

10-Commands for Security Function

Table of Contents

1 Commands for ACL	1
absolute-periodic/periodic	1
absolute start	2
access-list (ip extended)	2
access-list (ip standard)	4
access-list(mac extended)	5
access-list(mac-ip extended)	6
access-list (mac standard)	8
clear access-group statistic	9
firewall	9
ip access extended	10
ip access standard	10
ipv6 access-list	11
ipv6 access standard	11
ipv6 access extended	12
{ip ipv6 mac mac-ip} access-group	12
mac access extended	13
mac-ip access extended	14
permit deny (ip extended)	14
permit deny (ip standard)	16
permit deny (ipv6 extended)	16
permit deny (ipv6 standard)	18
permit deny (mac extended)	18
permit deny (mac-ip extended)	20
show access-lists	22
show access-group	22
show firewall	23
show ipv6 access-lists	23
show time-range	24
time-range	24
2 Commands for Self-defined ACL	26
userdefined-access-list standard offset	26
userdefined-access-list standard	27
userdefined access-group	27
vacl userdefined access-group	28
3 Commands for 802.1x	30
dot1x accept-mac	30
dot1x eapor enable	30
dot1x enable	31
dot1x ipv6 passthrough	31
dot1x guest-vlan	32
dot1x macfilter enable	33
dot1x macbased guest-vlan	33
dot1x macbased port-down-flush	34
dot1x max-req	35
dot1x user allow-movement	35
dot1x user free-resource	36
dot1x max-user macbased	36

dot1x max-user userbased.....	37
dot1x portbased mode single-mode	37
dot1x port-control	38
dot1x port-method.....	39
dot1x privateclient enable	39
dot1x privateclient protect enable	40
dot1x re-authenticate.....	41
dot1x re-authentication	41
dot1x timeout quiet-period.....	41
dot1x timeout re-authperiod.....	42
dot1x timeout tx-period.....	42
dot1x unicast enable.....	43
show dot1x	43
4 Commands for the Number Limitation Function of MAC and IP in Port, VLAN.....	45
ip arp dynamic maximum	45
ipv6 nd dynamic maximum.....	45
show arp-dynamic count	46
show mac-address dynamic count.....	46
show nd-dynamic count	47
switchport arp dynamic maximum.....	48
switchport mac-address dynamic maximum.....	48
switchport mac-address violation.....	49
switchport nd dynamic maximum.....	50
vlan mac-address dynamic maximum.....	50
5 Commands for AM Configuration	52
am enable	52
am port	52
am ip-pool	52
am mac-ip-pool	53
no am all.....	54
show am	54
6 Commands for Security Feature	55
dosattack-check srcip-equal-dstip enable.....	55
dosattack-check tcp-flags enable	55
dosattack-check srcport-equal-dstport enable	56
dosattack-check icmp-attacking enable.....	56
dosattack-check icmpV4-size.....	57
7 Commands for TACACS+	58
tacacs-server authentication host	58
tacacs-server key	58
tacacs-server nas-ipv4.....	59
tacacs-server timeout.....	60
8 Commands for RADIUS.....	61
aaa enable.....	61
aaa-accounting enable	61
aaa-accounting update.....	62
radius nas-ipv4.....	62
radius nas-ipv6.....	63
radius-server accounting host.....	63

radius-server authentication host	64
radius-server dead-time	65
radius-server key	66
radius-server retransmit	66
radius-server timeout	67
radius-server accounting-interim-update timeout	68
show aaa authenticated-user	68
show aaa authenticating-user	69
show aaa config	69
show radius authenticated-user count	70
show radius authenticating-user count	70
show radius count	71
9 Commands for SSL Configuration	72
ip http secure-server	72
ip http secure-port	72
ip http secure- ciphersuite	73
show ip http secure-server status	73
10 Commands for IPv6 Security RA	75
ipv6 security-ra enable	75
ipv6 security-ra enable	75
show ipv6 security-ra	76
11 Commands for MAB	77
authentication mab	77
clear mac-authentication-bypass binding	77
mac-authentication-bypass binding-limit	78
mac-authentication-bypass enable	78
mac-authentication-bypass guest-vlan	79
mac-authentication-bypass spoofing-garp-check	79
mac-authentication-bypass timeout linkup-period	80
mac-authentication-bypass timeout offline-detect	80
mac-authentication-bypass timeout quiet-period	81
mac-authentication-bypass timeout reauth-period	81
mac-authentication-bypass timeout stale-period	82
mac-authentication-bypass username-format	83
show mac-authentication-bypass	83
12 Commands for MAB PPPoE Intermediate Agent	85
pppoe intermediate-agent	85
pppoe intermediate-agent (Port)	85
pppoe intermediate-agent circuit-id	86
pppoe intermediate-agent delimiter	86
pppoe intermediate-agent format	87
pppoe intermediate-agent remote-id	87
pppoe intermediate-agent trust	88
pppoe intermediate-agent type self-defined circuit-id	88
pppoe intermediate-agent type self-defined remoteid	89
pppoe intermediate-agent type tr-101 circuit-id access-node-id	89
pppoe intermediate-agent type tr-101 circuit-id identifier-string option delimiter	90
pppoe intermediate-agent vendor-tag strip	91
show pppoe intermediate-agent access-node-id	91

show pppoe intermediate-agent identifier-string option delimiter	92
show pppoe intermediate-agent info	92
13 Commands for VLAN-ACL	94
clear vacl statistic vlan	94
show vacl vlan.....	94
vacl ip access-group	95
vacl ipv6 access-group.....	96
vacl mac access-group	96
vacl mac-ip access-group.....	97
14 Commands for SAVI.....	98
ipv6 cps prefix.....	98
ipv6 cps prefix check enable.....	98
ipv6 dhcp snooping trust.....	99
ipv6 nd snooping trust.....	99
savi check binding.....	100
savi enable.....	100
savi ipv6 binding num.....	101
savi ipv6 check source binding	101
savi ipv6 check source ip-address mac-address	102
savi ipv6 {dhcp-only slaac-only dhcp-slaac} enable.....	103
savi ipv6 mac-binding-limit	103
savi max-dad-dalay	104
savi max-dad-prepare-delay	104
savi max-slaac-life	105
savi timeout bind-protect	105
show savi ipv6 check source binding.....	106

