



Configuring ACL

CHAPTERS

1. Overview
2. ACL Configuration
3. Configuration Example for ACL
4. Appendix: Default Parameters



This guide applies to:

T1500G-10PS v2 or above, T1500G-8T v2 or above, T1500G-10MPS v2 or above, T1500-28PCT v3 or above, T1600G-52TS v3 or above, T1600G-52PS v3 or above, T1600G-28PS v3 or above, T1600G-28TS v3 or above, T1600G-18TS v2 or above, T2600G-52TS v3 or above, T2600G-28TS v3 or above, T2600G-28MPS v3 or above, T2600G-28SQ v1 or above.

1 Overview

ACL (Access Control List) filters traffic as it passes through a switch, and permits or denies packets crossing specified interfaces or VLANs. It accurately identifies and processes the packets based on the ACL rules. In this way, ACL helps to limit network traffic, manage network access behaviors, forward packets to specified ports and more.

To configure ACL, follow these steps:

- 1) Configure a time range during which the ACL is in effect.
- 2) Create an ACL and configure the rules to filter different packets.
- 3) Bind the ACL to a port or VLAN to make it effective.

Configuration Guidelines

- A packet "matches" an ACL rule when it meets the rule's matching criteria. The resulting action will be either to "permit" or "deny" the packet that matches the rule.
- If no ACL rule is configured, the packets will be forwarded without being processed by the ACL. If there is configured ACL rules and no matching rule is found, the packets will be dropped.

2 ACL Configuration

2.1 Using the GUI

2.1.1 Configuring Time Range

Some ACL-based services or features may need to be limited to take effect only during a specified time period. In this case, you can configure a time range for the ACL. For details about Time Range configuration, please refer to *Managing System*.

2.1.2 Creating an ACL

You can create different types of ACL and define the rules based on source MAC or IP address, destination MAC or IP address, protocol type, port number and so on.

MAC ACL: MAC ACL uses source and destination MAC address for matching operations.

IP ACL: IP ACL uses source and destination IP address, IP protocols and so on for matching operations.

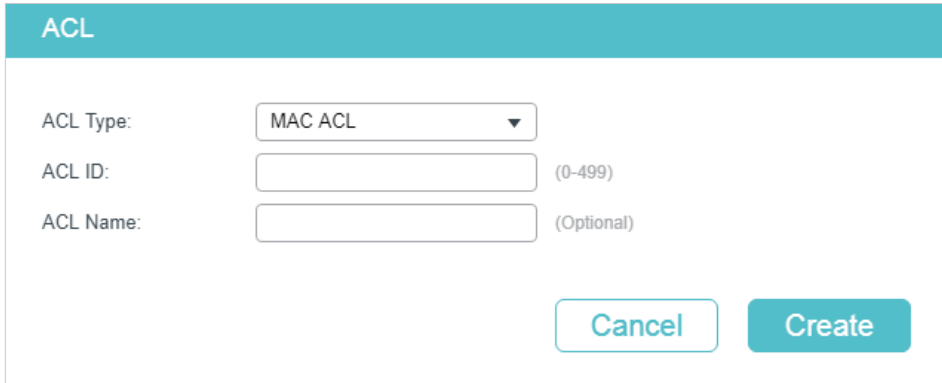
Combined ACL: Combined ACL uses source and destination MAC address, and source and destination IP address for matching operations.

IPv6 ACL: IPv6 ACL uses source and destination IPv6 address for matching operations.

Packet Content ACL: Packet Content ACL analyzes and processes data packets based on 4 chunk match conditions, each chunk can specify a user-defined 4-byte segment carried in the packet's first 128 bytes. Only T2600G series support this feature.

Choose the menu **SECURITY > ACL > ACL Config** and click **+ Add** to load the following page.

Figure 2-1 Creating an ACL



ACL

ACL Type:

ACL ID: (0-499)

ACL Name: (Optional)

Follow these steps to create an ACL:

- 1) Choose one ACL type and enter a number to identify the ACL.

- 2) (Optional) Assign a name to the ACL.
- 3) Click **Create**.

 **Note:**

The supported ACL type and ID range varies on different switch models. Please refer to the on-screen information.

2.1.3 Configuring ACL Rules

The created ACL will be displayed on the **SECURITY > ACL > ACL Config** page.

Figure 2-2 Editing ACL

ACL Config					
<input type="checkbox"/>	ACL Type	ACL ID	ACL Name	Rules	Operation
<input type="checkbox"/>	IP ACL	500	ACL1	None	Edit ACL
Total: 1					





Click **Edit ACL** in the **Operation** column. Then you can configure rules for this ACL.

The following sections introduce how to configure MAC ACL, IP ACL, Combined ACL, IPv6 ACL and Packet Content ACL.

Configuring MAC ACL Rule

Click **Edit ACL** for a MAC ACL entry to load the following page.

Figure 2-3 Configuring the MAC ACL Rule

ACL Details									
ACL Type:	MAC ACL								
ACL ID:	1								
ACL Name:	ACL2								
ACL Rules Table									
 Resequence							 Add	 Delete	 Refresh
<input type="checkbox"/>	ID	Rule ID	S-MAC	D-MAC	Action	Total Matched Counter	Operation		
No entries in this table.									
Total: 0									

In **ACL Rules Table** section, click  **Add** and the following page will appear.

Figure 2-4 Configuring the MAC ACL Rule

MAC ACL Rule

ACL ID: 1

ACL Name: ACL2

Rule ID: Auto Assign

Operation: Permit ▼

S-MAC: (Format: FF-FF-FF-FF-FF-FF)

Mask: (Format: FF-FF-FF-FF-FF-FF)

D-MAC: (Format: FF-FF-FF-FF-FF-FF)

Mask: (Format: FF-FF-FF-FF-FF-FF)

VLAN ID: (1-4094)

EtherType: (4-hex number)

User Priority: Default ▼

Time Range: ▼ (Optional)

Logging: Disable ▼

Policy

Mirroring

Redirect

Rate Limit

QoS Remark

Discard
Apply

Follow these steps to configure the MAC ACL rule:

1) In the **MAC ACL Rule** section, configure the following parameters:

Rule ID	<p>Enter an ID number to identify the rule.</p> <p>It should not be the same as any current rule ID in the same ACL. If you select Auto Assign, the rule ID will be assigned automatically and the interval between rule IDs is 5.</p>
Operation	<p>Select an action to be taken when a packet matches the rule.</p> <p>Permit: To forward the matched packets.</p> <p>Deny: To discard the matched packets.</p>
S-MAC/Mask	<p>Enter the source MAC address with a mask. A value of 1 in the mask indicates that the corresponding bit in the address will be matched.</p>
D-MAC/Mask	<p>Enter the destination MAC address with a mask. A value of 1 in the mask indicates that the corresponding bit in the address will be matched.</p>
VLAN ID	<p>Enter the ID number of the VLAN to which the ACL will apply.</p>

EtherType	Specify the EtherType to be matched using 4 hexadecimal numbers.
User Priority	Specify the User Priority to be matched.
Time Range	Select a time range during which the rule will take effect. The default value is No Limit, which means the rule is always in effect. The Time Range referenced here can be created on the SYSTEM > Time Range page.
Logging	Enable Logging function for the ACL rule. Then the times that the rule is matched will be logged every 5 minutes and a related trap will be generated. You can refer to Total Matched Counter in the ACL Rules Table to view the matching times.

- In the **Policy** section, enable or disable the Mirroring feature for the matched packets. With this option enabled, choose a destination port to which the packets will be mirrored.

Figure 2-5 Configuring Mirroring

- In the **Policy** section, enable or disable the Redirect feature for the matched packets. With this option enabled, choose a destination port to which the packets will be redirected.

Figure 2-6 Configuring Redirect

Note:

In the Mirroring feature, the matched packets will be copied to the destination port and the original forwarding will not be affected. While in the Redirect feature, the matched packets will be forwarded only on the destination port.

- In the **Policy** section, enable or disable the Rate Limit feature for the matched packets. With this option enabled, configure the related parameters.

Figure 2-7 Configuring Rate Limit

Rate Limit

Rate: Kbps (1-10000000)

Burst Size: KB (1-128)

Out of Band:

Rate	Specify the transmission rate for the matched packets.
Burst Size	Specify the maximum number of bytes allowed in one second.
Out of Band	Select the action for the packets whose rate is beyond the specified rate.

None: The packets will be forwarded normally.

Drop: The packets will be discarded.

Remark DSCP: You can specify a DSCP value, and the DSCP field of the packets will be changed to the specified one. T1500 series, T1600G-18TS, T1600G-28TS and T1600G-28PS do not support this option.

- 5) In the **Policy** section, enable or disable the QoS Remark feature for the matched packets. With this option enabled, configure the related parameters, and the remarked values will take effect in the QoS processing on the switch.

Figure 2-8 Configuring QoS Remark

QoS Remark

DSCP:

Local Priority:

802.1p Priority:

DSCP	Specify the DSCP field for the matched packets. The DSCP field of the packets will be changed to the specified one.
Local Priority	Specify the local priority for the matched packets. The local priority of the packets will be changed to the specified one.
802.1p Priority	Specify the 802.1p priority for the matched packets. The 802.1p priority of the packets will be changed to the specified one.

- 6) Click **Apply**.

Configuring IP ACL Rule

Click **Edit ACL** for an IP ACL entry to load the following page.

Figure 2-9 Configuring the IP ACL Rule

ACL Details

ACL Type: IP ACL
 ACL ID: 500
 ACL Name: ACL1

ACL Rules Table

Resequenece

 Add
 Delete
 Refresh

<input type="checkbox"/>	ID	Rule ID	S-IP	D-IP	IP Protocol	Action	Total Matched Counter	Operation
No entries in this table.								
Total: 0								

In **ACL Rules Table** section, click Add and the following page will appear.

