



## IPv6 Access Control Lists

Access lists determine what traffic is blocked and what traffic is forwarded at device interfaces and allow filtering of traffic based on source and destination addresses, and inbound and outbound traffic to a specific interface. Standard IPv6 ACL functionality was extended to support traffic filtering based on IPv6 option headers and optional, upper-layer protocol type information for finer granularity of control. Standard IPv6 ACL functionality was extended to support traffic filtering based on IPv6 option headers and optional, upper-layer protocol type information for finer granularity of control.

This module describes how to configure IPv6 traffic filtering and to control access to virtual terminal lines.

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### Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see [Bug Search Tool](#) and the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the feature information table.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to [www.cisco.com/go/cfn](http://www.cisco.com/go/cfn). An account on Cisco.com is not required.

### Information About IPv6 Access Control Lists

#### Access Control Lists for IPv6 Traffic Filtering

The standard ACL functionality in IPv6 is similar to standard ACLs in IPv4. Access lists determine what traffic is blocked and what traffic is forwarded at device interfaces and allow filtering based on source and destination addresses, inbound and outbound to a specific interface. Each access list has an implicit deny statement at the end. IPv6 ACLs are defined and their deny and permit conditions are set using the **ipv6 access-list** command with the **deny** and **permit** keywords in global configuration mode.

IPv6 extended ACLs augments standard IPv6 ACL functionality to support traffic filtering based on IPv6 option headers and optional, upper-layer protocol type information for finer granularity of control (functionality similar to extended ACLs in IPv4).

## IPv6 Packet Inspection

The following header fields are used for IPv6 inspection: traffic class, flow label, payload length, next header, hop limit, and source or destination IP address. For further information on and descriptions of the IPv6 header fields, see RFC 2474.

## Access Class Filtering in IPv6

Filtering incoming and outgoing connections to and from the device based on an IPv6 ACL is performed using the **ipv6 access-class** command in line configuration mode. The **ipv6 access-class** command is similar to the **access-class** command, except the IPv6 ACLs are defined by a name. If the IPv6 ACL is applied to inbound traffic, the source address in the ACL is matched against the incoming connection source address and the destination address in the ACL is matched against the local device address on the interface. If the IPv6 ACL is applied to outbound traffic, the source address in the ACL is matched against the local device address on the interface and the destination address in the ACL is matched against the outgoing connection source address. We recommend that identical restrictions are set on all the virtual terminal lines because a user can attempt to connect to any of them.

## Restrictions for IPv6 Access Control Lists

- IPv4 / IPv6 ACL is supported only at the access Layer 3 or bridge domain interfaces. It is not supported on the MPLS enabled core interfaces.
- IPv6 ACL is *not* supported on port-channel member link.
- IPv4 or IPv6 is *not* supported on label interface.
- MAC ACL supports only non-IP packets.
- MAC ACL counters are *not* supported.
- MAC ACL is *not* supported on trunk EFP or port channel EFP.
- TCAMS are programmed for ACL configured on both physical interface and BDI.
- A total of 512 unique and combination of IPv4 and IPv6 ACLs can be configured.
- Filtering based on extension header types is *not* supported except for filtering based on fragmentation.
- Filtering based on IPv6 Protocols and L4 ports will *not* work for IPv6 traffic carrying extension headers.
- Filtering based on TCP Control Flags is *not* supported.
- Egress IPv6 ACL is *not* supported.
- All NDP packets (ICMPv6 type 133-137) are allowed by default.
- IPv6 ACL is *not* supported on Link Local Addresses (LL).




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**Note** IPv6 packets with LL address as SA is permitted by default.

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- Per ACE counters are *not* supported.
- Re-sequencing of ACE's for an IPv6 ACL is *not* supported.
- Starting Cisco IOS XE Release 3.18SP, IPv6 ACLs are supported on the RSP3 module.
- Although the hardware is not programmed for TCAM exhaustion, ACL stats get incremented for control packets on the interface.

## How to Configure IPv6 Access Control Lists

### Configuring IPv6 Traffic Filtering

#### Creating and Configuring an IPv6 ACL for Traffic Filtering




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**Note** IPv6 ACLs on the Cisco ASR 1000 platform do not contain implicit permit rules. The IPv6 neighbor discovery process uses the IPv6 network-layer service; therefore, to enable IPv6 neighbor discovery, you must add IPv6 ACLs to allow IPv6 neighbor discovery packets to be sent and received on an interface. In IPv4, the Address Resolution Protocol (ARP), which is equivalent to the IPv6 neighbor discovery process, uses a separate data-link-layer protocol; therefore, by default IPv4 ACLs implicitly allow ARP packets to be sent and received on an interface.