1 Commands for ACL

absolute-periodic/periodic

Command	<pre>[no] absolute-periodic {Monday Tuesday Wednesday Thursday Friday Saturday Sunday}<start_time>to{Monday Tuesday Wednesday Thursday Friday Saturday Sunday}<end_time></pre> <pre>[no]periodic{{Monday+Tuesday+Wednesday+Thursday+Friday+Saturday+Sunday} daily weekdays weekend}<start_time> to <end_time></pre>																								
Parameter	<table border="1"><tr><td>Monday</td><td>Monday</td></tr><tr><td>Tuesday</td><td>Tuesday</td></tr><tr><td>Wednesday</td><td>Wednesday</td></tr><tr><td>Thursday</td><td>Thursday</td></tr><tr><td>Friday</td><td>Friday</td></tr><tr><td>Saturday</td><td>Saturday</td></tr><tr><td>Sunday</td><td>Sunday</td></tr><tr><td>daily</td><td>Every day of the week</td></tr><tr><td>weekdays</td><td>Monday thru Friday</td></tr><tr><td>weekend</td><td>Saturday thru Sunday</td></tr><tr><td><start_time></td><td>start time ,HH:MM:SS (hour: minute: second)</td></tr><tr><td><end_time></td><td>end time,HH:MM:SS (hour: minute: second)</td></tr></table>	Monday	Monday	Tuesday	Tuesday	Wednesday	Wednesday	Thursday	Thursday	Friday	Friday	Saturday	Saturday	Sunday	Sunday	daily	Every day of the week	weekdays	Monday thru Friday	weekend	Saturday thru Sunday	<start_time>	start time ,HH:MM:SS (hour: minute: second)	<end_time>	end time,HH:MM:SS (hour: minute: second)
Monday	Monday																								
Tuesday	Tuesday																								
Wednesday	Wednesday																								
Thursday	Thursday																								
Friday	Friday																								
Saturday	Saturday																								
Sunday	Sunday																								
daily	Every day of the week																								
weekdays	Monday thru Friday																								
weekend	Saturday thru Sunday																								
<start_time>	start time ,HH:MM:SS (hour: minute: second)																								
<end_time>	end time,HH:MM:SS (hour: minute: second)																								
Default	No time-range configuration.																								
Mode	time-range mode																								
Usage Guide	<p>This command is used for the switch configuration command effective time-range.</p> <p>By creating a time period and referencing it in a command, the user can make the command take effect within the time range defined that time period.</p> <p>When, for example, a ACL rule only needs to take effect within a specific time range, it can be configured first and then referenced when configuring the ACL rule, so that the ACL rule can only take effect within the time range defined for that time period.</p> <p>In a time period, the time range can be defined in two ways:</p> <p>Absolute cycle time a period of time that takes effect within a specified time range, such as Tuesday 8:00 to Saturday 8:00.</p> <p>Periodic period: a period of time in which a cycle (such as 14 to 16:00 a week) takes effect.</p> <p>The no command to delete the configured time-range.</p>																								
Example	<p>Make configurations effective within the period from9:15:30 to 12:30:00 during Tuesday to Saturday.</p> <pre>Switch(config)#time-range admin_timer Switch(config-time-range-admin_timer)#absolute-periodic Tuesday 9:15:30 to Saturday 12:30:00</pre>																								

Make configurations effective within the period from 14:30:00 to 16:45:00 on Monday, Wednesday, Friday and Sunday.

Switch(config-time-range-admin_timer)#periodic Monday Wednesday Friday Sunday 14:30:00 to 16:45:00

absolute start

Command	[no] absolute start <start_time> <start_data> [end <end_time> <end_data>]								
Parameter	<table><tr><td><start_time></td><td>start time ,HH:MM:SS (hour: minute: second)</td></tr><tr><td><start_data></td><td>start data ,YYYY.MM.DD (year.month.day)</td></tr><tr><td><end_time></td><td>end time ,HH:MM:SS (hour: minute: second)</td></tr><tr><td><end_data></td><td>end data ,YYYY.MM.DD (year.month.day)</td></tr></table>	<start_time>	start time ,HH:MM:SS (hour: minute: second)	<start_data>	start data ,YYYY.MM.DD (year.month.day)	<end_time>	end time ,HH:MM:SS (hour: minute: second)	<end_data>	end data ,YYYY.MM.DD (year.month.day)
<start_time>	start time ,HH:MM:SS (hour: minute: second)								
<start_data>	start data ,YYYY.MM.DD (year.month.day)								
<end_time>	end time ,HH:MM:SS (hour: minute: second)								
<end_data>	end data ,YYYY.MM.DD (year.month.day)								
Default	No time-range configuration by default.								
Mode	Time-range mode								
Usage Guide	<p>Define an absolute time-range, this time-range operates subject to the clock of this equipment. Absolute time and date, assign specific year, month, day, hour, minute of the start, shall not configure multiple absolute time and date, when in repeated configuration, the latter configuration covers the absolute time and date of the former configuration.</p> <p>The no command delete configuration.</p>								
Example	<p>Make configurations effective from 6:00:00 to 13:30:00 from Oct. 1, 2004 to Jan. 26, 2005.</p> <p>Switch(config)#time-range admin_timer Switch(config-time-range-admin_timer)#absolute start 6:00:00 2004.10.1 end 13:30:00 2005.1.26</p>								

access-list (ip extended)

Command	<p>access-list <num> {deny permit} icmp {{<sIpAddr> <sMask>} any-source {host-source <sIpAddr>}} {{<dIpAddr> <dMask>} any-destination {host-destination <dIpAddr>}} [<icmp-type> [<icmp-code>]] [precedence <prec>] [tos <tos>] [time-range<time-range-name>]</p> <p>access-list <num> {deny permit} igmp {{<sIpAddr> <sMask>} any-source {host-source <sIpAddr>}} {{<dIpAddr> <dMask>} any-destination {host-destination</p>
----------------	--

<dIpAddr>}} [<igmp-type>] [precedence <prec>] [tos <tos>][time-range <time-range-name>]

access-list <num> {deny | permit} tcp {{ <sIpAddr> <sMask> } | any-source | {host-source <sIpAddr> }} [s-port { <sPort> | range <sPortMin> <sPortMax> }] {{ <dIpAddr> <dMask> } | any-destination | {host-destination <dIpAddr> }} [d-port { <dPort> | range <dPortMin> <dPortMax> }] [ack+ fin+ psh+ rst+ urg+ syn] [precedence <prec>] [tos <tos>] [time-range <time-range-name>]

access-list <num> {deny | permit} udp {{ <sIpAddr> <sMask> } | any-source | {host-source <sIpAddr> }} [s-port { <sPort> | range <sPortMin> <sPortMax> }] {{ <dIpAddr> <dMask> } | any-destination | {host-destination <dIpAddr> }} [d-port { <dPort> | range <dPortMin> <dPortMax> }] [precedence <prec>] [tos <tos>] [time-range<time-range-name>]

access-list <num> {deny | permit} {eigrp | gre | igmp | ipinip | ip | ospf |<protocol-num> } {{ <sIpAddr> <sMask> } | any-source | {host-source <sIpAddr> }} {{ <dIpAddr> <dMask> } | any-destination | {host-destination <dIpAddr> }} [precedence <prec>] [tos <tos>] [time-range <time-range-name>]

no access-list <num>

Parameter	
<num>	the No. of access-list, 100-299
deny	deny packets
permit	permit packets
<sIpAddr>	the source IP address, the format is dotted decimal notation
<sMask>	the reverse mask of source IP, the format is dotted decimal notation
<sPort>	source port No., 0-65535
<sPortMin>	the down boundary of source port
<sPortMax>	the up boundary of source port
<protocol>	the No. of upper-layer protocol of ip, 0-255
<dIpAddr>	the destination IP address, the format is dotted decimal notation
<dMask>	the reverse mask of destination IP, the format is dotted decimal notation
<dPort>	destination port No. 0-65535
<dPortMin>	the down boundary of destination port
<dPortMax>	the up boundary of destination port
<igmp-type>	the type of igmp, 0-15
<icmp-type>	the type of icmp, 0-255
<icmp-code>	protocol No. of icmp, 0-255
<prec>	IP priority, 0-7
<tos>	to value, 0-15
<time-range-name>	the name of time-range

Default By default,no access-lists configured.

Mode Global mode

Usage Guide

Create a numeric extended IP access rule to match specific IP protocol or all IP protocol;if access-list of this coded numeric extended does not exist,thus to create such a access-list.

When the user assign specific <num> for the first time,ACL of the serial number is created,then the lists are added into this ACL;the access list which marked

200-299 can configure not continual reverse mask of IP address.

<igmp-type>represent the type of IGMP packet, and usual values please refer to the following description:

17(0x11): IGMP QUERY packet

18(0x12): IGMP V1 REPORT packet

22(0x16): IGMP V2 REPORT packet

23(0x17): IGMP V2 LEAVE packet

34(0x22): IGMP V3 REPORT packet

19(0x13): DVMR packet

20(0x14): PIM V1 packet

Particular notice:The packet types included here are not the types excluding IP OPTION. Normally, IGMP packet contains OPTION fields, and such configuration is of no use for this type of packet. If you want to configure the packets containing OPTION, please directly use the manner where OFFSET is configured.