Figure 2-10 Configuring the IP ACL Rule

IP ACL Rule

ACL ID: 500
 ACL Name: ACL1
 Rule ID: Auto Assign
 Operation: Permit ▼
 Fragment: Enable

S-IP: (Format: 192.168.0.1)
 Mask: (Format: 255.255.255.0)
 D-IP: (Format: 192.168.0.1)
 Mask: (Format: 255.255.255.0)

IP Protocol: No Limit ▼
 DSCP: No Limit ▼
 IP ToS: (Optional, 0-15)
 IP Pre: (Optional, 0-7)
 Time Range: ▼ (Optional)
 Logging: Disable ▼

Policy

Mirroring
 Redirect
 Rate Limit
 QoS Remark

Discard
Apply

Follow these steps to configure the IP ACL rule:

1) In the **IP ACL Rule** section, configure the following parameters:

Rule ID	<p>Enter an ID number to identify the rule.</p> <p>It should not be the same as any current rule ID in the same ACL. If you select Auto Assign, the rule ID will be assigned automatically and the interval between rule IDs is 5.</p>
Operation	<p>Select an action to be taken when a packet matches the rule.</p> <p>Permit: To forward the matched packets.</p> <p>Deny: To discard the matched packets.</p>
Fragment	<p>With this option selected, the rule will be applied to all fragment packets except for the last fragment packet in the fragment packet group.</p> <p>T1500 series, T1600G-18TS, T1600G-28TS and T1600G-28PS do not support this option.</p>
S-IP/Mask	<p>Enter the source IP address with a mask. A value of 1 in the mask indicates that the corresponding bit in the address will be matched.</p>
D-IP/Mask	<p>Enter the destination IP address with a mask. A value of 1 in the mask indicates that the corresponding bit in the address will be matched.</p>
IP Protocol	<p>Select a protocol type from the drop-down list. The default is No Limit, which indicates that packets of all protocols will be matched. You can also select User-defined to customize the IP protocol.</p>
TCP Flag	<p>If TCP protocol is selected, you can configure the TCP Flag to be used for the rule's matching operations. There are six flags and each has three options, which are *, 0 and 1. The default is *, which indicates that the flag is not used for matching operations.</p> <p>URG: Urgent flag.</p> <p>ACK: Acknowledge flag.</p> <p>PSH: Push flag.</p> <p>RST: Reset flag.</p> <p>SYN: Synchronize flag.</p> <p>FIN: Finish flag.</p>
S-Port / D-Port	<p>If TCP/UDP is selected as the IP protocol, specify the source and destination port number with a mask.</p> <p>Value: Specify the port number.</p> <p>Mask: Specify the port mask with 4 hexadecimal numbers.</p>
DSCP	<p>Specify a DSCP value to be matched between 0 and 63. The default is No Limit.</p>
IP ToS	<p>Specify an IP ToS value to be matched between 0 and 15. The default is No Limit.</p>

IP Pre	Specify an IP Precedence value to be matched to be matched between 0 and 7. The default is No Limit.
Time Range	Select a time range during which the rule will take effect. The default value is No Limit, which means the rule is always in effect. The Time Range referenced here can be created on the SYSTEM > Time Range page.
Logging	Enable Logging function for the ACL rule. Then the times that the rule is matched will be logged every 5 minutes and a related trap will be generated. You can refer to Total Matched Counter in the ACL Rules Table to view the matching times.

- In the **Policy** section, enable or disable the Mirroring feature for the matched packets. With this option enabled, choose a destination port to which the packets will be mirrored.

Figure 2-11 Configuring Mirroring

- In the **Policy** section, enable or disable the Redirect feature for the matched packets. With this option enabled, choose a destination port to which the packets will be redirected.

Figure 2-12 Configuring Redirect

Note:

In the Mirroring feature, the matched packets will be copied to the destination port and the original forwarding will not be affected. While in the Redirect feature, the matched packets will be forwarded only on the destination port.

- In the **Policy** section, enable or disable the Rate Limit feature for the matched packets. With this option enabled, configure the related parameters.

Figure 2-13 Configuring Rate Limit

Rate Limit

Rate: Kbps (1-10000000)

Burst Size: KB (1-128)

Out of Band:

Rate	Specify the transmission rate for the matched packets.
Burst Size	Specify the maximum number of bytes allowed in one second.
Out of Band	Select the action for the packets whose rate is beyond the specified rate.

None: The packets will be forwarded normally.

Drop: The packets will be discarded.

Remark DSCP: You can specify a DSCP value, and the DSCP field of the packets will be changed to the specified one. T1500 series, T1600G-18TS, T1600G-28TS and T1600G-28PS do not support this option.

- 5) In the **Policy** section, enable or disable the QoS Remark feature for the matched packets. With this option enabled, configure the related parameters, and the remarked values will take effect in the QoS processing on the switch.

Figure 2-14 Configuring QoS Remark

QoS Remark

DSCP: Default ▼

Local Priority: Default ▼

802.1p Priority: Default ▼

DSCP Specify the DSCP field for the matched packets. The DSCP field of the packets will be changed to the specified one.

Local Priority Specify the local priority for the matched packets. The local priority of the packets will be changed to the specified one.

802.1p Priority Specify the 802.1p priority for the matched packets. The 802.1p priority of the packets will be changed to the specified one.

- 6) Click **Apply**.

Configuring Combined ACL Rule

Click **Edit ACL** for a Combined ACL entry to load the following page.

Figure 2-15 Configuring the Combined ACL Rule

ACL Details

ACL Type: Combined ACL
 ACL ID: 1000
 ACL Name: ACL_1000

ACL Rules Table

 Resequenece

 Add
  Delete
  Refresh

<input type="checkbox"/>	ID	Rule ID	S-MAC	D-MAC	S-IP	D-IP	VID	Action	Total Matched Counter	Operation
No entries in this table.										
Total: 0										

In **ACL Rules Table** section, click  Add and the following page will appear.

Figure 2-16 Configuring the Combined ACL Rule

Combined ACL Rule

ACL ID: 1000
 ACL Name: ACL_1000

Rule ID: Auto Assign

Operation: Permit ▼

Fragment: Enable

S-MAC: (Format: FF-FF-FF-FF-FF-FF)
 Mask: (Format: FF-FF-FF-FF-FF-FF)

D-MAC: (Format: FF-FF-FF-FF-FF-FF)
 Mask: (Format: FF-FF-FF-FF-FF-FF)

VLAN ID: (1-4094)

EtherType: (4-hex number)

S-IP: (Format: 192.168.0.1)
 Mask: (Format: 255.255.255.0)

D-IP: (Format: 192.168.0.1)
 Mask: (Format: 255.255.255.0)

IP Protocol: No Limit ▼

DSCP: No Limit ▼

IP ToS: (Optional, 0-15)

IP Pre: (Optional, 0-7)

User Priority: Default ▼

Time Range: ▼ (Optional)

Logging: Disable ▼

Policy

Mirroring

Redirect

Rate Limit

QoS Remark

Discard
Apply

Follow these steps to configure the Combined ACL rule:

- 1) In the **Combined ACL Rule** section, configure the following parameters:

Rule ID	Enter an ID number to identify the rule.
	It should not be the same as any current rule ID in the same ACL. If you select Auto Assign, the rule ID will be assigned automatically and the interval between rule IDs is 5.

Operation	<p>Select an action to be taken when a packet matches the rule.</p> <p>Permit: To forward the matched packets.</p> <p>Deny: To discard the matched packets.</p>
Fragment	<p>With this option selected, the rule will be applied to all fragment packets except for the last fragment packet in the fragment packet group.</p> <p>T1500 series, T1600G-28TS and T1600G-28PS do not support this option.</p>
S-MAC/Mask	Enter the source MAC address with a mask. A value of 1 in the mask indicates that the corresponding bit in the address will be matched.
D-MAC/Mask	Enter the destination IP address with a mask. A value of 1 in the mask indicates that the corresponding bit in the address will be matched.
VLAN ID	Enter the ID number of the VLAN to which the ACL will apply.
EtherType	Specify the EtherType to be matched using 4 hexadecimal numbers.
S-IP/Mask	Enter the source IP address with a mask. A value of 1 in the mask indicates that the corresponding bit in the address will be matched.
D-IP/Mask	Enter the destination IP address with a mask. A value of 1 in the mask indicates that the corresponding bit in the address will be matched.
IP Protocol	Select a protocol type from the drop-down list. The default is No Limit, which indicates that packets of all protocols will be matched. You can also select User-defined to customize the IP protocol.
TCP Flag	<p>If TCP protocol is selected, you can configure the TCP Flag to be used for the rule's matching operations. There are six flags and each has three options, which are *, 0 and 1. The default is *, which indicates that the flag is not used for matching operations.</p> <p>URG: Urgent flag.</p> <p>ACK: Acknowledge flag.</p> <p>PSH: Push flag.</p> <p>RST: Reset flag.</p> <p>SYN: Synchronize flag.</p> <p>FIN: Finish flag.</p>
S-Port / D-Port	<p>If TCP/UDP is selected as the IP protocol, specify the source and destination port number with a mask.</p> <p>Value: Specify the port number.</p> <p>Mask: Specify the port mask with 4 hexadecimal numbers.</p>
DSCP	Specify a DSCP value to be matched between 0 and 63. The default is No Limit.

IP ToS	Specify an IP ToS value to be matched between 0 and 15. The default is No Limit.
IP Pre	Specify an IP Precedence value to be matched to be matched between 0 and 7. The default is No Limit.
User Priority	Specify the User Priority to be matched.
Time Range	Select a time range during which the rule will take effect. The default value is No Limit, which means the rule is always in effect. The Time Range referenced here can be created on the SYSTEM > Time Range page.
Logging	Enable Logging function for the ACL rule. Then the times that the rule is matched will be logged every 5 minutes and a related trap will be generated. You can refer to Total Matched Counter in the ACL Rules Table to view the matching times.