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#### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b> <b>Example:</b> Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>configure terminal</b> <b>Example:</b> Device# configure terminal	Enters global configuration mode.
<b>Step 3</b>	<b>ipv6 access-list <i>access-list-name</i></b> <b>Example:</b> Device(config)# ipv6 access-list inbound	Defines an IPv6 ACL, and enters IPv6 access list configuration mode. <ul style="list-style-type: none"> <li>• The <i>access-list name</i> argument specifies the name of the IPv6 ACL. IPv6 ACL</li> </ul>

	Command or Action	Purpose
		names cannot contain a space or quotation mark, or begin with a numeral.
<b>Step 4</b>	<p>Do one of the following:</p> <ul style="list-style-type: none"> <li>• <b>permit protocol</b>  <code>{source-ipv6-prefix/prefix-length   any   host source-ipv6-address} [operator [port-number]] {destination-ipv6-prefix / prefix-length   any   host destination-ipv6-address} [operator [port-number]] [dest-option-type [doh-number   doh-type]] [dscp value] [flow-label value] [fragments] [log] [log-input] [mobility] [mobility-type [mh-number   mh-type]] [routing] [routing-type routing-number] [sequence value] [time-range name]</code></li> <li>• <b>deny protocol</b>  <code>{source-ipv6-prefix/prefix-length   any   host source-ipv6-address} [operator port-number]] {destination-ipv6-prefix/prefix-length   any   host destination-ipv6-address} [operator [port-number]] [dest-option-type [doh-number   doh-type]] [dscp value] [flow-label value] [fragments] [log] [log-input] [mobility] [mobility-type [mh-number   mh-type]] [routing] [routing-type routing-number] [sequence value] [time-range name] [undetermined-transport]</code></li> </ul> <p><b>Example:</b></p> <pre>Device(config-ipv6-acl)# permit tcp 2001:DB8:0300:0201::/32 eq telnet any</pre> <p><b>Example:</b></p> <pre>Device(config-ipv6-acl)# deny tcp host 2001:DB8:1::1 any log-input</pre>	Specifies permit or deny conditions for an IPv6 ACL.

## Applying the IPv6 ACL to an Interface

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<code>enable</code>	Enables privileged EXEC mode.

	Command or Action	Purpose
	<b>Example:</b> Device> enable	<ul style="list-style-type: none"> <li>Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>configure terminal</b> <b>Example:</b> Device# configure terminal	Enters global configuration mode.
<b>Step 3</b>	<b>interface <i>type number</i></b> <b>Example:</b> Device(config)# interface gigabitethernet 0/0/0	Specifies the interface type and number, and enters interface configuration mode.
<b>Step 4</b>	<b>ipv6 traffic-filter <i>access-list-name</i> {in out}</b> <b>Example:</b> Device(config-if)# ipv6 traffic-filter inbound in	Applies the specified IPv6 access list to the interface specified in the previous step.

## Controlling Access to a vty

### Creating an IPv6 ACL to Provide Access Class Filtering

#### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b> <b>Example:</b> Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>configure terminal</b> <b>Example:</b> Device# configure terminal	Enters global configuration mode.
<b>Step 3</b>	<b>ipv6 access-list <i>access-list-name</i></b> <b>Example:</b> Device(config)# ipv6 access-list cisco	Defines an IPv6 ACL, and enters IPv6 access list configuration mode.
<b>Step 4</b>	Do one of the following: <ul style="list-style-type: none"> <li><b>permit protocol</b>                {<i>source-ipv6-prefix/prefix-length</i>   any  </li> </ul>	Specifies permit or deny conditions for an IPv6 ACL.