The no command delete configuration.

Example

Create the numeric extended access-list whose serial No. is 110. deny icmp packet to pass, and permit udp packet with destination address 192. 168. 0. 1 and destination port 32 to pass.

```
Switch(config)#access-list 110 deny icmp any any-destination
```

```
Switch(config)#access-list 110 permit udp any host-destination 192.168.0.1 d-port 32
```

access-list (ip standard)

Command

```
access-list <num> {deny | permit} {{<sIpAddr> <sMask >} | any-source}{host-source <sIpAddr>}}  
no access-list <num>
```

Parameter

<num>	the No. of access-list, 100-199
deny	deny packets
permit	permit packets
<sIpAddr>	the source IP address, the format is dotted decimal notation
<sMask>	the reverse mask of source IP, the format is dotted decimal notation

Default

By default,no access-lists configured.

Mode	Global mode
Usage Guide	<p>Create a numeric standard IP access-list. If this access-list exists, then add a rule list;When the user assign specific <num> for the first time, ACL of the serial number is created, then the lists are added into this ACL.</p> <p>The “no access-list <num>“ operation of this command is to delete a numeric standard IP access-list.</p>
Example	<p>Create a numeric standard IP access-list whose serial No. is 20, and permit date packets with source address of 10.1.1.0/24 to pass, and deny other packets with source address of 10.1.1.0/16.</p> <pre>Switch(config)#access-list 20 permit 10.1.1.0 0.0.0.255 Switch(config)#access-list 20 deny 10.1.1.0 0.0.255.255</pre>

access-list(mac extended)

Command	<pre>access-list <num> {deny permit} {any-source-mac {host-source-mac <sIpAddr>}} <host_smac>} {<smac> <smac-mask>}} {any-destination-mac {host-destination-mac <host_dmac>} {<dmac> <dmac-mask>}} [untagged-eth2 tagged-eth2 untagged-802-3 tagged-802-3] no access-list <num></pre>	
Parameter	<num>	the access-list No. which is a decimal's No. from 1100-1199
	deny	deny packets
	permit	permit packets
	any-source-mac	any source address
	host-source-mac	source mac address
	<sIpAddr>	the source IP address, the format is dotted decimal notation
	<host_smac>	source mac address
	<smac>	source mac address
	<smac-mask>	mask (reverse mask) of source MAC address
	any-destination-mac	any destination address
	host-destination-mac	destination MAC address
	<host_dmac>	destination MAC address
	<dmac>	destination MAC address
	<dmac-mask>	mask (reverse mask) of destination MAC address
	untagged-eth2	format of untagged ethernet II packet
	tagged-eth2	format of tagged ethernet II packet;
	untagged-802-3	format of untagged ethernet 802.3 packet
	tagged-802-3	format of tagged ethernet 802.3 packet
Default	By default,no access-lists configured.	

Mode	Global mode
Usage Guide	<p>Define an extended numeric MAC ACL rule.</p> <p>When the user assign specific <num> for the first time, ACL of the serial number is created, then the lists are added into this ACL.</p> <p>“no access-list <num>” command deletes an extended numeric MAC access-list rule.</p>
Example	<p>Permit tagged-eth2 with any source MAC addresses and any destination MAC addresses and the packets pass.</p> <pre>Switch(config)#access-list 1100 permit any-source-mac any-destination-mac tagged-eth2</pre>

access-list(mac-ip extended)

Command	<pre>access-list<num>{deny permit}{any-source-mac {host-source-mac<host_smac>} {<smac><smac-mask>}} {any-destination-mac {host-destination-mac <host_dmac>} {<dmac><dmac-mask>}}icmp {{<source><source-wildcard>} any-source {host-source<source-host-ip>}} {{<destination><destination-wildcard>} any-destination {host-destination<destination-host-ip>}} [<icmp-type> [<icmp-code>]] [precedence <precedence>] [tos <tos>][time-range<time-range-name>]</pre> <pre>access-list<num>{deny permit}{any-source-mac {host-source-mac<host_smac>} {<smac><smac-mask>}} {any-destination-mac {host-destination-mac <host_dmac>} {<dmac><dmac-mask>}}igmp {{<source><source-wildcard>} any-source {host-source<source-host-ip>}} {{<destination><destination-wildcard>} any-destination {host-destination<destination-host-ip>}} [<igmp-type>] [precedence <precedence>] [tos <tos>][time-range<time-range-name>]</pre> <pre>access-list <num> {deny permit}{any-source-mac {host-source-mac<host_smac> } { <smac> <smac-mask> }}{any-destination-mac {host-destination-mac <host_dmac> } { <dmac> <dmac-mask> }}tcp {{ <source> <source-wildcard> } any-source {host-source <source-host-ip> }}[s-port{ <port1> range <sPortMin> <sPortMax> } {{ <destination> <destination-wildcard> } any-destination {host-destination <destination-host-ip> }} [d-port { <port3> range <dPortMin> <dPortMax> } [ack+fin+psh+rst+urg+syn] [precedence<precedence>] [tos <tos>] [time-range <time-range-name>]</pre> <pre>access-list <num> {deny permit}{any-source-mac {host-source-mac<host_smac> } { <smac> <smac-mask> }}{any-destination-mac {host-destination-mac <host_dmac> } { <dmac> <dmac-mask> }}udp {{ <source> <source-wildcard> } any-source {host-source <source-host-ip> }}[s-port{ <port1> range <sPortMin> <sPortMax> } {{ <destination> <destination-wildcard> } any-destination {host-destination <destination-host-ip> }}[d-port{ <port3> range <dPortMin> <dPortMax> } [precedence <precedence>] [tos <tos>] [time-range <time-range-name>]</pre>
----------------	--

```

access-list <num> {deny|permit}{any-source-mac| {host-source-mac <host_smac> }}
{ <smac> <smac-mask> }} {any-destination-mac|{host-destination-mac <host_dmac> }}
{ <dmac> <dmac-mask> }} {eigrp|gre|igrp|ip|ipinip|ospf|{ <protocol-num> }}
{{ <source><source-wildcard> }|any-source|{host-source <source-host-ip> }}
{{ <destination><destination-wildcard> }|any-destination| {host-destination
<destination-host-ip> }}[precedence <precedence> ] [tos <tos> ][time-range
<time-range-name> ]

```

```
no access-list <num>
```

Parameter	
<num>	access-list serial No. this is a decimal's No. from 3100-3299
deny	deny packets
permit	permit packets
any-source-mac	any source mac address
any-destination-mac	any destination mac address
host_smac , smac	source mac address
smac-mask	(reverse mask) of source MAC address
host_dmac , dmas	destination mac address
dmac-mask	(reverse mask) of destination MAC address
protocol	No. of name or IP protocol. It can be a key word: eigrp, gre, icmp, igmp, igrp, ip, ipinip, ospf, tcp, or udp, or an integer from 0-255 of list No. of IP address. Use key word 'ip' to match all Internet protocols (including ICMP, TCP, AND UDP) list
source-host-ip	No. of source network or source host of packet delivery. Numbers of 32-bit binary system with dotted decimal notation expression
source-wildcard	reverse of source IP. Numbers of 32-bit binary system expressed by decimal's numbers with four-point separated, reverse mask
destination-host-ip	No. of destination network or host to which packets are delivered. Numbers of 32-bit binary system with dotted decimal notation expression
destination-wildcard	mask of destination. I Numbers of 32-bit binary system expressed by decimal's numbers with four-point separated, reverse mask
s-port	means the need to match TCP/UDP source port
port1	value of TCP/UDP source interface No.,Interface No. is an integer from 0-65535
d-port	means need to match TCP/UDP destination interface
sPortMin	the down boundary of source port
sPortMax	the up boundary of source port
port3	value of TCP/UDP destination interface No., Interface No. is an integer from 0-65535
dPortMin	the down boundary of destination port
dPortMax	the up boundary of destination port
[ack] [fin] [psh] [rst] [urg] [syn]	only for TCP protocol, multi-choices of tag positions are available, and when TCP data reports the configuration of corresponding position, then initialization of TCP data report is enabled to form a match when in connection
precedence	packets can be filtered by priority which is a number from 0-7