- In the **Policy** section, enable or disable the Mirroring feature for the matched packets. With this option enabled, choose a destination port to which the packets will be mirrored.

Figure 2-17 Configuring Mirroring

- In the **Policy** section, enable or disable the Redirect feature for the matched packets. With this option enabled, choose a destination port to which the packets will be redirected.

Figure 2-18 Configuring Redirect

Note:

In the Mirroring feature, the matched packets will be copied to the destination port and the original forwarding will not be affected. While in the Redirect feature, the matched packets will be forwarded only on the destination port.

- 4) In the **Policy** section, enable or disable the Rate Limit feature for the matched packets. With this option enabled, configure the related parameters.

Figure 2-19 Configuring Rate Limit

Rate	Specify the transmission rate for the matched packets.
Burst Size	Specify the maximum number of bytes allowed in one second.
Out of Band	Select the action for the packets whose rate is beyond the specified rate. None: The packets will be forwarded normally. Drop: The packets will be discarded. Remark DSCP: You can specify a DSCP value, and the DSCP field of the packets will be changed to the specified one. T1500 series, T1600G-18TS, T1600G-28TS and T1600G-28PS do not support this option.

- 5) In the **Policy** section, enable or disable the QoS Remark feature for the matched packets. With this option enabled, configure the related parameters, and the remarked values will take effect in the QoS processing on the switch.

Figure 2-20 Configuring QoS Remark

DSCP	Specify the DSCP field for the matched packets. The DSCP field of the packets will be changed to the specified one.
Local Priority	Specify the local priority for the matched packets. The local priority of the packets will be changed to the specified one.
802.1p Priority	Specify the 802.1p priority for the matched packets. The 802.1p priority of the packets will be changed to the specified one.

- 6) Click **Apply**.

Configuring the IPv6 ACL Rule

Click **Edit ACL** for an IPv6 ACL entry to load the following page.

Figure 2-21 Configuring the IPv6 ACL Rule

ACL Details

ACL Type: IPv6 ACL
 ACL ID: 1500
 ACL Name: ACL_1500

ACL Rules Table

Resequence

 Add
 Delete
 Refresh

<input type="checkbox"/>	ID	Rule ID	IPv6 Source IP	IPv6 Destination IP	Action	Total Matched Counter	Operation
No entries in this table.							
Total: 0							

In **ACL Rules Table** section, click Add and the following page will appear.

Figure 2-22 Configuring the IPv6 ACL Rule

IPv6 ACL Rule

ACL ID: 1500
 ACL Name: ACL_1500

Rule ID: Auto Assign

Operation: Permit ▼

IPv6 Class: (0-63)

Flow Label: (5-hex number: 0x00000-0xFFFFF)

IPv6 Source IP: (Format: 2001::)
 Mask: (Format: FFFF:FFFF:FFFF:FFFF)

IPv6 Destination IP: (Format: 2001::)
 Mask: (Format: FFFF:FFFF:FFFF:FFFF)

IP Protocol: No Limit ▼

Time Range: ▼ (Optional)

Policy

Mirroring

Redirect

Rate Limit

QoS Remark

Discard
Apply

Follow these steps to configure the IPv6 ACL rule:

- 1) In the **IPv6 ACL Rule** section, configure the following parameters:

Rule ID	<p>Enter an ID number to identify the rule.</p> <p>It should not be the same as any current rule ID in the same ACL. If you select Auto Assign, the rule ID will be assigned automatically and the interval between rule IDs is 5.</p>
Operation	<p>Select an action to be taken when a packet matches the rule.</p> <p>Permit: To forward the matched packets.</p> <p>Deny: To discard the matched packets.</p>
IPv6 Class	<p>Specify an IPv6 class value to be matched. The switch will check the class field of the IPv6 header.</p>
Flow Label	<p>Specify a Flow Label value to be matched.</p>
IPv6 Source IP	<p>Enter the source IPv6 address to be matched. All types of IPv6 address will be checked. You may enter a complete 128-bit IPv6 address but only the first 64 bits will be valid.</p>
Mask	<p>The mask is required if the source IPv6 address is entered. Enter the mask in complete format (for example, FFFF:FFFF:0000:FFFF).</p> <p>The IP address mask specifies which bits in the source IPv6 address to match the rule. A value of 1 in the mask indicates that the corresponding bit in the address will be matched.</p>
IPv6 Destination IP	<p>Enter the destination IPv6 address to be matched. All types of IPv6 address will be checked. You may enter a complete 128-bit IPv6 address but only the first 64 bits will be valid.</p>
Mask	<p>The mask is required if the destination IPv6 address is entered. Enter the complete mask (for example, FFFF:FFFF:0000:FFFF).</p> <p>The IP address mask specifies which bits in the source IP address to match the rule. A value of 1 in the mask indicates that the corresponding bit in the address will be matched.</p>
IP Protocol	<p>Select a protocol type from the drop-down list.</p> <p>No Limit: Packets of all protocols will be matched.</p> <p>UDP: Specify the source port and destination port for the UDP packet to be matched.</p> <p>TCP: Specify the source port and destination port for the TCP packet to be matched.</p> <p>User-defined: You can customize an IP protocol.</p>
S-Port / D-Port	<p>If TCP/UDP is selected as the IP protocol, specify the source and destination port numbers.</p>

Time Range Select a time range during which the rule will take effect. The default value is No Limit, which means the rule is always in effect. The Time Range referenced here can be created on the **SYSTEM > Time Range** page.

- In the **Policy** section, enable or disable the Mirroring feature for the matched packets. With this option enabled, choose a destination port to which the packets will be mirrored.

Figure 2-23 Configuring Mirroring

The screenshot shows the configuration for the Mirroring feature. At the top, the 'Mirroring' checkbox is checked. Below it is a 'Port' input field with a placeholder '(Format: 1/0/1, input or choose below)'. Underneath the input field is a grid of port selection buttons labeled 'UNIT1'. The buttons are arranged in two rows: the first row contains buttons for ports 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, and 28; the second row contains buttons for ports 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, and 27. The button for port 20 is highlighted in blue, indicating it is selected. Below the grid are three legend items: a blue square labeled 'Selected', a white square labeled 'Unselected', and a grey square labeled 'Not Available'.

- In the **Policy** section, enable or disable the Redirect feature for the matched packets. With this option enabled, choose a destination port to which the packets will be redirected.

Figure 2-24 Configuring Redirect

The screenshot shows the configuration for the Redirect feature. At the top, the 'Redirect' checkbox is checked. Below it is a 'Destination Port' input field with a placeholder '(Format: 1/0/1, input or choose below)'. Underneath the input field is a grid of port selection buttons labeled 'UNIT1'. The buttons are arranged in two rows: the first row contains buttons for ports 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, and 28; the second row contains buttons for ports 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, and 27. The button for port 20 is highlighted in blue, indicating it is selected. Below the grid are three legend items: a blue square labeled 'Selected', a white square labeled 'Unselected', and a grey square labeled 'Not Available'.

Note:

In the Mirroring feature, the matched packets will be copied to the destination port and the original forwarding will not be affected. While in the Redirect feature, the matched packets will be forwarded only on the destination port.

- In the **Policy** section, enable or disable the Rate Limit feature for the matched packets. With this option enabled, configure the related parameters.

Figure 2-25 Configuring Rate Limit

The screenshot shows the configuration for the Rate Limit feature. At the top, the 'Rate Limit' checkbox is checked. Below it are three configuration fields: 'Rate' with a text input field and the unit 'Kbps (1-10000000)', 'Burst Size' with a text input field and the unit 'KB (1-128)', and 'Out of Band' with a dropdown menu.

Rate	Specify the transmission rate for the matched packets.
Burst Size	Specify the maximum number of bytes allowed in one second.
Out of Band	Select the action for the packets whose rate is beyond the specified rate. None: The packets will be forwarded normally. Drop: The packets will be discarded. Remark DSCP: You can specify a DSCP value, and the DSCP field of the packets will be changed to the specified one. T1500 series, T1600G-18TS, T1600G-28TS and T1600G-28PS.

- 5) In the **Policy** section, enable or disable the QoS Remark feature for the matched packets. With this option enabled, configure the related parameters, and the remarked values will take effect in the QoS processing on the switch.

Figure 2-26 Configuring QoS Remark

QoS Remark

DSCP:

Local Priority:

802.1p Priority:

DSCP	Specify the DSCP field for the matched packets. The DSCP field of the packets will be changed to the specified one.
Local Priority	Specify the local priority for the matched packets. The local priority of the packets will be changed to the specified one.
802.1p Priority	Specify the 802.1p priority for the matched packets. The 802.1p priority of the packets will be changed to the specified one.

- 6) Click **Apply**.

Configuring the Packet Content ACL Rule

Only T2600G series support this feature.

Click **Edit ACL** for a Packet Content ACL entry to load the following page.

Figure 2-27 Configuring the Packet Content ACL Rule

Packet Content Offset Profile Global Config

Chunk0 Offset: (0-31)
 Chunk1 Offset: (0-31)
 Chunk2 Offset: (0-31)
 Chunk3 Offset: (0-31)

[Apply](#)

ACL Details

ACL Type: Packet Content ACL
 ACL ID: 2000
 ACL Name: ACL_2000

ACL Rules Table

↕ Resequence
+ Add - Delete ↻ Refresh

<input type="checkbox"/>	ID	Rule ID	Enabled Chunk	Action	Total Matched Counter	Operation
No entries in this table.						
Total: 0						

In the **Packet Content Offset Profile Global Config** section, configure the Chunk Offset. Click **Apply**.

