv6 <CLASS-NAME> |mac <CLASS-NAME> }`	Specifies either **all** classes be reset or specifies the type (**ip** for IPv4, **ipv6** for IPv6 or **mac** for MAC ACL) and name of the class to be reset.

Examples

Resetting the user-specified configuration to the active configuration:

```
switch(config)# class all reset
```

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.

clear policy hitcounts

`clear policy hitcounts { all | [<POLICY-NAME>] [[interface <IF-NAME> [in|out|routed-in]] | [vlan <VLAN-ID> [in|out]]] | global }`

Description

Clears the policy hit count statistics.

Parameter	Description
`all`	Selects all policies.
<POLICY-NAME>	Specifies the policy name.
`interface` *<IF-NAME>*	Specifies the interface name.
`vlan` *<VLAN-ID>*	Specifies the VLAN.
`in`	Specifies the inbound (ingress) traffic direction.
`out`	Selects the outbound (egress) traffic direction.
`routed-in`	Selects the routed in traffic direction. Not applicable to a policy applied to a VLAN.
`global`	Selects the globally applied policy.

Examples

On the HPE Aruba Networking 6400 Switch Series, interface identification differs.

Clearing policy hit counts and then showing the policy hit counts (statistics):

```
switch# clear policy hitcounts my_policy int 1/1/1 in
switch# show policy hitcounts my_policy
Statistics for Policy my_policy:
Interface 1/1/1* (in):
           Hit Count  Configuration
10 class ipv6 my_class1 action dscp af21 action drop
                   0  10 match any any any count
* policy statistics are shared among each context type (interface, VLAN).
  For routed ingress, they are only shared within the same VRF.
  Use 'policy NAME copy' to create a new policy for separate statistics.
```

Clearing the globally applied policy hit counts and then showing the global policy hit counts (statistics):

```
switch# clear policy hitcounts global
switch# show policy hitcounts global
Statistics for Policy global1:
Global Policy:
          Hit Count  Configuration
10 class ipv6 my_class1 action mirror
                  0  10 match any any any count
* policy statistics are shared among each context type (interface, VLAN).
  For routed ingress, they are only shared within the same VRF.
  Use 'policy NAME copy' to create a new policy for separate statistics.
```

Clearing hit counts for policy **MY_IPv6_Policy** applied to VLAN 10 (ingress):

```
switch# clear policy hitcounts My_IPv6_Policy vlan 10 in
```

Clearing hit counts for all policies:

```
switch# clear policy hitcounts all
```

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.

policy

```
policy <POLICY-NAME>

    [<SEQUENCE-NUMBER>]
    class {ip|ipv6|mac} <CLASS-NAME>
          action {<REMARK-ACTIONS> | <POLICE-ACTIONS> | <OTHER-ACTIONS>}
          [{<REMARK-ACTIONS> | <POLICE-ACTIONS> | <OTHER-ACTIONS>}]

    [<SEQUENCE-NUMBER>]
    comment ...
```

Description

Creates or modifies classifier policy and policy entries. A policy is made up of one or more policy entries ordered and prioritized by sequence numbers. Each entry has an IPv4/IPv6/MAC class and zero or more policy actions associated with it.

A policy must be applied using the **apply** command.

The **no** form of the command can be used to delete either a policy (use **no** with the policy command) or an individual policy entry (use **no** with the sequence number).

Parameter	Description
<POLICY-NAME>	Specifies the name of the policy.
<SEQUENCE-NUMBER>	Specifies a sequence number for the policy entry. Optional. Range: 1 to 4294967295.
`comment`	Stores the remaining entered text as a policy entry comment.
`class {ip|ipv6|mac}` *<CLASS-NAME>*	Specifies a type of class, **ip** for IPv4, **ipv6** for IPv6 and **mac** for a MAC policy. And specifies a class name.
<REMARK-ACTIONS>	Remark actions can be any of the following options: `{pcp` **<PRIORITY>** | **ip-precedence <IP-PRECEDENCE_VALUE> | dscp <*DSCP-VALUE*> | local-priority <*LOCAL-PRIORITY-VALUE*>**} where:
`pcp` *<PCP-VALUE>*	Specifies the Priority Code Point (PCP) value. Range: 0 to 7.
`ip-precedence` *<IP-PRECEDENCE-VALUE>*	Specifies the numeric IP precedence value. Range: 0 to 7.
`dscp` *<DSCP-VALUE>*	Specifies a Differentiated Services Code Point (DSCP) value. Enter either a numeric value (0 to 63) or a keyword as follows: ■ **AF11** - DSCP 10 (Assured Forwarding Class 1, low drop probability) ■ ■ **AF12** - DSCP 12 (Assured Forwarding Class 1, medium drop probability) ■ **AF13** - DSCP 14 (Assured Forwarding Class 1, high drop probability) ■ **AF21** - DSCP 18 (Assured Forwarding Class 2, low drop probability) ■ **AF22** - DSCP 20 (Assured Forwarding Class 2, medium drop probability) ■ **AF23** - DSCP 22 (Assured Forwarding Class 2, high drop probability) ■ **AF31** - DSCP 26 (Assured Forwarding Class 3, low drop probability) ■ **AF32** - DSCP 28 (Assured Forwarding Class 3, medium drop probability) ■ **AF33** - DSCP 30 (Assured Forwarding Class 3, high drop probability) ■ **AF41** - DSCP 34 (Assured Forwarding Class 4, low drop probability) ■ **AF42** - DSCP 36 (Assured Forwarding Class 4, medium drop probability) ■ **AF43** - DSCP 38 (Assured Forwarding Class 4, high drop probability)

Parameter	Description
	■ **CS0** - DSCP 0 (Class Selector 0: Default) ■ **CS1** - DSCP 8 (Class Selector 1: Scavenger) ■ **CS2** - DSCP 16 (Class Selector 2: OAM) ■ **CS3** - DSCP 24 (Class Selector 3: Signaling) ■ **CS4** - DSCP 32 (Class Selector 4: Real time) ■ **CS5** - DSCP 40 (Class Selector 5: Broadcast video) ■ **CS6** - DSCP 48 (Class Selector 6: Network control) ■ **CS7** - DSCP 56 (Class Selector 7) ■ **EF** - DSCP 46 (Expedited Forwarding)
`local-priority <LOCAL-PRIORITY-VALUE>`	Specifies a local priority value. Range: 0 to 7.
<POLICE-ACTIONS>	Police actions can be the following **{cir <*RATE-BPS*>cbs <BYTES> exceed}** where:
`cir kbps <RATE-KBPS>`	Specifies a Committed Information Rate value in Kilobits per second. Range: 1 to 4294967295.
`cbs <BYTES>`	Specifies a Committed Burst Size value in bytes. Range: 1 to 4294967295.
`exceed`	Specifies action to take on packets that exceed the rate limit.
<OTHER-ACTIONS>	Other actions can be the following:
`drop`	Specifies drop traffic.

Usage

- An applied policy will process a packet sequentially against policy entries in the list until the last policy entry in the list has been evaluated or the packet matches an entry.
- Entering an existing **<POLICY-NAME>** value will cause the existing policy to be modified, with any new **<SEQUENCE-NUMBER>** value creating an additional policy entry, and any existing **<SEQUENCE-NUMBER>** value replacing the existing policy entry with the same sequence number.
- If no sequence number is specified, a new policy entry will be appended to the end of the entry list with a sequence number equal to the highest policy entry currently in the list plus 10.