tos	packets can be filtered by service type which is a number from 0-15
icmp-type	ICMP packets can be filtered by packet type which is a number from 0-255
icmp-code	ICMP packets can be filtered by packet code which is a number from 0-255
igmp-type	ICMP packets can be filtered by IGMP packet name or packet type which is a number from 0-255
time-range-name	name of time range
Default	By default, no access-lists configured.
Mode	Global mode
Usage Guide	<p>Define an extended numeric MAC-IP ACL rule.</p> <p>When the user assigns specific <num> for the first time, ACL of the serial number is created, then the lists are added into this ACL; the access list which is marked 3200-3299 can configure not continual reverse mask of IP address.</p> <p>The no command deletes an extended numeric MAC-IP ACL access-list rule.</p>
Example	<p>Permit the passage of TCP packet with source MAC 00-12-34-45-XX-XX, any destination MAC address, source IP address 100.1.1.0 0.255.255.255, and source port 100.</p> <pre>Switch(config)#access-list 3199 permit 00-12-34-45-67-00 00-00-00-00-FF-FF any-destination-mac tcp 100.1.1.0 0.255.255.255 s-port 100 any-destination</pre>

access-list (mac standard)

Command	<pre>access-list <num> {deny permit} {any-source-mac {host-source-mac <host_smac> } {<smac> <smac-mask> } } no access-list <num></pre>										
Parameter	<table border="1"> <tr> <td><num></td> <td>the access-list No. which is a decimal's No. from 700-799</td> </tr> <tr> <td>deny</td> <td>deny packets</td> </tr> <tr> <td>permit</td> <td>permit packets</td> </tr> <tr> <td>host_smac, smac</td> <td>source mac address</td> </tr> <tr> <td>smac-mask</td> <td>(reverse mask) of source MAC address</td> </tr> </table>	<num>	the access-list No. which is a decimal's No. from 700-799	deny	deny packets	permit	permit packets	host_smac, smac	source mac address	smac-mask	(reverse mask) of source MAC address
<num>	the access-list No. which is a decimal's No. from 700-799										
deny	deny packets										
permit	permit packets										
host_smac, smac	source mac address										
smac-mask	(reverse mask) of source MAC address										
Default	By default, no access-lists configured.										
Mode	Global mode										
Usage Guide	<p>Define a standard numeric MAC ACL rule.</p> <p>When the user assigns specific <num> for the first time, ACL of the serial number is created, then the lists are added into this ACL.</p>										

The no command deletes a standard numeric MAC ACL access-list rule.

Example

Permit the passage of packets with source MAC address 00-00-XX-XX-00-01, and deny passage of packets with source MAC address 00-00-00-XX-00-ab.

```
Switch(config)# access-list 700 permit 00-00-00-00-00-01 00-00-FF-FF-00-00
Switch(config)# access-list 700 deny 00-00-00-00-00-ab 00-00-00-FF-00-00
```

clear access-group statistic

Command

clear access-group statistic [ethernet <interface-name>]

Parameter

interface-name interface-name

Default

None.

Mode

Admin Mode

Usage Guide

Empty packet statistics information of the specified interface.

Example

Empty packet statistics information of interface.

```
Switch#clear access-group statistic
```

firewall

Command

firewall {enable | disable}

Parameter

{enable | disable} enable or disable

Default

None.

Mode

Global Mode

Usage Guide

Enable or disable firewall.

Whether enabling or disabling firewall, access rules can be configured. But only when the firewall is enabled, the rules can be used in specific orientations of specific ports. When disabling the firewall, all ACL tied to ports will be deleted.

Example

Enable firewall.

Switch(config)#firewall enable

ip access extended

Command	[no] ip access extended <name>
Parameter	name the name of the access list. The name can be formed by non-all-digit characters of length of 1 to 32.
Default	By default,no access-lists configured.
Mode	Global mode
Usage Guide	Create a named extended IP access list. When this command is issued for the first time, an empty access list will be created. The no prefix will remove the named extended IP access list including all the rules.
Example	To create a extended IP access list name tcpFlow. Switch(config)#ip access-list extended tcpFlow

ip access standard

Command	[no] ip access standard<name>
Parameter	name the name of the access list. The name can be formed by non-all-digit characters of length of 1 to 32
Default	By default,no access-lists configured.
Mode	Global mode
Usage Guide	Create a named standard access list. When this command is issued for the first time, an empty access list will be created. The no prefix will remove the named standard access list including all the rules in the list.
Example	To create a standard IP access list name ipFlow. Switch(config)#ip access-list standard ipFlow

ipv6 access-list

Command	ipv6 access-list <num-std> {deny permit} {<sIPv6Prefix/sPrefixlen> any-source {host-source <sIPv6Addr>}} no ipv6 access-list <num-std>												
Parameter	<table><tr><td>num-std</td><td>the list number, list range is between 500 ~ 599</td></tr><tr><td>deny</td><td>deny packets</td></tr><tr><td>permit</td><td>permit packets</td></tr><tr><td>sIPv6Prefix</td><td>the prefix of the ipv6 source address</td></tr><tr><td>sPrefixlen</td><td>the length of prefix of the ipv6 source address, range is between 1 ~ 128</td></tr><tr><td>sIPv6Addr</td><td>the ipv6 source address</td></tr></table>	num-std	the list number, list range is between 500 ~ 599	deny	deny packets	permit	permit packets	sIPv6Prefix	the prefix of the ipv6 source address	sPrefixlen	the length of prefix of the ipv6 source address, range is between 1 ~ 128	sIPv6Addr	the ipv6 source address
num-std	the list number, list range is between 500 ~ 599												
deny	deny packets												
permit	permit packets												
sIPv6Prefix	the prefix of the ipv6 source address												
sPrefixlen	the length of prefix of the ipv6 source address, range is between 1 ~ 128												
sIPv6Addr	the ipv6 source address												
Default	By default,no access-lists configured.												
Mode	Global mode												
Usage Guide	Creates a numbered standard IP access-list, if the access-list already exists, then a rule will add to the current access-list. The no command deletes a numbered standard IP access-list.												
Example	Creates a numbered 520 standard IP access-list, allow the source packet from 2003:1:2:3::1/64 pass through the net, and deny all the other packet from the source address 2003:1:2::1/48 pass through. Switch (config)#ipv6 access-list 520 permit 2003:1:2:3::1/64 Switch (config)#ipv6 access-list 520 deny 2003:1:2::1/48												

ipv6 access standard

Command	ipv6 access-list standard <name> no ipv6 access-list standard <name>		
Parameter	<table><tr><td>name</td><td>the name for access list, the character string length is from 1 to 32</td></tr></table>	name	the name for access list, the character string length is from 1 to 32
name	the name for access list, the character string length is from 1 to 32		
Default	By default,no access-lists configured.		
Mode	Global mode		
Usage Guide	Create a name-based standard IPv6 access list.		

When this command is run for the first time, only an empty access list with no entry will be created.

The no command deletes the name-based standard IPv6 access list (including all entries).

Example

Create a standard IPv6 access list named ip6Flow.

```
Switch(config)#ipv6 access-list standard ip6Flow
```

ipv6 access extended

Command

```
ipv6 access-list extended <name>  
no ipv6 access-list extended <name>
```

Parameter

name	the name for access list, the character string length is from 1 to 32
-------------	---

Default

By default,no access-lists configured.