[Chunk0 Offset/](#)
[Chunk1 Offset/](#)
[Chunk2 Offset/](#)
[Chunk3 Offset](#)

Enter the offset of a chunk. Packet Content ACL analyzes and processes data packets based on 4 chunk match conditions, and each chunk can specify a user-defined 4-byte segment carried in the packet's first 128 bytes. Offset 31 matches the 127, 128, 1, 2 bytes of the packet, offset 0 matches the 3,4,5,6 bytes of the packet, and so on, for the rest of the offset value.

Note: All 4 chunks must be set at the same time.

In **ACL Rules Table** section, click + Add and the following page will appear.

Figure 2-28 Configuring the Packet Content ACL Rule

Packet Content Rule

ACL ID: 2000

ACL Name: ACL_2000

Rule ID: Auto Assign

Operation: Deny ▼

Chunk0

Chunk Value: (8-hex number)

Chunk Mask: (8-hex number, like '0000ffff')

Chunk1

Chunk Value: (8-hex number)

Chunk Mask: (8-hex number, like '0000ffff')

Chunk2

Chunk Value: (8-hex number)

Chunk Mask: (8-hex number, like '0000ffff')

Chunk3

Chunk Value: (8-hex number)

Chunk Mask: (8-hex number, like '0000ffff')

Time Range: ▼ (Optional)

Policy

Mirroring

Redirect

Rate Limit

QoS Remark

Discard
Apply

Follow these steps to configure the Packet Content ACL rule:

1) In the **Packet Content Rule** section, configure the following parameters:

Rule ID	<p>Enter an ID number to identify the rule.</p> <p>It should not be the same as any current rule ID in the same ACL. If you select Auto Assign, the rule ID will be assigned automatically and the interval between rule IDs is 5.</p>
Operation	<p>Select an action to be taken when a packet matches the rule.</p> <p>Permit: To forward the matched packets.</p> <p>Deny: To discard the matched packets.</p>
Chunk0-Chunk3	<p>Specify the EtherType to be matched using 4 hexadecimal numbers.</p>

Chunk Value	Enter the 4-byte value in hexadecimal for the desired chunk, like '0000ffff'. The Packet Content ACL will check this chunk of packets to examine if the packets match the rule or not.
Chunk Mask	Enter the 4-byte mask in hexadecimal for the desired chunk. The mask must be written completely in 4-byte hex mode, like '0000ffff'. The mask specifies which bits to match the rule.
Time Range	Select a time range during which the rule will take effect. The default value is No Limit, which means the rule is always in effect. The Time Range referenced here can be created on the SYSTEM > Time Range page.
Logging	Enable Logging function for the ACL rule. Then the times that the rule is matched will be logged every 5 minutes and a related trap will be generated. You can refer to Total Matched Counter in the ACL Rules Table to view the matching times.

- In the **Policy** section, enable or disable the Mirroring feature for the matched packets. With this option enabled, choose a destination port to which the packets will be mirrored.

Figure 2-29 Configuring Mirroring

Mirroring

Port: (Format: 1/0/1, input or choose below)

UNIT1

2	4	6	8	10	12	14	16	18	20	22	24	26	28
1	3	5	7	9	11	13	15	17	19	21	23	25	27

Selected Unselected Not Available

- In the **Policy** section, enable or disable the Redirect feature for the matched packets. With this option enabled, choose a destination port to which the packets will be redirected.

Figure 2-30 Configuring Redirect

Redirect

Destination Port: (Format: 1/0/1, input or choose below)

UNIT1

2	4	6	8	10	12	14	16	18	20	22	24	26	28
1	3	5	7	9	11	13	15	17	19	21	23	25	27

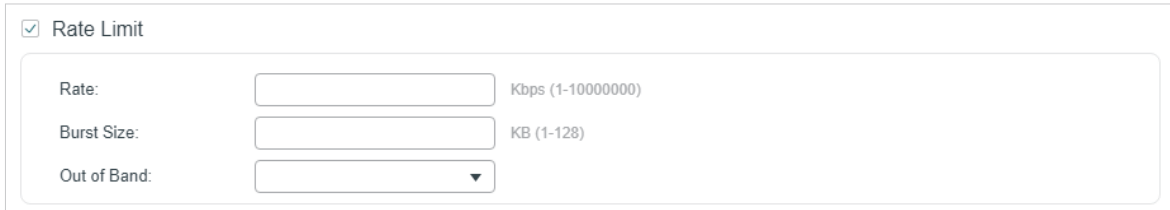
Selected Unselected Not Available

 **Note:**

In the Mirroring feature, the matched packets will be copied to the destination port and the original forwarding will not be affected. While in the Redirect feature, the matched packets will be forwarded only on the destination port.

- 4) In the **Policy** section, enable or disable the Rate Limit feature for the matched packets. With this option enabled, configure the related parameters.

Figure 2-31 Configuring Rate Limit



Rate	Specify the transmission rate for the matched packets.
Burst Size	Specify the maximum number of bytes allowed in one second.
Out of Band	Select the action for the packets whose rate is beyond the specified rate.

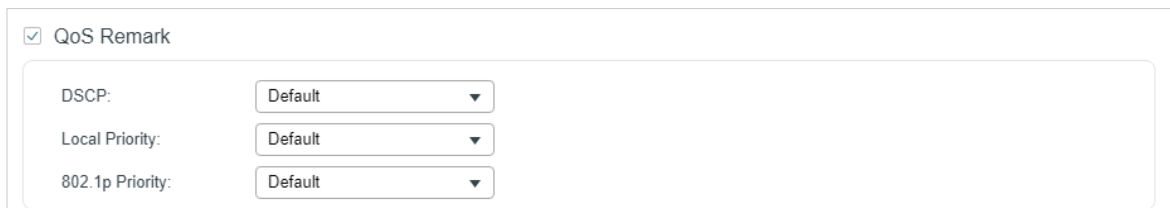
None: The packets will be forwarded normally.

Drop: The packets will be discarded.

Remark DSCP: You can specify a DSCP value, and the DSCP field of the packets will be changed to the specified one. T1500 series, T1600G-18TS, T1600G-28TS and T1600G-28PS do not support this option.

- 5) In the **Policy** section, enable or disable the QoS Remark feature for the matched packets. With this option enabled, configure the related parameters, and the remarked values will take effect in the QoS processing on the switch.

Figure 2-32 Configuring QoS Remark



DSCP Specify the DSCP field for the matched packets. The DSCP field of the packets will be changed to the specified one.

Local Priority Specify the local priority for the matched packets. The local priority of the packets will be changed to the specified one.

802.1p Priority Specify the 802.1p priority for the matched packets. The 802.1p priority of the packets will be changed to the specified one.











- 6) Click **Apply**.

Viewing the ACL Rules

The rules in an ACL are listed in ascending order of their rule IDs. The switch matches a received packet with the rules in order. When a packet matches a rule, the switch stops the match process and performs the action defined in the rule.

Click **Edit ACL** for an entry you have created and you can view the rule table. We take IP ACL rules table for example.

Figure 2-33 Viewing ACL Rules Table

ACL Rules Table									
 Resequence		 Add  Delete  Refresh							
<input type="checkbox"/>	ID	Rule ID	S-IP	D-IP	IP Protocol	Action	Total Matched Counter	Operation	
<input type="checkbox"/>	1	1	192.168.1.0	192.168.5.0		Permit	0		
<input type="checkbox"/>	2	3	192.168.7.0			Permit	0		
<input type="checkbox"/>	3	5	192.168.0.0			Deny	0		
Total: 3									

Here you can view and edit the ACL rules. You can also click **Resequence** to resequence the rules by providing a Start Rule ID and Step value.

2.1.4 Configuring ACL Binding

You can bind the ACL to a port or a VLAN. The received packets on the port or in the VLAN will then be matched and processed according to the ACL rules. An ACL takes effect only after it is bound to a port or VLAN.

Note:

- Different types of ACLs cannot be bound to the same port or VLAN.
- Multiple ACLs of the same type can be bound to the same port or VLAN. The switch matches the received packets using the ACLs in order. The ACL that is bound earlier has a higher priority.

Binding the ACL to a Port

Choose the menu **SECURITY > ACL > ACL Binding > Port Binding** and click  Add to load the following page.

Figure 2-34 Binding the ACL to a Port

Follow these steps to bind the ACL to a Port:

- 1) Choose ID or Name to be used for matching the ACL. Then select an ACL from the drop-down list.
- 2) Specify the port to be bound.
- 3) Click **Create**.

■ Binding the ACL to a VLAN

Choose the menu **SECURITY > ACL > ACL Binding > VLAN Binding** to load the following page.

Figure 2-35 Binding the ACL to a VLAN

Follow these steps to bind the ACL to a VLAN:

- 1) Choose ID or Name to be used for matching the ACL. Then select an ACL from the drop-down list.
- 2) Enter the ID of the VLAN to be bound.
- 3) Click **Create**.

2.2 Using the CLI

2.2.1 Configuring Time Range

Some ACL-based services or features may need to be limited to take effect only during a specified time period. In this case, you can configure a time range for the ACL. For details about Time Range Configuration, please refer to *Managing System*.

2.2.2 Configuring ACL

Follow the steps to create different types of ACL and configure the ACL rules.

You can define the rules based on source or destination IP address, source or destination MAC address, protocol type, port number and others.

MAC ACL

Follow these steps to configure MAC ACL:

-
- | | |
|--------|--|
| Step 1 | configure
Enter global configuration mode. |
|--------|--|
-
- | | |
|--------|---|
| Step 2 | access-list create <i>acl-id</i> [name <i>acl-name</i>]
Create a MAC ACL.