Examples

Creating a policy with several entries:

```
switch(config)# policy MY_POLICY
switch(config-policy)# 10 class ipv6 MY_CLASS1 action dscp af21 action drop
switch(config-policy)# 20 class ip MY_CLASS3 action mirror 1
switch(config-policy)# exit
switch(config)# show policy
           Name
  Sequence Comment
           Class Type
                    action
-------------------------------------------------------------------------------
           MY_POLICY
        10
```

```
           MY_CLASS1 ipv6
                    drop
                    dscp AF21

        20
           MY_CLASS3 ipv4
                    mirror 1
```

Adding a comment to an existing policy entry:

```
switch(config)# policy MY_POLICY
switch(config-policy)# 20 comment MY_TEST_POLICY
switch(config-policy)# exit
switch(config)# show policy
  Name       Sequence Comment          Class       Type   action
-------------------------------------------------------------------------------
  MY_POLICY   10                       MY_CLASS1   ipv6   drop dscp AF21
              20     MY_TEST_POLICY    MY_CLASS3   ipv4   mirror 1
```

Removing a comment from an existing policy entry:

```
switch(config)# policy MY_POLICY
switch(config-policy)# no 20 comment
switch(config-policy)# exit
switch(config)# show policy
Name        Sequence  Comment  Class     Type    action
-------------------------------------------------------------------------------
MY_POLICY   10                 MY_CLASS1 ipv6    drop dscp AF21
            20                 MY_CLASS3 ipv4    mirror 1
```

Adding/Replacing a policy entry in an existing policy:

```
switch(config)# policy MY_POLICY
switch(config-policy)# 10 class ip MY_CLASS3 action drop action dscp af21
switch(config-policy)# exit
switch(config)# show policy
           Name
  Sequence Comment
           Class Type
                    action
-------------------------------------------------------------------------------
           MY_POLICY
        10
           MY_CLASS3 ipv4
                    drop
                    dscp AF21

        20
           MY_CLASS3 ipv4
                    mirror 1
```

Removing a policy entry:

```
switch(config)# policy MY_POLICY
switch(config-policy)# no 10
switch(config-policy)# exit
```

```
switch(config)# show policy
           Name
  Sequence Comment
           Class Type
                    action
-------------------------------------------------------------------------------
           MY_POLICY
        20
           MY_CLASS3 ipv4
                    mirror 1
```

Removing a policy:

```
switch(config)# no policy MY_POLICY
switch(config)# show policy
Name       Sequence    Comment    Class      Type     action
-------------------------------------------------------------------------------
MY_POLICY   22                    MY_CLASS3   ipv4   mirror 1
```

The policer **exceed** DSCP action cannot be combined with other actions in the same policy entry, but other entries in the policy may use other actions.

For example, this configuration is valid:

```
switch(config)# policy my_policy
switch(config-policy)# 10 class ip my_class action cir kbps 1000 cbs 15625 exceed
dscp EF
```

But this is not because it adds a secondary action within the same policy entry:

```
6300(config-policy)# 10 class ip my_class action cir kbps 1000 cbs 15625 exceed
dscp EF action mirror 1
```

Invalid input: action

Command History

Release	Modification
10.07 or earlier	--

Command Information

Platforms	Command context	Authority
All platforms	`config` The **policy** command takes you into the **config-policy** context where you enter the policy entries.	Administrators or local user group members with execution rights for this command.

policy copy

`policy <POLICY-NAME> copy <DESTINATION-POLICY>`

Description

Copies a policy to a new destination policy or overwrites an existing policy. Copying a policy copies all its entries as well.

Parameter	Description
<POLICY-NAME>	Specifies the policy to be copied.
<DESTINATION-POLICY>	Specifies the name of the destination policy.

Examples

Copying a policy:

```
switch(config)# policy MY_POLICY copy MY_POLICY2
switch(config)# do show policy
            Name
  Sequence  Comment
            Class Type
                      action
------------------------------------------------------------------------------
            MY_POLICY
          2
            my_class3 ipv4
                      mirror 1
------------------------------------------------------------------------------
            MY_POLICY2
          2
            my_class3 ipv4
                      mirror 1
```

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.

policy resequence

`policy <POLICY-NAME> resequence <STARTING-SEQ-NUM> <INCREMENT>`

Description

Resequences numbering in a policy.

Parameter	Description
<POLICY-NAME>	Specifies the policy where you want to resequence policy entries.
<STARTING-SEQ-NUM>	Specifies the sequence number to start resequencing from.
<INCREMENT>	Specifies how much to increment the sequence numbers by.

Examples

Resequencing a policy:

```
switch(config)# policy MY_POLICY resequence 1 1
switch(config)# do show policy
            Name
  Sequence  Comment
            Class Type
                      action
-------------------------------------------------------------------------------
            MY_POLICY
          1
            MY_CLASS3 ipv4
                      drop
                      dscp AF21

          2
            MY_CLASS3 ipv4
                      mirror 1
```

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.

policy reset

`policy <POLICY-NAME> reset`

Description

Changes the user-specified policy configuration to match the active policy configuration. Use this command when a discrepancy exists between what the user configured and what is active and accepted by the system.

Parameter	Description
<POLICY-NAME>	Specifies the policy to be reset.

Examples

Resetting a policy:

```
switch(config)# policy MY_POLICY reset
```

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 class

```
show class [ip | ipv6 | mac] [<CLASS-NAME>] [commands] [configuration] [vsx-peer]
```

Description

Shows class configuration information.

All parameters are optional.

Parameter	Description
`[ip | ipv6 | mac]`	Selects the class type for the display: **ip** for IPv4, **ipv6** for IPv6, or **mac** for MAC classes.
<CLASS-NAME>	Specifies the class name.
`commands`	Specifies whether to display output as the CLI commands showing the configured class entries.
`configuration`	Specifies whether to display classes that have been configured by the user, even if they are not active due to issues with the command parameters or hardware issues. This parameter is useful during a mismatch between the entered configuration and the previous successfully programmed (active) classes.
`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.

Examples

Showing all class configuration:

```
switch# show class
Type Name
```

```
    Sequence Comment
           action                       L3 Protocol
           Source IP address            Source L4 Port(s)
           Destination IP address       Destination L4 Port(s)
           Additional Parameters
------------------------------------------------------------------
ipv4 MY_IPV4_CLASS
        10 my first class entry comment
           match                        icmp
           192.168.0.1/255.255.255.0
           192.168.1.1/255.255.255.0
           VLAN: 1
        20 my second class entry comment
           ignore                       tcp
           10.100.0.10/255.255.255.0    < 3000
           10.100.1.10/255.255.255.0    > 2000
           VLAN: 1
------------------------------------------------------------------
```

Showing class configuration for the IPv4 class MY_IPV4_CLASS as CLI commands:

```
switch# show class ip MY_IPV4_CLASS commands
class ip "MY_IPV4_CLASS"
  10 match icmp 192.168.0.1/255.255.255.0 192.168.1.1/255.255.255.0 vlan 1
  10 comment my first class entry comment
  20 ignore tcp 10.100.0.10/255.255.255.0 lt 3000 10.100.1.10/255.255.255.0 gt
     2000 vlan 1
  20 comment my second class entry comment
```

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 policy

Syntax that shows information for all policies:

```
show policy [commands] [configuration] [vsx-peer]
```

Syntax that filters by policies applied to an interface or VLAN:

```
show policy [interface <IF-NAME> [in | out | routed-in] | vlan <VLAN-ID> [in | out] | vni
<VNI-ID> [routed-in]]
            [commands] [configuration] [vsx-peer]
show policy [interface <IF-NAME> [in | out | routed-in] | vlan <VLAN-ID> [in] | vni <VNI-
ID> [routed-in]]
            [commands] [configuration] [vsx-peer]
```

Syntax that filters by the named policy:

```
show policy <POLICY-NAME> [commands] [configuration] [vsx-peer]
```

Syntax that filters by the globally applied policy:

```
show policy global [commands] [configuration] [vsx-peer]
```

Syntax that shows statistical information in the form of hit counts:

```
show policy hitcounts <POLICY-NAME> [interface <IF-NAME> [in | out | routed-in] |
                     vlan <VLAN-ID> [in | out] | vni <VNI-ID> [routed-in]] [vsx-peer]
```

Syntax that shows statistical information in the form of hit counts for the globally applied policy:

```
show policy hitcounts global [vsx-peer]
```

Description

Shows information about your defined policies and where they have been applied. When **show policy** is entered without parameters, information for all policies is shown. The parameters filter the list of policies for which information is shown.

Available filtering includes:

- The content of a specific policy.
- All policies applied to a specific interface.
- All policies applied to a specific VLAN.
- All policies applied to a specific VNI.
- The globally applied policy.
- The inbound (ingress) or outbound (egress) direction.