Mode

Global mode

Usage Guide

Create a name-based extended IPv6 access list.

When this command is run for the first time, only an empty access list with no entry will be created.

The no command delete the name-based extended IPv6 access list.

Example

Create an extensive IPv6 access list named tcpFlow.

```
Switch(config)#ipv6 access-list extended tcpFlow
```

{ip|ipv6|mac|mac-ip} access-group

Command

```
{ip|ipv6|mac|mac-ip} access-group <name> {in} [traffic-statistic]  
no {ip|ipv6|mac|mac-ip} access-group <name> {in}
```

Parameter

name	the name for access list, the character string length is from 1 to 32
traffic-statistic	flow statistics

Default

By default,the entry of port is not bound ACL.

Mode

Port Mode

Usage Guide

Apply an access-list on some direction of port, and determine if ACL rule is added statistic counter or not by options.

Note:when a ACL has multiple rules, traffic-statistic can't configure.

There are four kinds of packet head field based on concerned:MAC ACL,IP ACL,MAC-IP ACL and IPv6 ACL; to some extent,ACL filter behavior (permit,deny) has a conflict when a data packet matches multi types of four ACLs.The strict priorities are specified for each ACL based on outcome veracity.It can determine final behavior of packet filter through priority when the filter behavior has a conflict.

When binding ACL to port, there are some limits as below:

1. Each port can bind a MAC-IP ACL, a IP ACL, a MAC ACL and a IPv6 ACL.
2. When binding four ACLs and data packet matching the multi ACLs simultaneity, the priority from high to low are shown as below,

Ingress IPv6 ACL
Ingress MAC-IP ACL
Ingress MAC ACL
Ingress IP ACL

The no command deletes access-list binding on the port.

Example

Binding AAA access-list to entry direction of port.

```
Switch(config)#interface ethernet 1/0/5  
Switch(config-If-Ethernet1/0/5)#ip access-group aaa in
```

mac access extended

Command

```
mac-access-list extended <name>  
no mac-access-list extended <name>
```

Parameter

name	name of access-list excluding blank or quotation mark, and it must start with letter, and the length cannot exceed 32. (remark: sensitivity on capital or small letter.)
-------------	--

Default

By default, no access-lists configured.

Mode

Global mode

Usage Guide

Define a name-manner MAC ACL or enter access-list configuration mode.

After assigning this command for the first time, only an empty name access-list is created and no list item included.

The no command deletes this ACL.

Example	<p>Create an MAC ACL named mac_acl.</p> <pre>Switch(config)# mac-access-list extended mac_acl Switch(config-mac-ext-nacl-mac_acl)#</pre>
----------------	--

mac-ip access extended

Command	<pre>mac-ip-access-list extended <name> no mac-ip-access-list extended <name></pre>
Parameter	<p>name name of access-list excluding blank or quotation mark, and it must start with letter, and the length cannot exceed 32 (remark: sensitivity on capital or small letter).</p>
Default	By default, no named MAC-IP access-list.
Mode	Global mode
Usage Guide	<p>Define a name-manner MAC-IP ACL or enter access-list configuration mode.</p> <p>After assigning this command for the first time, only an empty name access-list is created and no list item included.</p> <p>The no command deletes this ACL.</p>
Example	<p>Create an MAC-IP ACL named macip_acl.</p> <pre>Switch(config)# mac-ip-access-list extended macip_acl Switch(config-macIp-ext-nacl-macip_acl)#</pre>

permit | deny (ip extended)

Command	<pre>[no] {deny permit} icmp {{<sIpAddr> <sMask>} any-source} {host-source <sIpAddr>}} {{<dIpAddr> <dMask>} any-destination {host-destination <dIpAddr>}} [<icmp-type> [<icmp-code>]] [precedence <prec>][tos <tos>] [time-range<time-range-name>]</pre> <pre>[no] {deny permit} igmp {{<sIpAddr> <sMask>} any-source} {host-source <sIpAddr>}} {{<dIpAddr> <dMask>} any-destination {host-destination <dIpAddr>}} [<igmp-type>] [precedence <prec>] [tos <tos>] [time-range<time-range-name>]</pre> <pre>[no] {deny permit} tcp {{ <sIpAddr> <sMask> } any-source} {host-source</pre>
----------------	--

```
<sIpAddr> }} [s-port { <sPort> | range <sPortMin> <sPortMax> }] {{ <dIpAddr>
<dMask> } | any-destination | {host-destination <dIpAddr> }} [d-port { <dPort> |
range <dPortMin> <dPortMax> }] [ack+fin+psh+rst+urg+syn] [precedence <prec> ]
[tos <tos> ][time-range <time-range-name> ]
```

```
[no] {deny | permit} udp {{ <sIpAddr> <sMask> } | any-source | {host-source
<sIpAddr> }} [s-port { <sPort> | range <sPortMin> <sPortMax> }] {{ <dIpAddr>
<dMask> } | any-destination | {host-destination <dIpAddr> }} [d-port { <dPort> |
range <dPortMin> <dPortMax> }] [precedence <prec> ] [tos <tos> ]
[time-range<time-range-name> ]
```

```
[no] {deny | permit} {eigrp | gre | igmp | ipinip | ip | ospf | <protocol-num>}
{{<sIpAddr> <sMask>} | any-source | {host-source <sIpAddr>}} {{<dIpAddr>
<dMask>} | any-destination | {host-destination <dIpAddr>}} [precedence <prec>]
[tos <tos>][time-range<time-range-name>]
```

Parameter	
deny	deny packets
permit	permit packets
<sIpAddr>	the source IP address, the format is dotted decimal notation
<sMask>	the reverse mask of source IP, the format is dotted decimal notation
<sPort>	source port No., 0-65535
<sPortMin>	the down boundary of source port
<sPortMax>	the up boundary of source port
<dIpAddr>	the destination IP address, the format is dotted decimal notation
<dMask>	the reverse mask of destination IP, the format is dotted decimal notation, attentive position 0, ignored position 1
<dPort>	destination port No. 0-65535
<dPortMin>	the down boundary of destination port
<dPortMax>	the up boundary of destination port
<igmp-type>	the type of igmp, 0-15
<icmp-type>	the type of icmp, 0-255
<icmp-code>	protocol No. of icmp, 0-255
<prec>	IP priority, 0-7
<tos>	to value, 0-15
<time-range-name>	time range name

Default By default, no access-list configured.

Mode Name extended IP access-list configuration mode

Usage Guide Create a name extended IP access rule to match specific IP protocol or all IP protocol.

The no command will delete this access list.