	Command or Action	Purpose
	<p><b>host</b> <i>source-ipv6-address</i> [<i>operator</i> [<i>port-number</i>]] {<i>destination-ipv6-prefix / prefix-length</i>   <b>any</b>   <b>host</b> <i>destination-ipv6-address</i> [<i>operator</i> [<i>port-number</i>]]} [<b>dest-option-type</b> [<i>doh-number</i>   <i>doh-type</i>]] [<b>dscp</b> <i>value</i>] [<b>flow-label</b> <i>value</i>] [<b>fragments</b>] [<b>log</b>] [<b>log-input</b>] [<b>mobility</b>] [<b>mobility-type</b> [<i>mh-number</i>   <i>mh-type</i>]] [<b>routing</b>] [<b>routing-type</b> <i>routing-number</i>] [<b>sequence</b> <i>value</i>] [<b>time-range</b> <i>name</i>]</p> <ul style="list-style-type: none"> <li>• <b>deny</b> <i>protocol</i> {<i>source-ipv6-prefix/prefix-length</i>   <b>any</b>   <b>host</b> <i>source-ipv6-address</i> [<i>operator</i> [<i>port-number</i>]]} {<i>destination-ipv6-prefix/prefix-length</i>   <b>any</b>   <b>host</b> <i>destination-ipv6-address</i> [<i>operator</i> [<i>port-number</i>]]} [<b>dest-option-type</b> [<i>doh-number</i>   <i>doh-type</i>]] [<b>dscp</b> <i>value</i>] [<b>flow-label</b> <i>value</i>] [<b>fragments</b>] [<b>log</b>] [<b>log-input</b>] [<b>mobility</b>] [<b>mobility-type</b> [<i>mh-number</i>   <i>mh-type</i>]] [<b>routing</b>] [<b>routing-type</b> <i>routing-number</i>] [<b>sequence</b> <i>value</i>] [<b>time-range</b> <i>name</i>] [<b>undetermined-transport</b>]</li> </ul> <p><b>Example:</b></p> <pre>Device(config-ipv6-acl)# permit ipv6 host 2001:DB8:0:4::32 any</pre> <p><b>Example:</b></p> <pre>Device(config-ipv6-acl)# deny ipv6 host 2001:DB8:0:6::6 any</pre>	

## Applying an IPv6 ACL to the Virtual Terminal Line

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<p><b>enable</b></p> <p><b>Example:</b></p> <pre>Device&gt; enable</pre>	<p>Enables privileged EXEC mode.</p> <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<p><b>configure terminal</b></p> <p><b>Example:</b></p>	<p>Enters global configuration mode.</p>

	Command or Action	Purpose
	Device# <code>configure terminal</code>	
<b>Step 3</b>	<b>line</b> [ <b>aux</b>   <b>console</b>   <b>tty</b>   <b>vtty</b> ] <i>line-number</i> [ <i>ending-line-number</i> ]  <b>Example:</b>  Device(config)# <code>line vty 0 4</code>	Identifies a specific line for configuration and enters line configuration mode. <ul style="list-style-type: none"> <li>In this example, the <b>vtty</b> keyword is used to specify the virtual terminal lines for remote console access.</li> </ul>
<b>Step 4</b>	<b>ipv6 access-class</b> <i>ipv6-access-list-name</i> { <b>in</b>   <b>out</b> }  <b>Example:</b>  Device(config-line)# <code>ipv6 access-class cisco in</code>	Filters incoming and outgoing connections to and from the device based on an IPv6 ACL.

## Configuration Examples for IPv6 Access Control Lists

### Example: Verifying IPv6 ACL Configuration

In this example, the `show ipv6 access-list` command is used to verify that IPv6 ACLs are configured correctly:

```
Device> show ipv6 access-list

IPv6 access list inbound
  permit tcp any any eq bgp (8 matches) sequence 10
  permit tcp any any eq telnet (15 matches) sequence 20
  permit udp any any sequence 30

IPv6 access list Virtual-Access2.1#427819008151 (per-user)
  permit tcp host 2001:DB8:1::32 eq bgp host 2001:DB8:2::32 eq 11000 sequence 1
  permit tcp host 2001:DB8:1::32 eq telnet host 2001:DB8:2::32 eq 11001 sequence 2
```

### Example: Creating and Applying an IPv6 ACL

The following example shows how to restrict HTTP access to certain hours during the day and log any activity outside of the permitted hours:

```
Device# configure terminal
Device(config)# time-range lunchtime
Device(config-time-range)# periodic weekdays 12:00 to 13:00
Device(config-time-range)# exit
Device(config)# ipv6 access-list INBOUND
Device(config-ipv6-acl)# permit tcp any any eq www time-range lunchtime
Device(config-ipv6-acl)# deny tcp any any eq www log-input
Device(config-ipv6-acl)# permit tcp 2001:DB8::/32 any
```

**Example: Controlling Access to a vty**

```
Device(config-ipv6-acl)# permit udp 2001:DB8::/32 any
Device(config-ipv6-acl)# end
```

**Example: Controlling Access to a vty**

In the following example, incoming connections to the virtual terminal lines 0 to 4 are filtered based on the IPv6 access list named `acl1`:

```
ipv6 access-list acl1
 permit ipv6 host 2001:DB8:0:4::2/32 any
!
line vty 0 4
 ipv6 access-class acl1 in
```

**Additional References****Related Documents**

Related Topic	Document Title
Cisco IOS commands	<a href="#">Cisco IOS Master Command List, All Releases</a>
IP access list commands	<i>Cisco IOS Security Command Reference</i>
Configuring IP access lists	“Creating an IP Access List and Applying It to an Interface”

**Technical Assistance**

Description	Link
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