To display policy statistics, use the **show policy hitcounts** form of this command.

When a policy is applied to a physical interface or lag using command **apply policy**, with the **per-interface** parameter included, unique instances of the policy are applied to each physical interface port or LAG. The unique instance of a policy has a parent-child relationship with the policy from which it was created. The **show policy** command shows information about the parent policy not the unique instances.

If a policy contains any class entries with the count keyword and policy entries with the **cir** action, and the policy is applied to multiple physical or virtual interfaces in the same direction, except for the routed ingress direction, the statistics will be aggregated. In the routed ingress direction, the statistics will be aggregated in multiple physical or virtual interfaces in the same VRF. If separate statistics for different physical or virtual interfaces are required, then another policy should be created. Alternatively, in the case of physical interfaces or LAGs, a policy applied with **per-interface** set can be used.

Parameter	Description
`interface <IF-NAME>`	Specifies the interface name.
`vlan <VLAN-ID>`	Specifies the VLAN.
`vni<VNI-ID>`	Specifies the VNI.
`in`	Selects the inbound (ingress) traffic direction.
`out`	Selects the outbound (egress) traffic direction.
`routed-in`	Selects the routed in traffic direction. Not applicable to a policy applied to a VLAN.

Parameter	Description
<POLICY-NAME>	Specifies the policy name.
commands	Causes the policy definition to be shown as the commands and parameters used to create it rather than in tabular form.
configuration	Causes the user-configured policies be shown as entered, even if the policies are not active due to policy-definition command issues or hardware issues. This parameter is useful if there is a mismatch between the entered configuration and the previous successfully programmed (active) policies configuration.
global	Selects the globally applied policy.
hitcounts	Selects the policy hit counts (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.

Examples

On the HPE Aruba Networking 6400 Switch Series, interface identification differs.

Showing information for all policies:

```
switch# show policy
           Name
  Sequence Comment
           Class Type
                    action
-------------------------------------------------------------------------------
           my_policy
        10 QOS class
           class1 ipv4
                    dscp af21
                    drop
        20 PBR policy.
           class2 ipv4
                    pbr mypbr
-------------------------------------------------------------------------------
```

Showing a policy as commands:

```
switch# show policy commands
policy my_policy
       10 class ip class1 action dscp af21 action drop
       20 class ip class2 action pbr mypbr
```

Showing the globally applied policy:

```
switch# show policy global commands
policy global1
    10 class ip my_class1 action drop
apply policy my_policy in
```

Showing policy hit counts (statistics) for the globally applied policy:

```
switch# show policy hitcounts global
Statistics for Policy My_Policy:
global (in):
     Matched Packets  Configuration
10 class ip My_ip_Class
                  0  10 match tcp any any ack count
                  -  20 match udp any lt 8 any
                  0  30 match icmp any 10.1.1.10 count
20 class ipv6 My_ipv6_Class action cir kbps 1000000 cbs 1000000 exceed drop  [ 0
kbps conform ]
                  -  10 match tcp any any ack
                  0  20 match icmpv6 1000::10 any count
```

Showing policy hit counts (statistics) for a policy applied everywhere (with 1/1/4 and 1/1/5 being applied per interface):

```
switch# show policy hitcounts My_Policy
Statistics for Policy My_Policy:

Interface 1/1/1,lag1 (in):
     Matched Packets  Configuration
10 class ip My_ip_Class
                  0  10 match tcp any any ack count
                  -  20 match udp any lt 8 any
                  0  30 match icmp any 10.1.1.10 count
20 class ipv6 My_ipv6_Class action cir kbps 1000000 cbs 1000000 exceed drop  [ 0
kbps conform ]
                  -  10 match tcp any any ack
                  0  20 match icmpv6 1000::10 any count

Interface 1/1/4 (in):
     Matched Packets  Configuration
10 class ip My_ip_Class
                  0  10 match tcp any any ack count
                  -  20 match udp any lt 8 any
                  0  30 match icmp any 10.1.1.10 count
20 class ipv6 My_ipv6_Class action cir kbps 1000000 cbs 1000000 exceed drop  [ 0
kbps conform ]
                  -  10 match tcp any any ack
                  0  20 match icmpv6 1000::10 any count

Interface 1/1/5 (in):
     Matched Packets  Configuration
10 class ip My_ip_Class
                  0  10 match tcp any any ack count
                  -  20 match udp any lt 8 any
                  0  30 match icmp any 10.1.1.10 count
20 class ipv6 My_ipv6_Class action cir kbps 1000000 cbs 1000000 exceed drop  [ 0
kbps conform ]
                  -  10 match tcp any any ack
                  0  20 match icmpv6 1000::10 any count

interface 1/1/2.10,1/1/3.10 (in):
     Matched Packets  Configuration
10 class ip My_ip_Class
                  0  10 match tcp any any ack count
                  -  20 match udp any lt 8 any
                  0  30 match icmp any 10.1.1.10 count
20 class ipv6 My_ipv6_Class action cir kbps 1000000 cbs 1000000 exceed drop  [ 0
```

```
kbps conform ]
                  -  10 match tcp any any ack
                  0  20 match icmpv6 1000::10 any count
...
```

Showing policy hit counts (statistics) for a policy applied on physical interfaces and LAGs:

```
switch# show policy hitcounts My_Policy interface 1/1/1
Statistics for Policy My_Policy:

Interface 1/1/1,lag1 (in):
     Matched Packets  Configuration
10 class ip My_ip_Class
                  0  10 match tcp any any ack count
                  -  20 match udp any lt 8 any
                  0  30 match icmp any 10.1.1.10 count
20 class ipv6 My_ipv6_Class action cir kbps 1000000 cbs 1000000 exceed drop  [ 0
kbps conform ]
                  -  10 match tcp any any ack
                  0  20 match icmpv6 1000::10 any count
```

Showing policy hit counts (statistics) for a policy applied on VLANs:

```
switch# show policy hitcounts My_Policy vlan 10
Statistics for Policy My_Policy:

vlan 10,20-30 (in):
     Matched Packets  Configuration
10 class ip My_ip_Class
                  0  10 match tcp any any ack count
                  -  20 match udp any lt 8 any
                  0  30 match icmp any 10.1.1.10 count
20 class ipv6 My_ipv6_Class action cir kbps 1000000 cbs 1000000 exceed drop  [ 0
kbps conform ]
                  -  10 match tcp any any ack
                  0  20 match icmpv6 1000::10 any count
Statistics for Policy My_Policy:

vlan 10,20-30 (in):
     Matched Packets  Configuration
10 class ip My_ip_Class
                  0  10 match tcp any any ack count
                  -  20 match udp any lt 8 any
                  0  30 match icmp any 10.1.1.10 count
20 class ipv6 My_ipv6_Class action cir kbps 1000000 cbs 1000000 exceed drop  [ 0
kbps conform ]
                  -  10 match tcp any any ack
                  0  20 match icmpv6 1000::10 any count
```

Showing policy hit counts (statistics) for a policy applied on interface VLANs:

```
switch# show policy hitcounts My_Policy interface vlan10
Statistics for Policy My_Policy:

VRF red
interface vlan 10,30 (routed-in):
     Matched Packets  Configuration
```

```
10 class ip My_ip_Class
                  0  10 match tcp any any ack count
                  -  20 match udp any lt 8 any
                  0  30 match icmp any 10.1.1.10 count
20 class ipv6 My_ipv6_Class action cir kbps 1000000 cbs 1000000 exceed drop  [ 0
kbps conform ]
                  -  10 match tcp any any ack
                  0  20 match icmpv6 1000::10 any count
```

```
show policy hitcounts My_Policy vni 1000
Statistics for Policy My_Policy:
vni 1000 (routed-in):
     Matched Packets  Configuration
10 class ip My_ip_Class
                  0  10 match tcp any any ack count
                  -  20 match udp any lt 8 any
                  0  30 match icmp any 10.1.1.10 count
20 class ipv6 My_ipv6_Class action cir kbps 1000000 cbs 1000000 exceed drop
                  0  10 match tcp any any count [ 0 kbps conform ]
                  0  20 match icmpv6 1000::10 any count [ 0 kbps conform ]show
policy hitcounts My_Policy vni 1000
Statistics for Policy My_Policy:
vni 1000 (routed-in):
     Matched Packets  Configuration
10 class ip My_ip_Class
                  0  10 match tcp any any ack count
                  -  20 match udp any lt 8 any
                  0  30 match icmp any 10.1.1.10 count
20 class ipv6 My_ipv6_Class action cir kbps 1000000 cbs 1000000 exceed drop
                  0  10 match tcp any any count [ 0 kbps conform ]
                  0  20 match icmpv6 1000::10 any count [ 0 kbps conform ]
```