<i>acl-id</i> : Enter an ACL ID. The ID ranges from 0 to 499.

<i>acl-name</i> : Enter a name to identify the ACL. |
|--------|---|
-

-
- Step 3 **access-list mac *acl-id-or-name* rule { auto | *rule-id* } { deny | permit } logging {enable | disable} [smac *source-mac* smask *source-mac-mask*] [dmac *destination-mac* dmask *destination-mac-mask*] [type ether-type] [pri *dot1p-priority*] [vid *vlan-id*] [tseg *time-range-name*]**
- Add a MAC ACL Rule.
- acl-id-or-name*: Enter the ID or name of the ACL that you want to add a rule for.
- auto*: The rule ID will be assigned automatically and the interval between rule IDs is 5.
- rule-id*: Assign an ID to the rule.
- deny | permit**: Specify the action to be taken with the packets that match the rule. By default, it is set to permit. The packets will be discarded if "deny" is selected and forwarded if "permit" is selected.
- logging {enable | disable}**: Enable or disable Logging function for the ACL rule. If "enable" is selected, the times that the rule is matched will be logged every 5 minutes. With ACL Counter trap enabled, a related trap will be generated if the matching times changes.
- source-mac*: Enter the source MAC address. The format is FF:FF:FF:FF:FF:FF.
- source-mac-mask*: Enter the mask of the source MAC address. This is required if a source MAC address is entered. The format is FF:FF:FF:FF:FF:FF.
- destination-mac*: Enter the destination MAC address. The format is FF:FF:FF:FF:FF:FF.
- destination-mac-mask*: Enter the mask of the destination MAC address. This is required if a destination MAC address is entered. The format is FF:FF:FF:FF:FF:FF.
- ether-type*: Specify an Ethernet-type with 4 hexadecimal numbers.
- dot1p-priority*: The user priority ranges from 0 to 7. The default is No Limit.
- vlan-id*: The VLAN ID ranges from 1 to 4094.
- time-range-name*: The name of the time-range. The default is No Limit.
-
- Step 4 **exit**
- Return to global configuration mode.
-
- Step 5 **show access-list [*acl-id-or-name*]**
- Display the current ACL configuration.
- acl-id-or-name*: The ID number or name of the ACL.
-
- Step 6 **end**
- Return to privileged EXEC mode.
-
- Step 7 **copy running-config startup-config**
- Save the settings in the configuration file.
-

The following example shows how to create MAC ACL 50 and configure Rule 5 to permit packets with source MAC address 00:34:A2:D4:34:B5:

Switch#configure

```
Switch(config)#access-list create 50
```

```
Switch(config-mac-acl)#access-list mac 50 rule 5 permit logging disable smac  
00:34:A2:D4:34:B5 smask FF:FF:FF:FF:FF:FF
```

```
Switch(config-mac-acl)#exit
```

```
Switch(config)#show access-list 50
```

```
MAC access list 50 name: ACL_50
```

```
rule 5 permit logging disable smac 00:34:a2:d4:34:b5 smask ff:ff:ff:ff:ff
```

```
Switch(config)#end
```

```
Switch#copy running-config startup-config
```

IP ACL

Follow these steps to configure IP ACL:

-
- | | |
|--------|--|
| Step 1 | configure
Enter global configuration mode. |
|--------|--|
-
- | | |
|--------|---|
| Step 2 | access-list create <i>acl-id</i> [name <i>acl-name</i>]
Create an IP ACL.

<i>acl-id</i> : Enter an ACL ID. The ID ranges from 500 to 999.

<i>acl-name</i> : Enter a name to identify the ACL. |
|--------|---|
-

Step 3 **access-list ip** *acl-id-or-name* **rule** {auto | *rule-id* } {deny | permit} **logging** {enable | disable} [**sip** *sip-address* **sip-mask** *sip-address-mask*] [**dip** *dip-address* **dip-mask** *dip-address-mask*] [**dscp** *dscp-value*] [**tos** *tos-value*] [**pre** *pre-value*] [**frag** {enable | disable}] [**protocol** *protocol*] [**s-port** *s-port-number* **s-port-mask** *s-port-mask*] [**d-port** *d-port-number* **d-port-mask** *d-port-mask*] [**tcpflag** *tcpflag*] [**tseg** *time-range-name*]

Add rules to the ACL.

acl-id-or-name: Enter the ID or name of the ACL that you want to add a rule for.

auto: The rule ID will be assigned automatically and the interval between rule IDs is 5.

rule-id: Assign an ID to the rule.

deny | **permit**: Specify the action to be taken with the packets that match the rule. Deny means to discard; permit means to forward. By default, it is set to permit.

logging {enable | disable}: Enable or disable Logging function for the ACL rule. If "enable" is selected, the times that the rule is matched will be logged every 5 minutes. With ACL Counter trap enabled, a related trap will be generated if the matching times changes.

sip-address: Enter the source IP address.

sip-address-mask: Enter the mask of the source IP address. This is required if a source IP address is entered.

dip-address: Enter the destination IP address.

dip-address-mask: Enter the mask of the destination IP address. This is required if a destination IP address is entered.

dscp-value: Specify the DSCP value between 0 and 63.

tos-value: Specify an IP ToS value to be matched between 0 and 15.

pre-value: Specify an IP Precedence value to be matched between 0 and 7.

frag {enable | disable}: Enable or disable matching of fragmented packets. The default is disable. When enabled, the rule will apply to all fragmented packets and always permit to forward the last fragment of a packet. T1500 series, T1600G-18TS, T1600G-28TS and T1600G-28PS do not support this option.

protocol: Specify a protocol number between 0 and 255.

s-port-number: With TCP or UDP configured as the protocol, specify the source port number.

s-port-mask: With TCP or UDP configured as the protocol, specify the source port mask with 4 hexadecimal numbers.

d-port-number: With TCP or UDP configured as the protocol, specify the destination port number.

d-port-mask: With TCP or UDP configured as the protocol, specify the destination port mask with 4 hexadecimal numbers.

tcpflag: With TCP configured as the protocol, specify the flag value using either binary numbers or * (for example, 01*010*). The default is *, which indicates that the flag will not be matched.

The flags are URG (Urgent flag), ACK (Acknowledge Flag), PSH (Push Flag), RST (Reset Flag), SYN (Synchronize Flag) and FIN (Finish Flag).

time-range-name: The name of the time-range. The default is No Limit.

Step 4 **end**
Return to privileged EXEC mode.

Step 5 **copy running-config startup-config**
Save the settings in the configuration file.

The following example shows how to create IP ACL 600, and configure Rule 1 to permit packets with source IP address 192.168.1.100:

Switch#configure

Switch(config)#access-list create 600

Switch(config)#access-list ip 600 rule 1 permit logging disable sip 192.168.1.100 sip-mask 255.255.255.255

Switch(config)#show access-list 600

IP access list 600 name: ACL_600

rule 1 permit logging disable sip 192.168.1.100 smask 255.255.255.255

Switch(config)#end

Switch#copy running-config startup-config

Combined ACL

Follow these steps to configure Combined ACL:

Step 1 **configure**
Enter global configuration mode

Step 2 **access-list create *acl-id* [*name acl-name*]**
Create a Combined ACL.

acl-id: Enter an ACL ID. The ID ranges from 1000 to 1499.

acl-name: Enter a name to identify the ACL.

Step 3 **access-list combined** *acl-id-or-name* **rule** {*auto* | *rule-id*} {deny | permit} **logging** {enable | disable} [**smac** *source-mac-address* **smask** *source-mac-mask*] [**dmac** *dest-mac-address* **dmask** *dest-mac-mask*] [**vid** *vlan-id*] [**type** *ether-type*] [**pri** *priority*] [**sip** *sip-address* **sip-mask** *sip-address-mask*] [**dip** *dip-address* **dip-mask** *dip-address-mask*] [**dscp** *dscp-value*] [**tos** *tos-value*] [**pre** *pre-value*] [**frag** {enable | disable}] [**protocol** *protocol*] [**s-port** *s-port-number* **s-port-mask** *s-port-mask*] [**d-port** *d-port-number* **d-port-mask** *d-port-mask*] [**tcpflag** *tcpflag*] [**tseg** *time-range-name*]

Add rules to the ACL.

acl-id-or-name: Enter the ID or name of the ACL that you want to add a rule for.

auto: The rule ID will be assigned automatically and the interval between rule IDs is 5.

rule-id: Assign an ID to the rule.

deny | permit: Specify the action to be taken with the packets that match the rule. Deny means to discard; permit means to forward. By default, it is set to permit.

logging {enable | disable}: Enable or disable Logging function for the ACL rule. If "enable" is selected, the times that the rule is matched will be logged every 5 minutes. With ACL Counter trap enabled, a related trap will be generated if the matching times changes.

source-mac-address: Enter the source MAC address.

source-mac-mask: Enter the source MAC address mask.

dest-mac-address: Enter the destination MAC address.

dest-mac-mask: Enter the destination MAC address mask. This is required if a destination MAC address is entered.

vlan-id: The VLAN ID ranges from 1 to 4094.

ether-type: Specify the Ethernet-type with 4 hexadecimal numbers.

priority: The user priority ranges from 0 to 7. The default is No Limit.

sip-address: Enter the source IP address.

sip-address-mask: Enter the mask of the source IP address. It is required if source IP address is entered.

dip-address: This is required if a source IP address is entered.

dip-address-mask: Enter the destination IP address mask. This is required if a destination IP address is entered.

dscp-value: Specify the DSCP value between 0 and 63.

tos-value: Specify an IP ToS value to be matched between 0 and 15.

pre-value: Specify an IP Precedence value to be matched between 0 and 7.

frag {enable | disable}: Enable or disable matching of fragmented packets. The default is disable. When enabled, the rule will apply to all fragmented packets and always permit to forward the last fragment of a packet.

protocol: Specify a protocol number between 0 and 255.

s-port-number: With TCP or UDP configured as the protocol, specify the source port number.

s-port-mask: With TCP or UDP configured as the protocol, specify the source port mask with 4 hexadecimal numbers.

d-port-number: With TCP or UDP configured as the protocol, specify the destination port number.

d-port-mask: With TCP or UDP configured as the protocol, specify the destination port mask with 4 hexadecimal numbers.

tcpflag: With TCP configured as the protocol, specify the flag value using either binary numbers or * (for example, 01*010*). The default is *, which indicates that the flag will not be matched.