Example Create the extended access-list, deny icmp packet to pass, and permit udp packet with destination address 192. 168. 0. 1 and destination port 32 to pass.

```
Switch(config)# access-list ip extended udpFlow
Switch(config-ip-ext-nacl-udpFlow)#deny igmp any any-destination
Switch(config-ip-ext-nacl-udpFlow)#permit udp any host-destination 192.168.0.1 d-port 32
```

permit | deny (ip standard)

Command	<code>{deny permit} {{<sIpAddr> <sMask>} any-source {host-source <sIpAddr>}}</code> <code>no {deny permit} {{<sIpAddr> <sMask>} any-source {host-source <sIpAddr>}}</code>								
Parameter	<table border="1"> <tr> <td>deny</td> <td>deny packets</td> </tr> <tr> <td>permit</td> <td>permit packets</td> </tr> <tr> <td><sIpAddr></td> <td>the source IP address, the format is dotted decimal notation</td> </tr> <tr> <td><sMask></td> <td>the reverse mask of source IP, the format is dotted decimal notation</td> </tr> </table>	deny	deny packets	permit	permit packets	<sIpAddr>	the source IP address, the format is dotted decimal notation	<sMask>	the reverse mask of source IP, the format is dotted decimal notation
deny	deny packets								
permit	permit packets								
<sIpAddr>	the source IP address, the format is dotted decimal notation								
<sMask>	the reverse mask of source IP, the format is dotted decimal notation								
Default	By default, no access-list configured.								
Mode	Name standard IP access-list configuration mode								
Usage Guide	<p>Create a name standard IP access rule</p> <p>The no command deletes this name standard IP access rule.</p>								
Example	<p>Permit packets with source address 10.1.1.0/24 to pass, and deny other packets with source address 10.1.1.0/16.</p> <pre>Switch(config)# access-list ip standard ipFlow Switch(config-std-nacl-ipFlow)# permit 10.1.1.0 0.0.0.255 Switch(config-std-nacl-ipFlow)# deny 10.1.1.0 0.0.255.255</pre>								

permit | deny (ipv6 extended)

Command	<pre>[no] {deny permit} icmp {{<sIPv6Prefix/sPrefixlen>} any-source {host-source <sIPv6Addr>}} {<dIPv6Prefix/dPrefixlen> any-destination {host-destination <dIPv6Addr>}} [<icmp-type> [<icmp-code>]] [dscp <dscp>] [flow-label <fl>] [time-range <time-range-name>]</pre> <pre>[no] {deny permit} tcp { <sIPv6Prefix/sPrefixlen> any-source {host-source <sIPv6Addr> } } [s-port { <sPort> range <sPortMin> <sPortMax> }] { <dIPv6Prefix/dPrefixlen> any-destination {host-destination <dIPv6Addr> } } [d-port { <dPort> range <dPortMin> <dPortMax> }] [syn ack urg rst fin psh] [dscp <dscp>] [flow-label <fl>] [time-range <time-range-name>]</pre>
----------------	---

[no] {deny | permit} udp { <sIPv6Prefix/sPrefixlen> | any-source | {host-source <sIPv6Addr> } } [s-port { <sPort> | range <sPortMin> <sPortMax> }] { <dIPv6Prefix/dPrefixlen> | any-destination | {host-destination <dIPv6Addr> } } [d-port { <dPort> | range <dPortMin> <dPortMax> }] [dscp <dscp>] [flow-label <fl>] [[time-range <time-range-name>]

[no] {deny | permit} <next-header> {<sIPv6Prefix/sPrefixlen> | any-source | {host-source <sIPv6Addr>}} {<dIPv6Prefix/dPrefixlen> | any-destination | {host-destination <dIPv6Addr>}} [dscp <dscp>] [flow-label <fl>][time-range <time-range-name>]

[no] {deny | permit} {<sIPv6Prefix/sPrefixlen> | any-source | {host-source <sIPv6Addr>}} {<dIPv6Prefix/dPrefixlen> | any-destination | {host-destination <dIPv6Addr>}} [dscp <dscp>] [flow-label <fl>] [time-range<time-range-name>]

Parameter	deny	deny packets
	permit	permit packets
	<sIPv6Addr>	the source IPv6 address
	<sPrefixlen>	the length of the IPv6 address prefix, the range is 1~128
	<sPort>	source port number, the range is 0~65535
	<sPortMin>	the down boundary of source port
	<sPortMax>	the up boundary of source port
	<dIPv6Addr>	the destination IPv6 address
	<dPrefixlen>	the length of the IPv6 address prefix, the range is 1~128
	<dPort>	destination port number, the range is 0~65535
	<dPortMin>	the down boundary of destination port
	<dPortMax>	the up boundary of destination port
	<igmp-type>	type of the IGMP
	<icmp-type>	icmp type
	<icmp-code>	icmp protocol number
	<dscp>	IPv6 priority ,the range is 0~63
	<flowlabel>	value of the flow label, the range is 0~1048575
	syn,ack,urg,rst,fin, psh,tcp	label position
	<next-header>	the IPv6 next-header
	<time-range-name>	time range name
Default	By default, No access control list configured.	
Mode	IPv6 nomenclature extended access control list mode	
Usage Guide	Create an extended nomenclature IPv6 access control rule for specific IPv6 protocol. The no command will delete this access list.	
Example	Create an extended access control list named udpFlow,denying the igmppackets while allowing udp packets with destination address 2001:1:2:3::1 and destination port 32.	

```
Switch(config)#ipv6 access-list extended udpFlow
Switch(config-ipv6-ext-nacl-udpFlow)#deny igmp any any-destination
Switch(config-ipv6-ext-nacl-udpFlow)#permit udp any-source host-destination 2001:1:2:3::1
dPort 32
```

permit | deny (ipv6 standard)

Command	[no] {deny permit} {{<sIPv6Prefix/sPrefixlen>} any-source {host-source <sIPv6Addr>}}								
Parameter	<table border="1"> <tr> <td>deny</td> <td>deny packets</td> </tr> <tr> <td>permit</td> <td>permit packets</td> </tr> <tr> <td><sPrefixlen></td> <td>the length of the IPv6 address prefix, the valid range is 1~128</td> </tr> <tr> <td><sIPv6Addr></td> <td>the source IPv6 address</td> </tr> </table>	deny	deny packets	permit	permit packets	<sPrefixlen>	the length of the IPv6 address prefix, the valid range is 1~128	<sIPv6Addr>	the source IPv6 address
deny	deny packets								
permit	permit packets								
<sPrefixlen>	the length of the IPv6 address prefix, the valid range is 1~128								
<sIPv6Addr>	the source IPv6 address								
Default	No access list configured by default.								
Mode	Standard IPv6 nomenclature access list mode								
Usage Guide	<p>Create a standard nomenclature IPv6 access control rule.</p> <p>The no form of this command deletes the nomenclature standard IPv6 access control rule.</p>								
Example	<p>Permit packets with source address of 2001:1:2:3::1/64 while denying those with source address of 2001:1:2:3::1/48.</p> <pre>Switch(config)#ipv6 access-list standard ipv6Flow Switch(config-ipv6-std-nacl-ipv6Flow)# permit 2001:1:2:3::1/64 Switch(config-ipv6-std-nacl-ipv6Flow)# deny 2001:1:2:3::1/48</pre>								

permit | deny (mac extended)

Command	<pre>[no]{deny permit} {any-source-mac[{host-source-mac <host_smac> }]{ <smac> <smac-mask> }} {any-destination-mac[{host-destination-mac <host_dmac> }]{ <dmac> <dmac-mask> }} [cos <cos-val> [<cos-bitmask>]] [vlanId <vid-value> [<vid-mask>]] [ethertype <protocol> [<protocol-mask>]]</pre> <pre>[no]{deny permit} {any-source-mac[{host-source-mac <host_smac> }]{ <smac> <smac-mask> }} {any-destination-mac[{host-destination-mac <host_dmac> }]{ <dmac> <dmac-mask> }} [untagged-eth2 [ethertype <protocol>[protocol-mask]]]</pre> <pre>[no]{deny permit}{any-source-mac[{host-source-mac <host_smac> }]{ <smac></pre>
----------------	--

<smac-mask> }} {any-destination-mac}{host-destination-mac <host_dmac> }}{ <dmac>
<dmac-mask> }} [untagged-802-3]

[no]{deny|permit} {any-source-mac}{host-source-mac <host_smac> }}{ <smac>
<smac-mask> }} {any-destination-mac}{host-destination-mac <host_dmac> }}{ <dmac>
<dmac-mask> }} [tagged-eth2 [cos <cos-val>[<cos-bitmask>]] [vlanId <vid-value>
[<vid-mask>]] [ethertype <protocol>[<protocol-mask>]]]