Showing policy hit counts (statistics) for a policy applied on interface VLANs for a specific VRF:

```
switch# show policy hitcounts My_Policy vrf green routed-in
Statistics for Policy My_Policy:

VRF green
interface vlan 20,25 (routed-in):
     Matched Packets  Configuration
10 class ip My_ip_Class
                  0  10 match tcp any any ack count
                  -  20 match udp any lt 8 any
                  0  30 match icmp any 10.1.1.10 count
20 class ipv6 My_ipv6_Class action cir kbps 1000000 cbs 1000000 exceed drop  [ 0
kbps conform ]
                  -  10 match tcp any any ack
                  0  20 match icmpv6 1000::10 any count
```

Command History

Release	Modification
10.08	Added **[per-interface]** information. Updated examples.
10.07 or earlier	--

Command Information

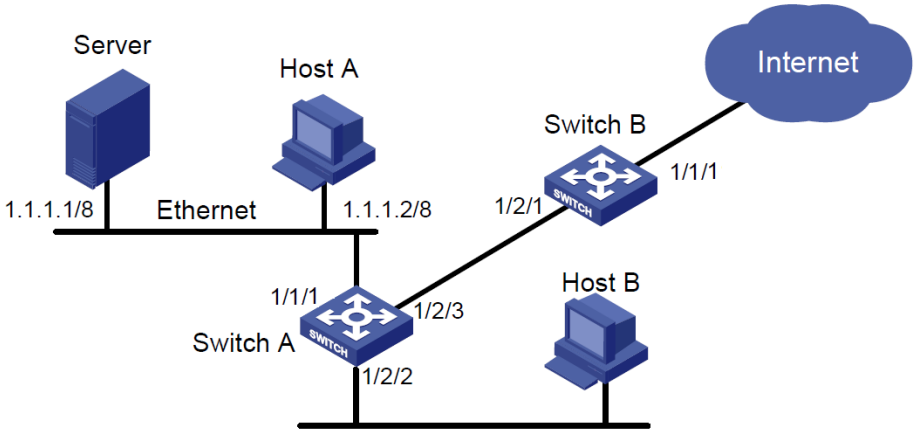
Platforms	Command context	Authority
All platforms	Operator (>) or Manager (#)	Operators or Administrators or local user group members with execution rights for this command. Operators can execute this command from the operator context (>) only.

Chapter 5
Classifier policies configuration example

On the HPE Aruba Networking 6400 Switch Series, interface identification differs.

This example configures traffic policing on:

- A 10-Gbit Ethernet of Switch A meeting the following requirements:
  - Police the rate of packets from the server to 102,400 kbps. Traffic 102,400 kbps or less is forwarded. The traffic more than 102,400 kbps is dropped.
  - Police the rate of packets from Host A to 25,600 kbps. Traffic 25,600 kbps or less is forwarded. The traffic more than 25,600 kbps is dropped.
- A 10-Gbit Ethernet 1/2/1 of Switch B limiting the incoming traffic rate of HTTP packets on 10-Gbit Ethernet 1/1/1 to the data rate of 204,800 kbps and dropping excess packets.



Configuring the classifier policies example

These steps are part of the classifier policies configuration example.

On the HPE Aruba Networking 6400 Switch Series, interface identification differs.

Procedure

1. Configure Switch A.

   Create traffic classes named SERVER_TRAFFIC and HOST_A_TRAFFIC for matching the packets from the server and Host A:

```
switch# configure
switch(config)# class ip SERVER_TRAFFIC
switch(config-class-ip)# match any 1.1.1.1 any
switch(config-class-ip)# exit
switch(config)# class ip HOST_A_TRAFFIC
```

```
switch(config-class-ip)# match any 1.1.1.2 any
switch(config-class-ip)# exit
```

2. Create a classifier policy named RATE_LIMIT_POLICY:

```
switch(config)# policy RATE_LIMIT_POLICY
```

3. Configure the policy RATE_LIMIT_POLICY, so that 102,400 kbps of traffic, matching the class SERVER_TRAFFIC, is forwarded and the excess is dropped:

```
switch(config-policy)# class ip SERVER_TRAFFIC action cir kbps 102400 exceed
drop
```

4. Configure the policy RATE_LIMIT_POLICY so that 25,600 kbps of traffic, matching the class HOST_A_TRAFFIC, is forwarded and the excess is dropped:

```
switch(config-policy)# class ip HOST_A_TRAFFIC action cir kbps 25600 exceed
drop
switch(config-policy)# exit
```

5. Apply RATE_LIMIT_POLICY to interface 1/1/1 for the inbound traffic:

```
switch(config)# int 1/1/1
switch(config-if)# apply policy RATE_LIMIT_POLICY in
switch(config-if)# exit
```

6. To view the configuration with the RATE_LIMIT_POLICY applied:

```
switch# show running-config
Current configuration:
!
...
class ip SERVER_TRAFFIC
    10 match any 1.1.1.1 any
class ip HOST_A_TRAFFIC
    10 match any 1.1.1.2 any
policy RATE_LIMIT_POLICY
    10 class ip SERVER_TRAFFIC action cir kbps 102400 exceed drop
    20 class ip HOST_A_TRAFFIC action cir kbps 25600 exceed drop
interface 1/1/1
    apply policy RATE_LIMIT_POLICY in
```

7. Configure Switch B.

   Create a traffic class named HTTP_TRAFFIC and configure it to match traffic to port 80:

```
switch(config)# class ip HTTP_TRAFFIC
switch(config-class-ip)# match tcp any any eq 80
switch(config-class-ip)# exit
```

8. Create a classifier policy named RATE_LIMIT_HTTP:

```
switch(config)# policy RATE_LIMIT_HTTP
```

9. Configure the policy RATE_LIMIT_HTTP so that 204,800 kbps of traffic, matching the class HTTP_TRAFFIC, is forwarded and the excess is dropped:

```
switch(config-policy)# class ip HTTP_TRAFFIC action cir kbps 204800 exceed
drop
switch(config-policy)# exit
```

10. Apply RATE_LIMIT_HTTP to interface 1/1/1 for inbound traffic:

```
switch(config)# int 1/1/1
switch(config-if)# apply policy RATE_LIMIT_HTTP in
switch(config-if)# exit
```

11. Show the running configuration with RATE_LIMIT_HTTP applied:

```
switch# show running-config
Current configuration:
!
...
class ip HTTP_TRAFFIC
    10 match tcp any any eq 80
policy RATE_LIMIT_HTTP
    10 class ip HTTP_TRAFFIC action cir kbps 204800 exceed drop
interface 1/1/1
    apply policy RATE_LIMIT_HTTP in
```

```
switch# show running-config
Current configuration:
!
...
class ip HTTP_TRAFFIC
    10 match tcp any any eq 80
policy RATE_LIMIT_HTTP
    10 class ip HTTP_TRAFFIC action cir kbps 204800 exceed drop
interface 1/1/1
    apply policy RATE_LIMIT_HTTP in
```

Chapter 6

ACL and Policy hardware resource

Switches have finite (TCAM and other) hardware resources used in the application of ACLs and Classifier policies (including Port-Access policies) to packets being processed in switch hardware. ADC (analytics data collection) also consumes TCAM lookups. Take the considerations described in this chapter into account when deciding what ACL and classifier policy-related features to use at the same time.

Show Resources

The **show resources** command allows users to see hardware resource consumption in the switch.