The flags are URG (Urgent flag), ACK (Acknowledge Flag), PSH (Push Flag), RST (Reset Flag), SYN (Synchronize Flag), and FIN (Finish Flag).

time-range-name: The name of the time-range. The default is No Limit.

Step 4 **end**

Return to privileged EXEC mode.

Step 5 **copy running-config startup-config**

Save the settings in the configuration file.

The following example shows how to create Combined ACL 1100 and configure Rule 1 to deny packets with source IP address 192.168.3.100 in VLAN 2:

Switch#configure

Switch(config)#access-list create 1100

Switch(config)#access-list combined 1100 logging disable rule 1 permit vid 2 sip 192.168.3.100 sip-mask 255.255.255.255

Switch(config)#show access-list 2600

Combined access list 2600 name: ACL_2600

rule 1 permit logging disable vid 2 sip 192.168.3.100 sip-mask 255.255.255.255

Switch(config)#end

Switch#copy running-config startup-config

IPv6 ACL

Follow these steps to configure IPv6 ACL:

Step 1 **configure**

Enter global configuration mode

Step 2 **access-list create *acl-id* [name *acl-name*]**

Create an IPv6 ACL.

acl-id: Enter an ACL ID. The ID ranges from 1500 to 1999.

acl-name: Enter a name to identify the ACL.

Step 3 **access-list ipv6 *acl-id-or-name* rule {auto | *rule-id*} {deny | permit} logging {enable | disable} [class *class-value*] [flow-label *flow-label-value*] [sip *source-ip-address* sip-mask *source-ip-mask*] [dip *destination-ip-address* dip-mask *destination-ip-mask*] [s-port *source-port-number*] [d-port *destination-port-number*] [tseg *time-range-name*]**

Add rules to the ACL.

acl-id-or-name: Enter the ID or name of the ACL that you want to add a rule for.

auto: The rule ID will be assigned automatically and the interval between rule IDs is 5.

rule-id: Assign an ID to the rule.

deny | permit: Specify the action to be taken with the packets that match the rule. Deny means to discard; permit means to forward. By default, it is set to permit.

logging {enable | disable}: Enable or disable Logging function for the ACL rule. If "enable" is selected, the times that the rule is matched will be logged every 5 minutes. With ACL Counter trap enabled, a related trap will be generated if the matching times changes.

class-value: Specify a class value to be matched. It ranges from 0 to 63.

flow-label-value: Specify a Flow Label value to be matched.

source-ip-address: Enter the source IP address. Enter the destination IPv6 address to be matched. All types of IPv6 address will be checked. You may enter a complete 128-bit IPv6 address but only the first 64 bits will be valid.

source-ip-mask: Enter the source IP address mask. The mask is required if the source IPv6 address is entered. Enter the mask in complete format (for example, ffff:fff:0000:ffff). The mask specifies which bits in the source IPv6 address to match the rule.

destination-ip-address: Enter the destination IPv6 address to be matched. All types of IPv6 address will be checked. You may enter a complete 128-bit IPv6 addresses but only the first 64 bits will be valid.

destination-ip-mask: Enter the source IP address mask. The mask is required if the source IPv6 address is entered. Enter the mask in complete format (for example, ffff:fff:0000:ffff). The mask specifies which bits in the source IPv6 address to match the rule.

source-port-number: Enter the TCP/UDP source port if TCP/UDP protocol is selected.

destination-port-number: Enter the TCP/UDP destination port if TCP/UDP protocol is selected.

time-range-name: The name of the time-range. The default is No Limit.

Step 4 **end**

Return to privileged EXEC mode.

Step 5 **copy running-config startup-config**

Save the settings in the configuration file.

The following example shows how to create IPv6 ACL 1600 and configure Rule 1 to deny packets with source IPv6 address CDCD:910A:2222:5498:8475:1111:3900:2020:

Switch#configure

```
Switch(config)#access-list create 1600
```

```
Switch(config)#access-list ipv6 1600 rule 1 deny logging disable sip
CDCD:910A:2222:5498:8475:1111:3900:2020 sip-mask ffff:ffff:ffff:ffff
```

```
Switch(config)#show access-list 1600
```

```
IPv6 access list 1600 name: ACL_1600
```

```
rule 1 deny logging disable sip cdc:910a:2222:5498:8475:1111:3900:2020 sip-mask ffff:ff
ff:ffff:ffff
```

```
Switch(config)#end
```

```
Switch#copy running-config startup-config
```

Packet Content ACL

Only T2600G series support this feature.

Follow these steps to configure Packet Content ACL:

Step 1	<p>configure</p> <p>Enter global configuration mode</p>
Step 2	<p>access-list create <i>acl-id</i> [name <i>acl-name</i>]</p> <p>Create a Packet Content ACL.</p> <p><i>acl-id</i>: Enter an ACL ID. The ID ranges from 2000 to 2499.</p> <p><i>acl-name</i>: Enter a name to identify the ACL.</p>
Step 3	<p>access-list packet-content profile chunk-offset0 <i>offset0</i> chunk-offset1 <i>offset1</i> chunk-offset2 <i>offset2</i> chunk-offset3 <i>offset3</i></p> <p>Specify the offset of each chunk, all the 4 chunks must be set at the same time.</p> <p><i>offset0 -offset3</i>: Specify the offset of each chunk, the value ranges from 0 to 31. When the offset is set as 31, it matches the first 127,128, 1, 2 bytes of the packet; when the offset is set as 0, it matches the 3, 4, 5, 6 bytes, and so on, for the rest of the offset value.</p>

-
- Step 4 **access-list packet-content config** *acl-id-or-name* **rule** { auto | *rule-id* } {deny | permit} **logging** { enable | disable } [**chunk0** *value mask0 mask*] [**chunk1** *value mask1 mask*] [**chunk2** *value mask2 mask*] [**chunk3** *value mask3 mask*] [**tseg** *time-range-name*]
- Add rules to the ACL.
- acl-id-or-name*: Enter the ID or name of the ACL that you want to add a rule for.
- auto*: The rule ID will be assigned automatically and the interval between rule IDs is 5.
- rule-id*: Assign an ID to the rule.
- deny* | *permit*: Specify the action to be taken with the packets that match the rule. Deny means to discard; permit means to forward. By default, it is set to permit.
- logging** { *enable* | *disable* } : Enable or disable Logging function for the ACL rule. If "enable" is selected, the times that the rule is matched will be logged every 5 minutes. With ACL Counter trap enabled, a related trap will be generated if the matching times changes.
- value*: Enter the 4-byte value in hexadecimal for the desired chunk, like '0000ffff'. The Packet Content ACL will check this chunk of packets to examine if the packets match the rule or not.
- mask*: Enter the 4-byte mask in hexadecimal for the desired chunk. The mask must be written completely in 4-byte hex mode, like '0000ffff'. The mask specifies which bits to match the rule.
- time-range-name*: The name of the time-range. The default is No Limit.
-
- Step 5 **end**
- Return to privileged EXEC mode.
-
- Step 6 **copy running-config startup-config**
- Save the settings in the configuration file.
-

The following example shows how to create Packet Content ACL 2000, and deny the packets with the value of its chunk1 0x58:

Switch#configure

Switch(config)#access-list create 2000

Switch(config)#access-list packet-content profile chunk-offset0 offset0 **chunk-offset1** offset1 **chunk-offset2** offset2 **chunk-offset3** offset3

Switch(config)#packet-content config 2000 rule 10 deny logging disable **chunk1 58 mask1** ffffffff

Switch(config)#show access-list 2000

Packet content access list 2000 name: ACL_2000

rule 10 deny logging disable chunk1 value 0x58 mask 0xffffffff

Switch(config)#end

Switch#copy running-config startup-config

Resequencing Rules

You can resequence the rules by providing a Start Rule ID and Step value.

Step 1	configure Enter global configuration mode.
Step 2	access-list resequence <i>acl-id-or-name</i> start <i>start-rule-id</i> step <i>rule-id-step-value</i> Resequencing the rules of the specific ACL. <i>acl-id-or-name</i> : Enter the ID or name of the ACL. <i>start-rule-id</i> : Enter the start rule ID. <i>rule-id-step-value</i> : Enter the Step value.
Step 3	end Return to privileged EXEC mode.
Step 4	copy running-config startup-config Save the settings in the configuration file.

The following example shows how to resequence the rules of MAC ACL 100: set the start rule ID as 1 and the step value as 10:

Switch#configure

Switch(config)#access-list resequence 100 start 1 step 10

Switch(config)#show access-list 100

MAC access list 100 name: "ACL_100"

rule 1 deny logging disable smac aa:bb:cc:dd:ee:ff smask ff:ff:ff:ff:ff:ff

rule 11 permit logging disable vid 18

rule 21 permit logging disable dmac aa:cc:ee:ff:dd:33 dmask ff:ff:ff:ff:ff:ff

Switch(config)#end

Switch#copy running-config startup-config

2.2.3 Configuring Policy

Policy allows you to further process the matched packets through operations such as mirroring, rate-limiting, redirecting, or changing priority.

Follow the steps below to configure the policy actions for an ACL rule.