[no]{deny|permit}{any-source-mac}{host-source-mac <host_smac> }}{ <smac>
<smac-mask> }} {any-destination-mac}{host-destination-mac <host_dmac> }}{ <dmac>
<dmac-mask> }} [tagged-802-3 [cos <cos-val>[<cos-bitmask>]] [vlanId <vid-value>
[<vid-mask>]]]

Parameter	
deny	deny packets
permit	permit packets
any-source-mac	any source of MAC address
any-destination-mac	any destination of MAC address
host_smac, smac	source MAC address
smac-mask	mask (reverse mask) of source MAC address
host_dmac, dmas	destination MAC address
dmac-mask	(reverse mask) of destination MAC address
untagged-eth2	format of untagged ethernet II packet
tagged-eth2	format of tagged ethernet II packet
untagged-802-3	format of untagged ethernet 802.3 packet
tagged-802-3	format of tagged ethernet 802.3 packet
cos-val	cos value, 0-7
cos-bitmask	cos mask, 0-7reverse mask and mask bit is consecutive
vid-value	VLAN No, 1-4094
vid-bitmask	VLAN mask, 0-4095, reverse mask and mask bit is consecutive
protocol	specific Ethernet protocol No., 1536-65535
protocol-bitmask	protocol mask, 0-65535, reverse mask and mask bit is consecutive

Default By default, no access-list configured.

Mode Name extended MAC access-list configuration mode

Usage Guide Define an extended name MAC ACL rule.
Notice: mask bit is consecutive means the effective bit must be consecutively effective from the first bit on the left, no ineffective bit can be added through. For example: the reverse mask format of one byte is: 00001111b; mask format is 11110000; and this is not permitted: 00010011.

The no command deletes this extended name IP access rule.

Example The forward source MAC address is not permitted as 00-12-11-23-XX-XX of 802.3 data packet.

```
Switch(config)# mac-access-list extended macExt
Switch(config-mac-ext-nacl-macExt)#deny          00-12-11-23-00-00          00-00-00-00-ff-ff
any-destination-mac untagged-802-3
```

```
Switch(config-mac-ext-nacl-macExt)#deny 00-12-11-23-00-00 00-00-00-00-ff-ff
any tagged-802
```

permit | deny (mac-ip extended)

Command

```
[no]{deny|permit} {any-source-mac}{host-source-mac<host_smac>}|
{<smac><smac-mask>}} {any-destination-mac}{host-destination-mac<host_dmac>}}
{<dmac><dmac-mask>}} icmp{{<source><source-wildcard>}}any-source|
{host-source<source-host-ip>}} {{<destination><destination-wildcard>}}
any-destination|{host-destination <destination-host-ip>}} [<icmp-type> [<icmp-code>]]
[precedence <precedence>] [tos <tos>][time-range<time-range-name>]
```

```
[no]{deny|permit} {any-source-mac}{host-source-mac<host_smac>}|
{<smac><smac-mask>}} {any-destination-mac}{host-destination-mac<host_dmac>}}
{<dmac><dmac-mask>}} igmp{{<source><source-wildcard>}}any-source|
{host-source<source-host-ip>}} {{<destination><destination-wildcard>}}
any-destination|{host-destination <destination-host-ip>}} [<igmp-type>]
[precedence <precedence>] [tos <tos>][time-range<time-range-name>]
```

```
[no]{deny|permit}{any-source-mac}{host-source-mac <host_smac> }| { <smac>
<smac-mask> }|{any-destination-mac}{host-destination-mac<host_dmac> }|
{ <dmac> <dmac-mask> }|tcp{{ <source><source-wildcard> }|any-source| {host-source
<source-host-ip> }|s-port { <port1> |range <sPortMin> <sPortMax> } }
{{ <destination> <destination-wildcard> } | any-destination| {host-destination
<destination-host-ip> } } [d-port { <port3> | range<dPortMin> <dPortMax> } ]
[ack+fin+psh+rst+urg+syn] [precedence <precedence> ] [tos <tos> ]
[time-range <time-range-name> ]
```

```
[no]{deny|permit}{any-source-mac}{host-source-mac <host_smac> }| { <smac>
<smac-mask> }|{any-destination-mac}{host-destination-mac <host_dmac> }|
{ <dmac> <dmac-mask> }|udp{{ <source> <source-wildcard> }|any-source|
{host-source <source-host-ip> }|s-port{ <port1> | range <sPortMin> <sPortMax> } }
{{ <destination> <destination-wildcard> }|any-destination| {host-destination
<destination-host-ip> } } [d-port { <port3> | range <dPortMin> <dPortMax> } ]
[precedence <precedence> ] [tos <tos> ][time-range <time-range-name> ]
```

```
[no]{deny|permit}{any-source-mac}{host-source-mac<host_smac>}|{<smac>
<smac-mask>}}{any-destination-mac}{host-destination-mac<host_dmac>}}
{<dmac><dmac-mask>}}{eigrp|gre|igrp|ip|ipinip|ospf|{<protocol-num>}}
{{<source><source-wildcard>}}any-source|{host-source<source-host-ip>}}
{{<destination><destination-wildcard>}}any-destination|{host-destination
<destination-host-ip>}} [precedence <precedence>] [tos <tos>]
[time-range<time-range-name>]
```

Parameter

num	access-list serial No. this is a decimal's No. from 3100-3199
deny	deny packets

permit	permit packets
any-source-mac	any source MAC address
any-destination-mac	any destination MAC address
host_smac, smac	source MAC address
smac-mask	(reverse mask) of source MAC address
host_dmac, dmas	destination MAC address
dmac-mask	(reverse mask) of destination MAC address
protocol	No. of name or IP protocol. It can be a key word: eigrp, gre, icmp, igmp, igrp, ip, ipinip, ospf, tcp, or udp, or an integer from 0-255 of list No. of IP address. Use key word 'ip' to match all Internet protocols (including ICMP, TCP, AND UDP) list
source-host-ip, source	No. of source network or source host of packet delivery. Numbers of 32-bit binary system with dotted decimal notation expression
source-wildcard	reverse of source IP. Numbers of 32-bit binary system expressed by decimal's numbers with four-point separated, reverse mask
destination-host-ip, destination	destination No. of destination network or host to which packets are delivered. Numbers of 32-bit binary system with dotted decimal notation expression
destination-wildcard	mask of destination. I Numbers of 32-bit binary system expressed by decimal's numbers with four-point separated, reverse mask
s-port	means the need to match TCP/UDP source port
port1	value of TCP/UDP source interface No., Interface No. is an integer from 0-65535
<sPortMin>	the down boundary of source port
<sPortMax>	the up boundary of source port
d-port	means need to match TCP/UDP destination interface
port3	value of TCP/UDP destination interface No., Interface No. is an integer from 0-65535
<dPortMin>	the down boundary of destination port
<dPortMax>	the up boundary of destination port
[ack] [fin] [psh] [rst] [urg] [syn]	(optional) only for TCP protocol, multi-choices of tag positions are available, and when TCP data reports the configuration of corresponding position, then initialization of TCP data report is enabled to form a match when in connection
precedence	packets can be filtered by priority which is a number from 0-7
tos	packets can be filtered by service type which ia number from 0-15
icmp-type	ICMP packets can be filtered by packet type which is a number from 0-255
icmp-code	ICMP packets can be filtered by packet code which is a number from 0-255
igmp-type	ICMP packets can be filtered by IGMP packet name or packet type which is a number from 0-255
time-range-name	name of time range

Default

By default, no access-list configured.