These hardware resources include the following:

- TCAM entries
- L4 Port ranges
- High-Capacity TCAM entries

On the 6400 and 8400X switch series, these resources are only reported per line module.

On the 4100i, 6000, 6100, 8320, 8325, and 8360 switch series, these resources are reported for the entire switch. On the 9300 switch series, resources are reported per pipe. The 9300 switch series has four pipes and the 9300s and 10040 switch series has two pipes.

On the 6300, 6400, and 8360 switch series, when IPFIX is initially enabled, it always pre-reserves a large number of TCAM entries for learning new flows.

On the 6200 and 6300 switch series, these resources are only reported per VSF member.

The usage of high capacity TCAM can be viewed specifically using **show system high-capacity-tcam**. This command displays the feature that is currently configured, pending configuration, and the default feature present in high capacity TCAM.

Event Logs

The following event logs are displayed when the TCAM runs out of resources:

Daemon	Event ID	Severity	Message
ops-switchd	10214	ERROR	TCAM Context Group selectors have been exhausted
ops-switchd	10215	ERROR	TCAM Context Group IDs have been exhausted
ops-switchd	10216	ERROR	Policer resources have been exhausted
ops-switchd	10217	ERROR	TCAM entries have been exhausted

Daemon	Event ID	Severity	Message
ops-switchd	10218	ERROR	TCAM tables have been exhausted
ops-switchd	10219	ERROR	TCAM ranges have been exhausted
ops-switchd	10220	ERROR	TCAM counters have been exhausted

Limitations and exclusions

On the 6300 and 6400 switch series, the widths for **show resources** can have features combined (IPv4 + IPv6) into one lookup. For example: "Ingress IP Port ACL" = Ingress v4 Port ACLs + Ingress v6 Port ACLs = 1 TCAM Entry + 4 TCAM Entries = 5 TCAM Entries.

Therefore, the table widths for each ACL/Class type are variable depending on what is applied. Widths for each feature: MAC ACL = 1 IPv4 ACL = 1 IPv6 ACL = 4 MAC Class = 1 IPv4 Class = 2 IPv6 Class = 4.

On the 4100i, 6000, 6100, 6300, and 6400 switch series, a MAC Class with an ethertype of 'any' has a width of 7 because it uses one TCAM entry each of MAC, IPv4, and IPv6. Specifying the IPv4 (0x0800) or IPv6 (0x86DD) ethertypes in a MAC Class uses an entry equal to their respective size. IPv4 uses a width of 2 and IPv6 uses a width of 4.

Resources reserved for one lookup cannot be shared or used by other lookups.

TCAM resource consumption and lookups

TCAM entries and lookups are consumed by features that deal with the classification of packets using the TCAM. TCAM lookups are a finite hardware resource used in the application of ACLs and policies (including port access policies) to packets processed in switch hardware. ADC (analytics data collection) also consumes TCAM lookups. A switch can support a limited number of ACL and policy features at the same time. Use the command **show resources** to monitor TCAM resources and lookups.

Certain platforms have additional resources that features may consume, such as L4 port range checkers, context group selectors, policers, and counters. Different platforms consume these resources at different rates. There are a limited number of features that use TCAM that can be enabled simultaneously on the same line card.

In the following TCAM lookup lists, **IP** means both IPv4 and IPv6.

TCAM lookup behaviors vary by switch type.

For the 6300, 6400, 8100, 8360 Switch series:

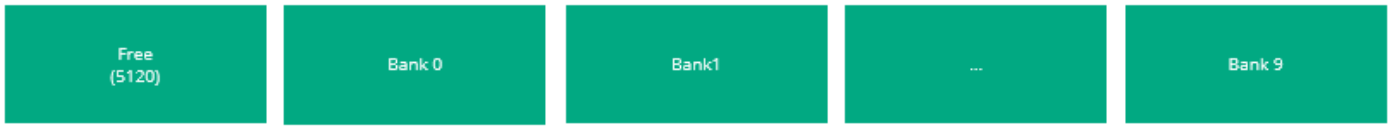
The ingress TCAM is organized in a series of uniformly sized banks. Each feature uses one lookup and can reserve one or more banks to install entries. While certain sub-features may have different entry widths, this does not mean that they need to initially reserve multiple banks. The width of a feature affects how many TCAM entries a single software entry consumes. It is unlikely that a configuration runs out of ingress TCAM lookups first. Typically, TCAM entries or Context Group Selectors are exhausted before TCAM lookups. There are many slightly different SKUs of these platforms which all allocate resources in the same way, though the quantities of resources can vary. Figure 1, Ingress TCAM with no features installed provides a visual representation of ingress TCAM.

Table 1, Platform specific TCAM resources provides information about the capacities of each platform's TCAM resources.

Table 1: *Platform specific TCAM resources*

Platform	Bank Size	Number of banks	Total entries
6300/6400 (Access)	2048	10	20480
6300/6400 (Core)	8192	8	65536
8100	2048	8	16384
8360	8192	8	65536

Figure 1 *Ingress TCAM with no features installed*



The following features compete with each other for ingress lookups:

- Audio Visual Bridging (AVB)
- Ingress Global Policy
- Ingress IP Analytics Data Collection (ADC)
- Ingress L2 Tunnel
- Ingress Port IP ACL
- Ingress Port MAC ACL
- Ingress Port Policy
- Ingress Role Based Policy (ABP and GBP)
- Ingress Routed Port Policy
- Ingress Routed Tunnel Policy
- Ingress Routed VLAN IP ACL
- Ingress Routed VLAN Policy
- Ingress Tunnel IP ACL
- Ingress Tunnel MAC ACL
- Ingress Tunnel Policy
- Ingress VLAN IP ACL
- Ingress VLAN MAC ACL
- Ingress VLAN Policy
- Ingress IPFIX
- Long Prefix IPv6 Unicast Routes
- Port Access Client (only on the 6300 switch series)
- QoS WRED

There is one dedicated Flex lookup used only by Group-Based Policy (GBP) and Audio/Visual Bridging (AVB). This lookup uses entries from the same set of shared banks as other TCAM lookups. Due to both AVB and GBP both competing for this Flex lookup, only one of these features may be installed in a configuration.

The following features compete with each other for egress lookups:

- Egress Port IP ACL
- Egress Port MAC ACL
- Egress Port Policy
- Egress Routed VLAN IP ACL
- Egress Tunnel IP ACL
- Egress Tunnel MAC ACL
- Egress VLAN IP ACL
- Egress VLAN MAC ACL
- Egress VLAN Policy

Use **show resources** to determine the total number of available ingress and egress lookups for each line card or stack member.

Subinterface applications share lookups with ingress and egress VLANs.

The IPFIX feature consumes all available TCAM entries and fills the TCAM in a very short amount of time, preventing other features, like ACLs from being applied. Should this condition occur, an event is logged indicating that the TCAM is FULL. To avoid this scenario, ACLs, Policies and other static TCAM features should be configured first. After the static features have finished applying, IPFIX can be configured, which results in IPFIX only consuming TCAM resources which are not in use or reserved by other actively applied features.