Step 1	configure Enter global configuration mode.
--------	--

Step 2 **access-list action *acl-id-or-name* rule *rule-id***

Configure the policy actions for an ACL rule.

acl-id-or-name: Enter the ID or name of the ACL.

rule-id: Enter the ID of the ACL rule.

Step 3 **redirect interface { fastEthernet *port* | gigabitEthernet *port* | ten-gigabitEthernet *port* }**

(Optional) Define the policy to redirect the matched packets to the desired port.

port: The destination port to which the packets will be redirected. The default is All.

s-mirror interface { fastEthernet *port* | gigabitEthernet *port* | ten-gigabitEthernet *port* }

(Optional) Define the policy to mirror the matched packets to the desired port.

port: The destination port to which the packets will be mirrored.

s-condition rate *rate* burst *burst-size* osd { none | discard | remark dscp *dscp* }

(Optional) Define the policy to monitor the rate of the matched packets.

rate: Specify a rate from 1 to 1000000 kbps.

burst-size: Specify the number of bytes allowed in one second ranging from 1 to 128.

osd: Select either "none", "discard" or "remark dscp" as the action to be taken for the packets whose rate is beyond the specified rate. The default is None. When "remark dscp" is selected, you also need to specify the DSCP value for the matched packets. The DSCP value ranges from 0 to 63. T1500 series, T1600G-18TS, T1600G-28TS and T1600G-28PS do not support DSCP option.

qos-remark [dscp *dscp*] [priority *pri*] [dot1p *pri*]

(Optional) Define the policy to remark priority for the matched packets.

dscp: Specify the DSCP region for the data packets. The value ranges from 0 to 63.

priority *pri*: Specify the local priority for the data packets. The value ranges from 0 to 7.

dot1p *pri*: Specify the 802.1p priority for the data packets. The value ranges from 0 to 7.

Step 4 **end**

Return to privileged EXEC mode.

Step 5 **copy running-config startup-config**

Save the settings in the configuration file.

Redirect the matched packets to port 1/0/4 for rule 1 of MAC ACL 10:

Switch#configure

Switch(config)#access-list action 10 rule 1

```
Switch(config-action)#redirect interface gigabitEthernet 1/0/4
```

```
Switch(config-action)#exit
```

```
Switch(config)#show access-list 10
```

```
MAC access list 10 name: ACL_10
```

```
rule 5 permit logging disable action redirect Gi1/0/4
```

```
Switch(config)#end
```

```
Switch#copy running-config startup-config
```

2.2.4 Configuring ACL Binding

You can bind the ACL to a port or a VLAN. The received packets on the port or in the VLAN will then be matched and processed according to the ACL rules. An ACL takes effect only after it is bound to a port or VLAN.

Note:

- Different types of ACLs cannot be bound to the same port or VLAN.
- Multiple ACLs of the same type can be bound to the same port or VLAN. The switch matches the received packets using the ACLs in order. The ACL that is bound earlier has a higher priority.

Follow the steps below to bind ACL to a port or a VLAN:

Step 1	configure Enter global configuration mode
Step 2	access-list bind <i>acl-id-or-name</i> interface { [<i>vlan vlan-list</i>] [<i>fastEthernet port-list</i>] [<i>gigabitEthernet port-list</i>] [<i>ten-gigabitEthernet port-list</i>] } Bind the ACL to a port or a VLAN. <i>acl-id-or-name</i> : Enter the ID or name of the ACL that you want to add a rule for. <i>vlan-list</i> : Specify the ID or the ID list of the VLAN(s) that you want to bind the ACL to. The valid values are from 1 to 4094, for example, 2-3,5. <i>port-list</i> : Specify the number or the list of the Ethernet port that you want to bind the ACL to.
Step 3	show access-list bind View the ACL binding configuration.
Step 4	end Return to privileged EXEC mode.
Step 5	copy running-config startup-config Save the settings in the configuration file.

The following example shows how to bind ACL 1 to port 3 and VLAN 4:

```
Switch#configure
```

```
Switch(config)#access-list bind 1 interface vlan 4 gigabitEthernet 1/0/3
```

```
Switch(config)#show access-list bind
```

ACL ID	ACL NAME	Interface/VID	Direction	Type
-----	-----	-----	-----	----
1	ACL_1	Gi1/0/3	Ingress	Port
1	ACL_1	4	Ingress	VLAN

```
Switch(config)#end
```

```
Switch#copy running-config startup-config
```

2.2.5 Viewing ACL Counting

You can use the following command to view the number of matched packets of each ACL in the privileged EXEC mode and any other configuration mode:

```
show access-list acl-id-or-name counter
```

View the number of matched packets of the specific ACL.

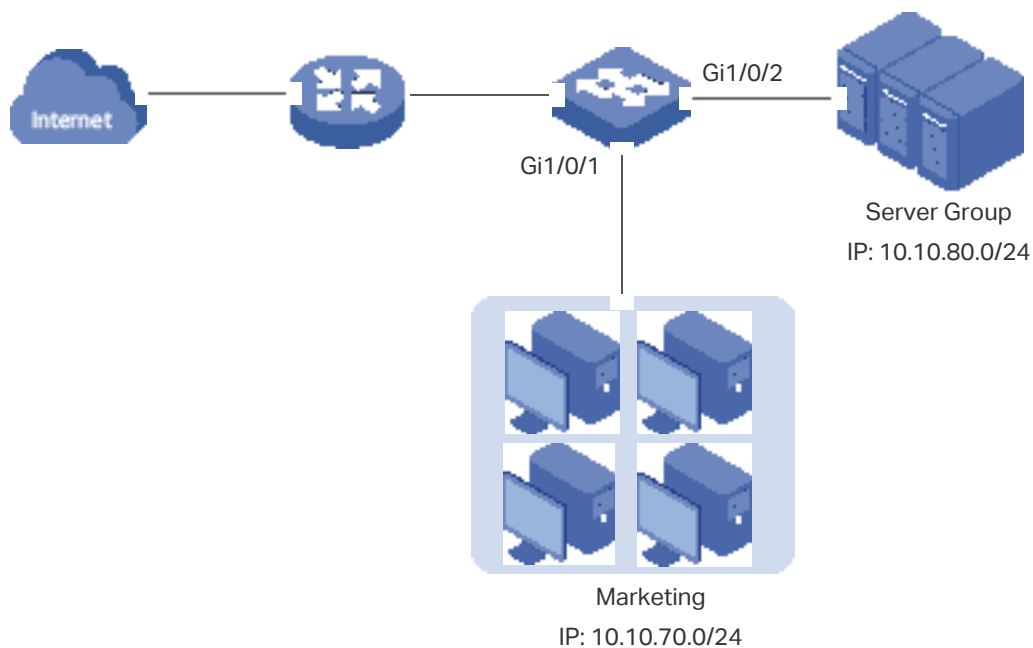
acl-id-or-name: Specify the ID or name of the ACL to be viewed.

3 Configuration Example for ACL

3.1 Network Requirements

As shown below, a company's internal server group can provide different types of services. Computers in the Marketing department are connected to the switch via port 1/0/1, and the internal server group is connected to the switch via port 1/0/2.

Figure 3-1 Network Topology



It is required that:

- The Marketing department can only access internal server group in the intranet.
- The Marketing department can only visit http and https websites on the internet.

3.2 Configuration Scheme

To meet the requirements above, you can set up packet filtering by creating an IP ACL and configuring rules for it.

- **ACL Configuration**

Create an IP ACL and configure the following rules for it:

- Configure a permit rule to match packets with source IP address 10.10.70.0/24, and destination IP address 10.10.80.0/24. This rule allows the Marketing department to access internal network servers from intranet.
- Configure four permit rules to match the packets with source IP address 10.10.70.0/24, and destination ports TCP 80, TCP 443 and TCP/UDP 53. These allow the Marketing department to visit http and https websites on the internet.
- Configure a deny rule to match the packets with source IP address 10.10.70.0/24. This rule blocks other network services.

The switch matches the packets with the rules in order, starting with Rule 1. If a packet matches a rule, the switch stops the matching process and initiates the action defined in the rule.

- **Binding Configuration**

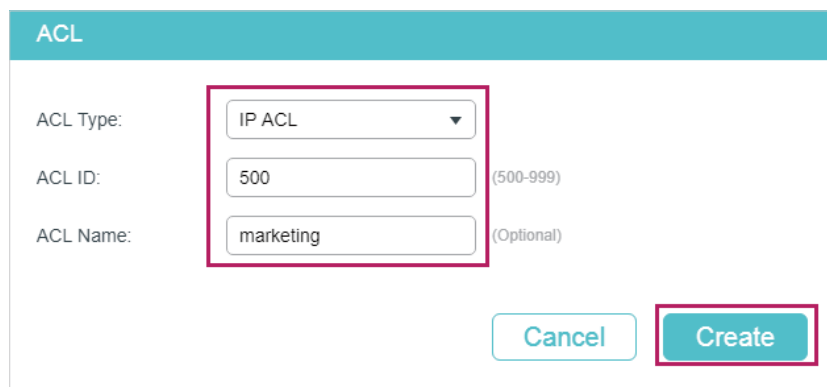
Bind the IP ACL to port 1/0/1 so that the ACL rules will apply to the Marketing department only.

Demonstrated with T2600G-28TS, the following sections explain the configuration procedure in two ways: using the GUI and using the CLI.

3.3 Using the GUI

- 1) Choose the menu **SECURITY > ACL > ACL Config** and click **+ Add** to load the following page. Then create an IP ACL for the marketing department.

