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.

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. 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).

How to Configure IPv6 Access Control Lists

Configuring IPv6 Traffic Filtering

Creating and Configuring an IPv6 ACL for Traffic Filtering

This section describes how to configure your networking devices to filter traffic, function as a firewall, or detect potential viruses.

Before You Begin

Note

- Each IPv6 ACL contains implicit permit rules to enable IPv6 neighbor discovery. These rules can be overridden by the user by placing a deny ipv6 any any statement within an ACL. The IPv6 neighbor discovery process makes use of the IPv6 network layer service; therefore, by default, IPv6 ACLs implicitly 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, makes use of a separate data link layer protocol; therefore, by default, IPv4 ACLs implicitly allow ARP packets to be sent and received on an interface.
- Time-based and reflexive ACLs are not supported for IPv4 or IPv6 on the Cisco 12000 series platform. The **reflect**, **timeout**, and **time-range** keywords of the **permit** command in IPv6 are excluded on the Cisco 12000 series.

>

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ipv6 access-list** *access-list-name*
4. Do one of the following:
   - **permit protocol** {*source-ipv6-prefix* / *prefix-length* | **any** | **host** *source-ipv6-address* | **auth**} [*operator* [*port-number*]] {*destination-ipv6-prefix* / *prefix-length*| **any** | **host** *destination-ipv6-address*| **auth**} [*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*]] [**reflect** *name* [**timeout** *value*]] [**routing**] [**routing-type** *routing-number*] [**sequence** *value*] [**time-range** *name*]
   -
   -
   - **deny** *protocol* {*source-ipv6-prefix* / *prefix-length* | **any** | **host** *source-ipv6-address* | **auth**} [*operator port-number*]] {*destination-ipv6-prefix/prefix-length* | **any** | **host** *destination-ipv6-address* | **auth**} [*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**]

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**ipv6 access-list** *access-list-name* **Example:** `Router(config)# ipv6 access-list outbound`	Defines an IPv6 ACL, and enters IPv6 access list configuration mode. • The *access-list name* argument specifies the name of the IPv6 ACL. IPv6 ACL names cannot contain a space or quotation mark, or begin with a numeral.
Step 4	Do one of the following: • **permit protocol** {*source-ipv6-prefix* / *prefix-length*	**any**	**host** *source-ipv6-address*	**auth**} [*operator* [*port-number*]]	Specifies permit or deny conditions for an IPv6 ACL.

	Command or Action	Purpose
	{*destination-ipv6-prefix* / *prefix-length*| **any**	**host** *destination-ipv6-address*| **auth**} [*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*]] [**reflect** *name* [**timeout** *value*]] [**routing**] [**routing-type** *routing-number*] [**sequence** *value*] [**time-range** *name*] • • • **deny** *protocol* {*source-ipv6-prefix* / *prefix-length*	**any**	**host** *source-ipv6-address*	**auth**} [*operator port-number*]] {*destination-ipv6-prefix/prefix-length*	**any**	**host** *destination-ipv6-address*	**auth**} [*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**] **Example:** `Router(config-ipv6-acl)# permit tcp 2001:DB8:0300:0201::/32 eq telnet any reflect reflectout` **Example:** **Example:** **Example:** `Router(config-ipv6-acl)# deny tcp host 2001:DB8:1::1 any log-input`	

Applying the IPv6 ACL to an Interface

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *type number*
4. **ipv6 traffic-filter** *access-list-name* {**in**| **out**}

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**interface** *type number* **Example:** `Router(config)# interface ethernet 0`	Specifies the interface type and number, and enters interface configuration mode.
Step 4	**ipv6 traffic-filter** *access-list-name* {**in**| **out**} **Example:** `Router(config-if)# ipv6 traffic-filter outbound out`	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

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ipv6 access-list** *access-list-name*
4. Do one of the following:
   - **permit protocol** {*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*
   - **deny** *protocol* {*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**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**ipv6 access-list** *access-list-name* **Example:** `Device(config)# ipv6 access-list cisco`	Defines an IPv6 ACL, and enters IPv6 access list configuration mode.

	Command or Action	Purpose

Step 4	Do one of the following:
	• **permit protocol** {*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*
	• **deny** *protocol* {*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**
	Example:
	`Device(config-ipv6-acl)# permit ipv6 host 2001:DB8:0:4::32 any`
	Example:
	`Device(config-ipv6-acl)# deny ipv6 host 2001:DB8:0:6::6 any`
		Specifies permit or deny conditions for an IPv6 ACL.

Applying an IPv6 ACL to the Virtual Terminal Line

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **line** [**aux**| **console**| **tty**| **vty**] *line-number*[*ending-line-number*]
4. **ipv6 access-class** *ipv6-access-list-name* {**in**| **out**}

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable**	Enables privileged EXEC mode.

	Command or Action	Purpose
	Example: `Device> enable`	• Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**line** [**aux**| **console**| **tty**| **vty**] *line-number*[*ending-line-number*] **Example:** `Device(config)# line vty 0 4`	Identifies a specific line for configuration and enters line configuration mode. • In this example, the **vty** keyword is used to specify the virtual terminal lines for remote console access.
Step 4	**ipv6 access-class** *ipv6-access-list-name* {**in**| **out**} **Example:** `Device(config-line)# ipv6 access-class cisco in`	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
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
IPv6 addressing and connectivity	*IPv6 Configuration Guide*
Cisco IOS commands	Cisco IOS Master Commands List, All Releases
IPv6 commands	*Cisco IOS IPv6 Command Reference*
Cisco IOS IPv6 features	Cisco IOS IPv6 Feature Mapping

Standards and RFCs

Standard/RFC	Title
RFCs for IPv6	*IPv6 RFCs*

MIBs

MIB	MIBs Link
CISCO-UNIFIED-FIREWALL-MIB	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

Technical Assistance

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	http://www.cisco.com/cisco/web/support/index.html

Feature Information for IPv6 Access Control Lists

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

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. An account on Cisco.com is not required.

Table 1: Feature Information for IPv6 Access Control Lists

Feature Name	Releases	Feature Information
IPv6 Services: Standard Access Control Lists	12.0(22)S 12.2(14)S 12.2(28)SB 12.2(25)SG 12.2(33)SRA 12.2(17a)SX1 12.2(2)T 12.3 12.3(2)T 12.4 12.4(2)T 15.0(1)S	Access lists determine what traffic is blocked and what traffic is forwarded at router interfaces and allow filtering based on source and destination addresses, inbound and outbound to a specific interface.
IPv6 Services: Extended Access Control Lists	12.0(23)S 12.2(14)S 12.2(28)SB 12.2(25)SG 12.2(33)SRA 12.2(17a)SX1 12.2(13)T 12.3 12.3(2)T 12.4 12.4(2)T 15.0(1)S 15.4(3)S	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.