The following is an example configuration:

```
access-list ip test
        10 deny any any any
interface 1/1/1
        apply access-list ip test in
```

In this example, a single feature is configured, IP Port ACLs. The resources consumed only require one bank to be reserved for the feature. This is displayed in Figure 2, One bank reservation

Figure 2 *One bank reservation*

In this example, IPv4 and IPv6 ACLs are applied to ports. IPv4 and IPv6 entries share a lookup and may be installed in the same feature's reserved banks, though IPv6 entries consume four times as many TCAM entries.

```
access-list ip test
        10 deny any any any
access-list ipv6 v6_acl
```

```
        10 deny any any any
        20 deny any any any
        ...
        5090 deny any any any
        5100 deny any any any
interface 1/1/1
        apply access-list ip test in
interface 1/1/2
        apply access-list ipv6 v6_acl in
```

As a result, this single feature requires two banks to install all configured entries This is displayed in Figure 3, IPv4 and IPv6 ACLs applied to ports

Figure 3 *IPv4 and IPv6 ACLs applied to ports*

In this example, an IP Port ACL feature and a port policy with IPv4, IPv6, and MAC classes are configured.

```
access-list ip test
        10 deny any any any
access-list ipv6 v6_acl
        10 deny any any any
        20 deny any any any
        ...
        5090 deny any any any
        5100 deny any any any
class ip c
        10 match tcp any any count
class ipv6 v6
        10 match any any any count
class mac m
        10 match any any any count
policy p
        10 class ip c action drop
        20 class ipv6 v6 action drop
        30 class mac m action drop
interface 1/1/1
        apply access-list ip test in
interface 1/1/2
        apply access-list ipv6 v6_acl in
interface 1/1/3
        apply policy p in
```

The IP Port ACL feature continues to use two banks and the added port policy requires its own bank, as displayed in Figure 4, IP Port ACL and port policy configuration

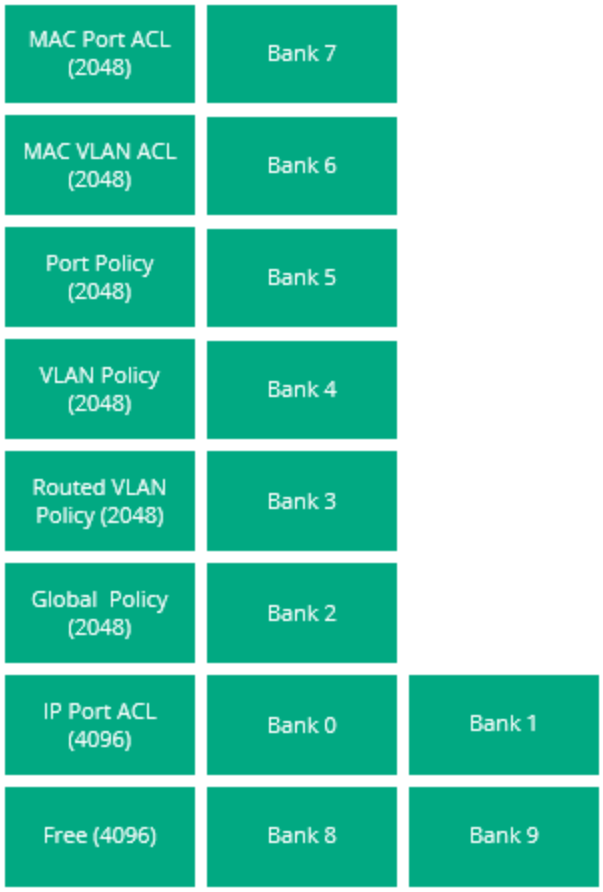
Figure 4 *IP Port ACL and port policy configuration*

The following example demonstrates that it is unlikely for a typical configuration to exhaust the maximum number of features that can be configured.

```
access-list ip test
        10 deny any any any
access-list ipv6 v6_acl
        10 deny any any any
        20 deny any any any
        ...
        5100 deny any any any
        5110 deny any any any
access-list mac m
        10 deny any any any
class ip c
        10 match tcp any any count
class ipv6 v6
        10 match any any any count
class mac m
        10 match any any any count
policy ip
        10 class ip c action drop
        20 class ipv6 v6 action drop
policy p
        10 class ip c action drop
        20 class ipv6 v6 action drop
        30 class mac m action drop
apply policy p in
vlan 1, 100
vlan 200
        apply policy p in
vlan 300
        apply access-list mac m in
interface 1/1/1
        apply access-list ip test in
        apply access-list ipv6 v6_acl in
        apply access-list mac m in
interface 1/1/2
        apply policy p in
interface vlan 100
        apply policy p ip routed-in
```

This adds a configured VLAN Policy on VLAN 200, a routed VLAN policy on interface VLAN 100, and a global policy. Additionally, there is a configured MAC port ACL and a MAC VLAN ACL. These seven features consume eight banks, leaving two free banks that may be used for additional features or to expand the resources available to one of the currently configured features. This is displayed in Figure 5, Eight banks consumed.

Figure 5 *Eight banks consumed*



Matching precedence order

When a packet is matched by multiple TCAM Lookups with the same action, a precedence order is followed.

For example, if a packet matches an IPv6 Policy with an action to change DSCP to AF11 and a MAC policy with an action to change DSCP to AF12, the MAC DSCP action takes precedence and the DSCP of the packet will change to AF12, given that the precedence of a IPv6 Policy is higher than the precedence of a MAC Policy. Count is an exception in that if a packet matches an IPv4 ACL, MAC ACL, and a policy with count actions, all the counters will increment.

A maximum of two Redirect action-capable lookups are available. These lookups will be conserved if possible and not used for policies that do not configure the Redirect action, but the lookups may be consumed if needed to apply a policy without a Redirect action. It is therefore possible to consume the Redirect-capable lookups with non-Redirect policies in a configuration with many policies applied.

Subinterface applications have the same precedence order as VLAN applications.

The precedence order from highest to lowest is as follows:

```
Meter Actions:
Port Access Client Policy
Ingress Routed Port Policy
Port Policy
Routed Ingress VLAN Policy
VLAN Policy
```

```
Ingress Global Policy

QoS Actions:
Port Access Client Policy Remark
Routed Ingress Port Policy Remark
Ingress/Egress Port Policy Remark
Routed Ingress VLAN Policy Remark
Ingress/Egress VLAN Policy Remark
Global Policy Remark
QoS DSCP Map Entry
QoS COS Map Entry
QoS Port Config
MAC Port ACL Logging
IP Port ACL Logging
MAC VLAN ACL Logging
IP VLAN ACL Logging

Redirect actions:
Software Route
Policy L2 Tunnel
PBR Nexthop
Normal Route Table Hit
PBR Default Nexthop
Default Route Table Hit
Port Access Client Policy Captive-portal
```

Policer Action Considerations and Limitations

The policer **exceed remark** DSCP action is supported on the following platforms:

- 6300
- 6400
- 8100
- 8360

Policer **exceed remark** DSCP action cannot be combined with other actions in the same policy entry, but other entries in the policy may use other actions.

For example, this configuration is allowed:

```
switch(config)# policy my_policswitch
(config-policy)# 10 class ip my_class action cir kbps 1000 cbs 15625 exceed dscp
EF
```

But this is not because it adds a secondary action within the same policy entry:

```
switch(config-policy)# 10 class ip my_class action cir kbps 1000 cbs 15625 exceed
dscp EF action mirror 1
Invalid input: action
```

When using the **exceed remark** DSCP action on 6300, 6400, 8100, 8360 Switch series, do not remark the DSCP or ip-precedence values with static remark actions in packets with lookups in the same ingress or egress stage. The hardware has to decide which will take priority given the DSCP or ip-precedence values of the packet and the relative precedence of the features, and the result may not always be as intended.

Packets with a low drop precedence can be remarked before they hit the egress stage with the **exceed remark** DSCP action. For example, an ingress policy could statically remark the traffic with a DSCP value of EF while an egress policy uses the exceed remark DSCP action to remark the packets that exceed the configured rate and burst with a DSCP value of CS1.

The following commands create a configuration for traffic that ingresses 1/1/1 and egresses 1/1/2:

```
policy my_ingress_policy
     10 class ip my_class action dscp EF
interface 1/1/1
     qos dscp 46
     apply policy my_ingress_policy in

policy my_egress_policy
     10 class ip my_class action cir kbps 1000 cbs 15625 exceed dscp CS1
interface 1/1/2
     apply policy my_egress_policy out
```

Packets with a low drop precedence value (green packets) can be remarked using a QoS remark of all traffic on ingress on ports and LAGs.

```
policy my_ingress_policy
     10 class ip my_class action cir kbps 1000 cbs 15625 exceed dscp CS1
interface 1/1/1
     qos dscp 46
     apply policy my_ingress_policy in
```

Packets can be statically remarked by a separate switch before they reach the switch with the **exceed remark** DSCP action.