Figure 3-2 Creating an IP ACL



The screenshot shows the 'ACL' configuration page. It has a teal header with the text 'ACL'. Below the header, there are three input fields: 'ACL Type:' with a dropdown menu showing 'IP ACL', 'ACL ID:' with a text box containing '500' and '(500-999)' to its right, and 'ACL Name:' with a text box containing 'marketing' and '(Optional)' to its right. At the bottom right, there are two buttons: 'Cancel' and 'Create'. The 'Create' button is highlighted with a red border.

- 2) Click **Edit ACL** in the Operation column.

Figure 3-3 Editing IP ACL

ACL Config

+ Add - Delete

<input type="checkbox"/>	ACL Type	ACL ID	ACL Name	Rules	Operation
<input type="checkbox"/>	IP ACL	500	marketing	None	Edit ACL

Total: 1

3) On the ACL configuration page, click **+ Add**.

Figure 3-4 Editing IP ACL

ACL Details

ACL Type: IP ACL
 ACL ID: 500
 ACL Name: marketing

ACL Rules Table

1 Resequence + Add - Delete Refresh

<input type="checkbox"/>	ID	Rule ID	S-IP	D-IP	IP Protocol	Action	Total Matched Counter	Operation
No Entries in this table.								

Total: 0

4) Configure rule 1 to permit packets with the source IP address 10.10.70.0/24 and destination IP address 10.10.80.0/24.

Figure 3-5 Configuring Rule 1

IP ACL Rule

ACL ID: 500
 ACL Name: marketing

Rule ID: Auto Assign
 Operation:

Fragment: Enable

S-IP: (Format: 192.168.0.1)
 Mask: (Format: 255.255.255.0)
 D-IP: (Format: 192.168.0.1)
 Mask: (Format: 255.255.255.0)

IP Protocol:
 DSCP:
 IP ToS: (Optional, 0-15)
 IP Pre: (Optional, 0-7)

- In the same way, configure rule 2 and rule 3 to permit packets with source IP 10.10.70.0 and destination port TCP 80 (http service port) and TCP 443 (https service port).

Figure 3-6 Configuring Rule 2

IP ACL Rule

ACL ID: 500

ACL Name: marketing

Rule ID: Auto Assign

Operation:

Fragment: Enable

S-IP: (Format: 192.168.0.1)

Mask: (Format: 255.255.255.0)

D-IP: (Format: 192.168.0.1)

Mask: (Format: 255.255.255.0)

IP Protocol:

URG: ACK: PSH:

RST: SYN: FIN:

S-Port

Value: (0-65535)

Mask: (0000-ffff)

D-Port

Value: (0-65535)

Mask: (0000-ffff)

DSCP:

IP ToS: (Optional, 0-15)

Figure 3-7 Configuring Rule 3

IP ACL Rule

ACL ID: 500

ACL Name: marketing

Rule ID: Auto Assign

Operation:

Fragment: Enable

S-IP: (Format: 192.168.0.1)

Mask: (Format: 255.255.255.0)

D-IP: (Format: 192.168.0.1)

Mask: (Format: 255.255.255.0)

IP Protocol:

URG: ACK: PSH:

RST: SYN: FIN:

S-Port

Value: (0-65535)

Mask: (0000-ffff)

D-Port

Value: (0-65535)

Mask: (0000-ffff)

DSCP:

IP ToS: (Optional, 0-15)

- 6) In the same way, configure rule 4 and rule 5 to permit packets with source IP 10.10.70.0 and with destination port TCP 53 or UDP 53 (DNS service port).

Figure 3-8 Configuring Rule 4

IP ACL Rule

ACL ID: 500

ACL Name: marketing

Rule ID: Auto Assign

Operation:

Fragment: Enable

S-IP: (Format: 192.168.0.1)

Mask: (Format: 255.255.255.0)

D-IP: (Format: 192.168.0.1)

Mask: (Format: 255.255.255.0)

IP Protocol:

URG: ACK: PSH:

RST: SYN: FIN:

S-Port

Value: (0-65535)

Mask: (0000-ffff)

D-Port

Value: (0-65535)

Mask: (0000-ffff)

DSCP:

IP ToS: (Optional, 0-15)

Figure 3-9 Configuring Rule 5

IP ACL Rule

ACL ID: 500

ACL Name: marketing

Rule ID: Auto Assign

Operation:

Fragment: Enable

S-IP: (Format: 192.168.0.1)

Mask: (Format: 255.255.255.0)

D-IP: (Format: 192.168.0.1)

Mask: (Format: 255.255.255.0)

IP Protocol:

S-Port

Value: (0-65535)

Mask: (0000-ffff)

D-Port

Value: (0-65535)

Mask: (0000-ffff)

DSCP:

IP ToS: (Optional, 0-15)

7) In the same way, configure rule 6 to deny packets with source IP 10.10.70.0.

Figure 3-10 Configuring Rule 6

IP ACL Rule

ACL ID: 500

ACL Name: marketing

Rule ID: Auto Assign

Operation:

Fragment: Enable

S-IP: (Format: 192.168.0.1)

Mask: (Format: 255.255.255.0)

D-IP: (Format: 192.168.0.1)

Mask: (Format: 255.255.255.0)

IP Protocol:

DSCP:

IP ToS: (Optional, 0-15)

IP Pre: (Optional, 0-7)

- 8) Choose the menu **SECURITY > ACL > ACL Binding** and click **+** Add to load the following page. Bind Policy Market to port 1/0/1 to make it take effect.

Figure 3-11 Binding the Policy to Port 1/0/1

The screenshot shows the 'Port Binding Config' window. At the top, there's a teal header. Below it, the 'ACL' section has radio buttons for 'ID' (selected) and 'Name', and a dropdown menu showing '500'. The 'Direction' is set to 'Ingress'. The 'Port' field contains '1/0/1' with a note '(Format: 1/0/1, input or choose below)'. Below this is a grid of ports labeled 'UNIT1', with port '1' highlighted in a red box. At the bottom right, there are 'Cancel' and 'Create' buttons, with 'Create' also highlighted in a red box.

- 9) Click  Save to save the settings.

3.4 Using the CLI

- 1) Create an IP ACL.

```
Switch#configure
```

```
Switch(config)#access-list create 500 name marketing
```

- 2) Configure rule 1 to permit packets with source IP 10.10.70.0/24 and destination IP 10.10.80.0/24.

```
Switch(config)#access-list ip 500 rule 1 permit logging disable sip 10.10.70.0 sip-mask 255.255.255.0 dip 10.10.80.0 dmask 255.255.255.0
```

- 3) Configure rule 2 and Rule 3 to permit packets with source IP 10.10.70.0/24, and destination port TCP 80 (http service port) or TCP 443 (https service port).

```
Switch(config)#access-list ip 500 rule 2 permit logging disable sip 10.10.70.0 sip-mask 255.255.255.0 protocol 6 d-port 80 d-port-mask ffff
```

```
Switch(config)#access-list ip 500 rule 3 permit logging disable sip 10.10.70.0 sip-mask 255.255.255.0 protocol 6 d-port 443 d-port-mask ffff
```

- 4) Configure rule 4 and rule 5 to permit packets with source IP 10.10.70.0/24, and destination port TCP53 or UDP 53.

```
Switch(config)#access-list ip 500 rule 4 permit logging disable sip 10.10.70.0 sip-mask 255.255.255.0 protocol 6 d-port 53 d-port-mask ffff
```



```
Switch(config)#access-list ip 500 rule 5 permit logging disable sip 10.10.70.0 sip-amask
255.255.255.0 protocol 17 d-port 53 d-port-mask ffff
```

- 5) Configure rule 6 to deny packets with source IP 10.10.70.0/24.

```
Switch(config)#access-list ip 500 rule 2 deny logging disable sip 10.10.70.0 sip-mask
255.255.255.0
```

- 6) Bind ACL500 to port 1.

```
Switch(config)#access-list bind 500 interface gigabitEthernet 1/0/1
```

```
Switch(config)#end
```

```
Switch#copy running-config startup-config
```

Verify the Configurations

Verify the IP ACL 500:

```
Switch#show access-list 500
```

```
rule 1 permit logging disable sip 10.10.70.0 smask 255.255.255.0 dip 10.10.80.0 dmask
255.255.255.0
```

```
rule 2 permit logging disable sip 10.10.70.0 smask 255.255.255.0 protocol 6 d-port 80
```

```
rule 3 permit logging disable sip 10.10.70.0 smask 255.255.255.0 protocol 6 d-port 443
```

```
rule 4 permit logging disable sip 10.10.70.0 smask 255.255.255.0 protocol 6 d-port 53
```

```
rule 5 permit logging disable sip 10.10.70.0 smask 255.255.255.0 protocol 17 d-port 53
```

```
rule 6 deny logging disable sip 10.10.70.0 smask 255.255.255.0
```

```
Switch#show access-list bind
```

ACL ID	ACL NAME	Interface/VID	Direction	Type
-----	-----	-----	-----	----
500	marketing	Gi1/0/1	Ingress	Port

4 Appendix: Default Parameters

The default settings of ACL are listed in the following tables:

Table 4-1 MAC ACL

Parameter	Default Setting
Operation	Permit
User Priority	No Limit
Time-Range	No Limit

Table 4-2 IP ACL

Parameter	Default Setting
Operation	Permit
IP Protocol	All
DSCP	No Limit
IP ToS	No Limit
IP Pre	No Limit
Time-Range	No Limit

Table 4-3 IPv6 ACL

Parameter	Default Setting
Operation	Permit
Time-Range	No Limit

Table 4-4 Combined ACL

Parameter	Default Setting
Operation	Permit
Time-Range	No Limit

Table 4-5 Packet Content ACL

Parameter	Default Setting
Operation	Permit
Time-Range	No Limit

Table 4-6 Policy

Parameter	Default Setting
Mirroring	Disabled
Redirect	Disabled
Rate Limit	Disabled
QoS Remark	Disabled