Switch 1 example configuration:

```
policy my_ingress_policy
     10 class ip my_class action dscp EF
interface 1/1/1
     qos dscp 46
     ! OR
     apply policy my_ingress_policy in
```

Switch 2 example configuration:

```
policy my_ingress_policer_policy
     10 class ip my_class action cir kbps 1000 cbs 15625 exceed dscp CS1
interface 1/1/1
     apply policy my_ingress_policer_policy in
```

Subinterface Application Considerations

For multiple subinterfaces in the same direction, a single policer will be shared for all the subinterfaces on the same line card/stack member and data pipeline, if applicable.

The HPE ANW 8360-48Y6C v2 (JL719C) Switch series, for example, have two data pipelines with physical interfaces split between the two pipelines

Metering and Remarking

When the same policy is applied across multiple ports, each port the policy is applied to contributes traffic to the rate limit. Policers are shared among all ports with the same policy applied as long as they are on the same line card and vrf member.

HPE ANW 8360 Switch series have two data piplines with physical interfaces split between the two that do not share policers.

L4 port ranges

On platforms that support the use of dedicated resources called **L4 Port Ranges**, any ACE that uses **lt**, **gt**, **range**, or port groups attempts to use these dedicated hardware resources. L4 port ranges are used to reduce the number of TCAM entries needed to cover an L4 port range. For example, range `50000 50005` could be covered by a single L4 port range or by two TCAM entries using the following value/masks:

Entry number	L4 port range	Value/Mask
1	range 50000 50003	0xC350/0xFFFC
2	range 50004 50005	0xC354/0xFFFE

The problem gets multiplied when an ACE matches on two L4 port ranges. The TCAM entries used to cover a source and destination L4 port range must cover all possibilities. For example, for this ACE,

```
10 permit tcp any range 100 200 any range 50000 50005
```

The `range 100 200` needs six value masks. As a result, this ACE needs 12 (6*2=12) TCAM entries. However, if the TCAM group uses L4 port ranges then the ACE only needs one TCAM entry that matches on two L4 port ranges.

On the switch series, TCAM entries can share an L4 port range given the following conditions:

- The min and max of the L4 port range are the same
- The L4 port range type (either source or destination L4 ports) is the same
- The TCAM entries are on the same ingress packet processing pipeline

The TCAM entries do not need to be in the same TCAM group.

L4 port ranges are not allocated if the L4 port range can be covered by a single value/mask. For example, **eq 1** and **lt 1024** do not allocate an L4 port range. As a result, the L4 port range allocation can be reduced if the L4 port range is split into multiple ACEs that can each be covered by a single value/mask. For example, the following ACE:

```
10 permit tcp any any range 50000 50005
```

can be split into these two ACEs with L4 port ranges that can each be covered by a single value/mask:

```
10 permit tcp any any range 50000 50003
11 permit tcp any any range 50004 50005
```

Reducing the number of L4 port ranges needed by a config can be desirable if the config requires more L4 port ranges than are available in the hardware and there are available TCAM entries to absorb the additional ACEs.

On the 6200, 6300, 6400, 8100, 8360, 9300, and 9300S switch series, any ACE that uses **lt**, **gt**, **range**, or a port group, may use more than one hardware entry to represent the range of L4 ports. L4 port ranges are not supported on these platforms.

Context group selectors

On the 6200, 6300, 6400, 8100, and 8360 switch series, context group selectors are a limited hardware resource that are required for applying ACLs and Policies. They enable applying an ACL or Policy to multiple instances of the same context, for example ports on a line card and VLANs, without consuming additional resources. There are a limited number of available context group selectors for each context group type:

- Ingress ports
- Ingress VLANs
- Egress Ports
- Egress VLANs

There are a limited number of available context group selectors for each context group (Ingress Ports, Ingress VLANs, Egress Ports, Egress VLANs).

Context group selectors work on a first-come-first-served basis. IP ACLs and Classes require two selectors that are allocated together; one selector for each address family (IPv4 and IPv6). Once all the group selectors for a context group have been used, no new application type of ACL or classifier policy for the context group can be applied. For example, if an existing configuration has a MAC ACL, IP ACL, and classifier policy applied on ingress to ports, a policy cannot be applied to a port in the routed-in direction.

Subinterface applications use the VLAN context group selectors. For example, if one of the Ingress VLAN context group selectors is allocated due to one or more MAC ACLs applied to VLANs on ingress, then the context group selector can be shared with one or more MAC ACLs applied to subinterfaces on ingress.

Context group selector consumption and availability is as follows:

Type	Selectors
Ingress Port MAC ACL	1
Ingress Port IP ACL	2
Ingress Port Policy	1
Ingress Routed Port Policy	1
Available Ingress Port Selectors	4
-	-
Ingress VLAN MAC ACL	1
Ingress VLAN IP ACL	2
Routed-Ingress VLAN IP ACL	2
Ingress VLAN Policy	1
Ingress Routed VLAN Policy	1
Available Ingress VLAN Selectors	4
-	-

Type	Selectors
Egress Port MAC ACL	1
Egress Port IP ACL	2
Egress Port Policy	1
Available Egress Port Selectors	5
-	-
Egress VLAN MAC ACL	1
Egress VLAN IP ACL	2
Routed-Egress VLAN IP ACL	2
Egress VLAN Policy	1
Available Egress VLAN Selectors	5

ACL and Policy hardware resource commands

show resources

`show resources [<SLOT-ID>] [vsx-peer]`

Description

On the HPE Aruba Networking 6300 switch, shows hardware resource consumption for the specified VSF member or for all VSF members. On the HPE Aruba Networking 6400 switch, shows hardware resource consumption for the specified line module or for all line modules. Resource data is updated every 10 seconds.

Hardware resource consumption information is shown for:

- TCAM entries
- TCAM lookups
- Policers

Parameter	Description
<SLOT-ID>	Specifies the VSF member on the 6300 switch and the member and slot of the line module on the 6400 switch. For example, on the 6400 switch, to specify the line module in member 1, slot 2, enter `1/2`.
`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

The widths for show resources can have features combined (IPv4 + IPv6) into one TCAM lookup. Therefore, the table widths for each ACL/classifier policy type are variable depending on what is applied. For example:

```
  "Ingress IP Port ACL" = Ingress v4 Port ACLs + Ingress v6 Port ACLs
                        = 1 TCAM entry + 4 TCAM entries
                        = 5 TCAM entries/  "Ingress IP Port ACL" = Ingress v4 Port
ACLs + Ingress v6 Port ACLs
                        = 1 TCAM entry + 4 TCAM entries
                        = 5 TCAM entriC(v2) /  "Ingress IP Port ACL" = Ingress v4
Port ACLs + Ingress v6 Port ACLs
                        = 1 TCAM entry + 4 TCAM entries
                        = 5 TCAM entries/  "Ingress IP Port ACL" = Ingress v4 Port
ACLs + Ingress v6 Port ACLs
                        = 1 TCAM entry + 4 TCAM entries
                        = 5 TCAM entriC(v2C(v2)/  "Ingress IP Port ACL" = Ingress
v4 Port ACLs + Ingress v6 Port ACLs
                        = 1 TCAM entry + 4 TCAM entries
                        = 5 TCAM entries/  "Ingress IP Port ACL" = Ingress v4 Port
ACLs + Ingress v6 Port ACLs
                        = 1 TCAM entry + 4 TCAM entries
                        = 5 TCAM entriC(v2C(v2) /  "Ingress IP Port ACL" = Ingress
v4 Port ACLs + Ingress v6 Port ACLs
                        = 1 TCAM entry + 4 TCAM entries
                        = 5 TCAM entries/  "Ingress IP Port ACL" = Ingress v4 Port
ACLs + Ingress v6 Port ACLs
                        = 1 TCAM entry + 4 TCAM entries
                        = 5 TCAM entriC(v2) /  "Ingress IP Port ACL" = Ingress v4
Port ACLs + Ingress v6 Port ACLs
                        = 1 TCAM entry + 4 TCAM entries
                        = 5 TCAM entries/  "Ingress IP Port ACL" = Ingress v4 Port
ACLs + Ingress v6 Port ACLs
                        = 1 TCAM entry + 4 TCAM entries
                        = 5 TCAM entriC(v2C(v2)/  "Ingress IP Port ACL" = Ingress
v4 Port ACLs + Ingress v6 Port ACLs
                        = 1 TCAM entry + 4 TCAM entries
                        = 5 TCAM entries/  "Ingress IP Port ACL" = Ingress v4 Port
ACLs + Ingress v6 Port ACLs
                        = 1 TCAM entry + 4 TCAM entries
                        = 5 TCAM entriC(v2C(v2C(v2)/  "Ingress IP Port ACL" =
Ingress v4 Port ACLs + Ingress v6 Port ACLs
                        = 1 TCAM entry + 4 TCAM entries
                        = 5 TCAM entries/  "Ingress IP Port ACL" = Ingress v4 Port
ACLs + Ingress v6 Port ACLs
                        = 1 TCAM entry + 4 TCAM entries
                        = 5 TCAM entriC(v2) /  "Ingress IP Port ACL" = Ingress v4
Port ACLs + Ingress v6 Port ACLs
                        = 1 TCAM entry + 4 TCAM entries
                        = 5 TCAM entries/  "Ingress IP Port ACL" = Ingress v4 Port
ACLs + Ingress v6 Port ACLs
                        = 1 TCAM entry + 4 TCAM entries
                        = 5 TCAM entriC(v2C(v2)/  "Ingress IP Port ACL" = Ingress
v4 Port ACLs + Ingress v6 Port ACLs
                        = 1 TCAM entry + 4 TCAM entries
                        = 5 TCAM entries/  "Ingress IP Port ACL" = Ingress v4 Port
ACLs + Ingress v6 Port ACLs
                        = 1 TCAM entry + 4 TCAM entries
                        = 5 TCAM entriC(v2C(v2C(v2)
```

Widths per feature are as follows:

```
MAC ACL    1
IPv4 ACL   1
IPv6 ACL   4
MAC Class  1
IPv4 Class 2
IPv6 Class 4
```

A MAC Class with an ethertype of "any" has a width of 7 because it uses one TCAM entry each for MAC, IPv4, and IPv6. Specifying the IPv4 (0x0800) or IPv6 (0x86DD) ethertypes in a MAC Class uses a TCAM entry equal to their respective size. IPv4 uses a width of 2 and IPv6 uses a width of 4.

Examples

Showing hardware resource consumption on a 6300 switch:

```
switch# show resources

Resource Usage:

Mod  Description
         Resource                                    Used Reserved    Free
-------------------------------------------------------------------------
1/1  Total
         Ingress TCAM Entries                           0        0   20480
         Egress TCAM Entries                            0        0    8192
         Ingress Lookups                                0               9
         Egress Lookups                                 0               4
         Ingress Policers                               0            2048
         Egress Policers                                0            2048
```

Showing hardware resource consumption for line module 1/1 on a 6300 switch:

```
switch# show resources 1/1

Resource Usage:

Mod  Description
         Resource                          Width    Used Reserved    Free
-------------------------------------------------------------------------
1/1  Total
         Ingress TCAM Entries                           0        0   20480
         Egress TCAM Entries                            0        0    8192
         Ingress Lookups                                0               9
         Egress Lookups                                 0               4
         Ingress Policers                               0            2048
         Egress Policers                                0            2048
```

Showing hardware resource consumption for all line modules on a 6400 switch:

```
switch# show resources

Resource Usage:

Mod  Description
         Resource                                    Used Reserved    Free
```

```
--------------------------------------------------------------------------------
1/3  Total
         Ingress TCAM Entries                          0         0   20480
         Egress TCAM Entries                           0         0    8192
           Ingress Lookups                               0                 9
         Egress Lookups                                0                 4
         Ingress Policers                              0              2048
         Egress Policers                               0              2048
1/5  Total
         Ingress TCAM Entries                          0         0   20480
         Egress TCAM Entries                           0         0    8192
         Ingress Lookups                               0                 9
         Egress Lookups                                0                 4
         Ingress Policers                              0              2048
         Egress Policers                               0              2048
```

Showing hardware resource consumption for line module 1/3 on a 6400 switch:

```
switch# show resources 1/3

Resource Usage:

Mod  Description
         Resource                                  Used Reserved    Free
--------------------------------------------------------------------------------
1/3  Total
         Ingress TCAM Entries                          0         0   20480
         Egress TCAM Entries                           0         0    8192
           Ingress Lookups                               0                 9
         Egress Lookups                                0                 4
         Ingress Policers                              0              2048
         Egress Policers                               0              2048
```

Command History

Release	Modification
10.07 or earlier	--

Command Information

Platforms	Command context	Authority
6300 6400	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 resources

```
show resources [vsx-peer]
```

Description

On the HPE Aruba Networking 8100 and 8360 Switch Series, shows hardware resource consumption on the switch. Resource data is updated every 10 seconds.

Hardware resource consumption information is shown for:

- TCAM entries
- Policers
- L4 Port Ranges

Parameter	Description
`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

The widths for show resources can have features combined (IPv4 + IPv6) into one TCAM lookup. Therefore, the table widths for each ACL/classifier policy type are variable depending on what is applied. For example:

```
  "Ingress IP Port ACL" = Ingress v4 Port ACLs + Ingress v6 Port ACLs
                        = 1 TCAM entry + 4 TCAM entries
                        = 5 TCAM entries
```

Widths per feature are as follows:

```
MAC ACL    1
IPv4 ACL   1
IPv6 ACL   4
MAC Class  1
IPv4 Class 2
IPv6 Class 4
```

A MAC Class with an ethertype of "any" has a width of 7 because it uses one TCAM entry each for MAC, IPv4, and IPv6. Specifying the IPv4 (0x0800) or IPv6 (0x86DD) ethertypes in a MAC Class uses a TCAM entry equal to their respective size. IPv4 uses a width of 2 and IPv6 uses a width of 4.

Example

Showing hardware resource consumption:

```
switch# show resources

Resource Usage:

Mod  Description
         Resource                                      Used Reserved    Free
-------------------------------------------------------------------------------
1/1  Ingress IP Port ACL Lookup
         Ingress TCAM Entries                            20        0    5093
     Total
         Ingress Lookups                                  1        0       4
         Egress Lookups                                   0        0       4
```

Command History

Release	Modification
10.07 or earlier	--

Command Information

Platforms	Command context	Authority
8100 8360	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.

Chapter 7
Support and Other Resources

Accessing HPE Aruba Networking Support

HPE Aruba Networking Support Services	https://www.hpe.com/us/en/networking/hpe-aruba-networking-support-services.html
AOS-CX Switch Software Documentation Portal	https://arubanetworking.hpe.com/techdocs/AOS-CX/help_portal/Content/home.htm
HPE Aruba Networking Support Portal	https://networkingsupport.hpe.com/home
North America telephone	1-800-943-4526 (US & Canada Toll-Free Number) +1-650-750-0350 (Backup—Toll Number)
International telephone	https://www.hpe.com/psnow/doc/a50011948enw

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:

HPE Aruba Networking Developer Hub	https://developer.arubanetworks.com/hpe-aruba-networking-aoscx/docs/about
Airheads social forums and Knowledge Base	https://community.arubanetworks.com/
AOS-CX Software Technical Update channel on YouTube.	Videos on new features introduced in this release: https://www.youtube.com/playlist?list=PLsYGHuNuBZcbWPEjjHuVMqP-Q_UL3CskS

HPE Aruba Networking Hardware Documentation and Translations Portal	https://arubanetworking.hpe.com/techdocs/hardware/DocumentationPortal/Content/home.htm
HPE Aruba Networking software	https://networkingsupport.hpe.com/downloads
Software licensing and Feature Packs	https://licensemanagement.hpe.com/
End-of-Life information	https://networkingsupport.hpe.com/end-of-life

Accessing Updates

You can access updates from the HPE Aruba Networking Support Portal at https://networkingsupport.hpe.com.

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://networkingsupport.hpe./notifications/subscriptions (requires an active HPE Aruba Networking Support Portal account to manage subscriptions). Security notices are viewable without an HPE Aruba Networking Support Portal 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

HPE Aruba Networking 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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(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.