Mode

Name extended MAC-IP access-list configuration mode

Usage Guide	Define an extended name MAC-IP ACL rule. No form deletes one extended numeric MAC-IP ACL access-list rule.
Example	Deny the passage of UDP packets with any source MAC address and destination MAC address, any source IP address and destination IP address, and source port 100. Switch(config)# mac-ip-access-list extended macIpExt Switch(config-macip-ext-nacl-macIpExt)# deny any-source-mac any-destination-mac udp any-source s-port 100 any-destination

show access-lists

Command	show access-lists [<num> <acl-name>]
Parameter	<num> <acl-name> specific ACL No specific ACL name character string
Default	None.
Mode	Admin Mode
Usage Guide	Reveal ACL of configuration. When not assigning names of ACL, all ACL will be revealed, used x time (s) indicates the times of ACL to be used.
Example	Reveal ACL of configuration. Switch#show access-lists access-list 10(used 0 time(s)) access-list 10 deny any-source access-list 100(used 1 time(s)) access-list 100 deny ip any any-destination access-list 100 deny tcp any any-destination access-list 1100(used 0 time(s)) access-list 1100 permit any-source-mac any-destination-mac tagged-eth2 14 2 0800

show access-group

Command	show access-group in (interface {Ethernet Ethernet IFNAME})
Parameter	IFNAME Port name

Default	None.
Mode	admin/ Global Mode
Usage Guide	Display the ACL binding status on the port. When not assigning interface names, all ACL tied to port will be revealed.
Example	Displays all ACL bound to the port. Switch#show access-group interface name: Ethernet 1/0/1 IP Ingress access-list used is 100, traffic-statistics Disable. interface name: Ethernet1/0/2 IP Ingress access-list used is 1, packet(s) number is 11110.

show firewall

Command	show firewall
Parameter	none none
Default	None.
Mode	Admin/Global Mode
Usage Guide	Reveal configuration information of packet filtering functions.
Example	Display firewall status. Switch#show firewall Firewall status: Enable.

show ipv6 access-lists

Command	show ipv6 access-lists [<num> <acl-name>]
Parameter	<num> the number of specific access control list, the valid range is 500~699, amongst 500~599 is digit standard IPv6 ACL number, 600~699 is the digit extended IPv6 ACL number
	<acl-name> the nomenclature character string of a specific access control list, lengthening within 1~32

Default	None.
Mode	Admin/Global Mode
Usage Guide	Show the configured IPv6 access control list. When no access control list is specified, all the access control lists will be displayed; in used x time (s) is shown the times the ACL had been quoted.
Example	Show the configured IPv6 access control list. Switch#show ipv6 access-lists ipv6 access-list 500(used 1 time(s)) ipv6 access-list 500 deny any-source ipv6 access-list 510(used 1 time(s)) ipv6 access-list 510 deny ip any-source any-destination ipv6 access-list 510 deny tcp any-source any-destination ipv6 access-list 520(used 1 time(s)) ipv6 access-list 520 permit ip any-source any-destination

show time-range

Command	show time-range <word>
Parameter	<word> assign name of time-range needed to be revealed
Default	None.
Mode	Admin/Global Mode
Usage Guide	Reveal configuration information of time range functions. When not assigning time-range names, all time-range will be revealed. in used x time (s) is shown the times the ACL had been quoted.
Example	Reveal configuration information of time range functions. Switch#show time-range time-range timer1 (inactive, used 0 times) absolute-periodic Saturday 0:0:0 to Sunday 23:59:59 time-range timer2 (inactive, used 0 times) absolute-periodic Monday 0:0:0 to Friday

time-range

Command	[no] time-range <time_range_name>
Parameter	<time_range_name> time range name must start with letter or number, and the length cannot exceed 32 characters long
Default	By default, no time-range configuration.
Mode	Global Mode
Usage Guide	Create the name of time-range as time range name, enter the time-range mode at the same time. The no command to delete this time range.
Example	Create a time-range named admin_timer. Switch(config)#Time-range admin_timer

2 Commands for Self-defined ACL

userdefined-access-list standard offset

Command	<pre>userdefined-access-list standard offset [window1 { l3start l4start } <offset>] [window2 { l3start l4start } <offset>] [window3 { l3start l4start } <offset>] [window4 { l3start l4start } <offset>] [window5 { l3start l4start } <offset>] [window6 { l3start l4start } <offset>] [window7 { l3start l4start } <offset>] [window8 { l3start l4start } <offset>] [window9 { l3start l4start } <offset>] [window10 { l3start l4start } <offset>] [window11 { l3start l4start } <offset>] [window12 { l3start l4start } <offset>] no userdefined-access-list standard offset [window1] [window2] [window3] [window4] [window5] [window6] [window7] [window8] [window9] [window10] [window11] [window12]</pre>								
Parameter	<table border="1"><tr><td>window1-window12</td><td>self-defined window 1 to 12</td></tr><tr><td>l3start</td><td>The start offset position is start of layer3 (It can be effective only when the start of layer3 exists)</td></tr><tr><td>l4start</td><td>The start offset position is start of layer4 (It can be effective only when the start of layer4 exists)</td></tr><tr><td>offset</td><td>The configured offset is from 0 to 178 (unit is 2Bytes)</td></tr></table>	window1-window12	self-defined window 1 to 12	l3start	The start offset position is start of layer3 (It can be effective only when the start of layer3 exists)	l4start	The start offset position is start of layer4 (It can be effective only when the start of layer4 exists)	offset	The configured offset is from 0 to 178 (unit is 2Bytes)
window1-window12	self-defined window 1 to 12								
l3start	The start offset position is start of layer3 (It can be effective only when the start of layer3 exists)								
l4start	The start offset position is start of layer4 (It can be effective only when the start of layer4 exists)								
offset	The configured offset is from 0 to 178 (unit is 2Bytes)								
Default	No Configuration Template.								
Mode	Global Mode								
Usage Guide	<p>Create a standard self-defined ACL template. If the template exists, the corresponding window of the template can be modified.</p> <p>{l2endoftag l3start l4start}: used to configure the start offset position of a window, <offset>: used to the offset of a window, the range is <0-178>, unit is 2Bytes,namely, 0 means 0Bytes offset and 1 means 2Bytes offset. Standard self-defined ACL template can configure the start offset position and offset for 12 window at most. One standard self-defined ACL template can be shared in global mode. The window cannot be modified if the standard self-defined ACL rule is configured with this window. But if the standard self-defined ACL rule is not configured, the window configuration can be modified with this command.</p> <p>The no command can delete one or more offset configuration of the window in the template or delete the whole template. The window in the template can be deleted successfully when it is not used by the self-defined ACL rule.</p> <p>Ipv6 only supports window1-6, the biggest offset of l3start includes the head of L2, the biggest offset of l4start includes the head of L2 and L3.</p> <p>The no command deletes the window of the standard self-defined ACL template. If the window is not specified, the standard self-defined ACL template will be deleted.</p>								
Example	Create a global template with 7 windows (3-9) to configure the start offset position and the offset:								

```
Switch(config)#userdefined-access-list standard offset window3 I2 0 window4 I2 2 window5 I3 0 window6 I3 1 window7 I3 2 window8 I4 1 window9 I4 2
```

userdefined-access-list standard

Command

```
userdefined-access-list standard <1200-1299> {permit|deny} {window1|window2|window3|window4|window5|window6|window7|window8|window9|window10|window11|window12}
```

```
no userdefined-access-list standard <1200-1299> {permit|deny} {window1|window2|window3|window4|window5|window6|window7|window8|window9|window10|window11|window12}
```

Parameter

<1200-1299>	the access-list No. from 1200 to 1299 in decimal notation
permit	permit access
deny	deny access
window1-window12	custom windows 1 to 12

Default

By default, no any access-list configured.

Mode

Global Mode

Usage Guide

Create a numbered standard self-defined ACL. If the standard self-defined ACL exists, then a rule will be added to the ACL.

When users specify the specified <num> for the first time, create the ACL with this serial number, then add the entry into this ACL.

The no command deletes a numbered standard self-defined ACL.

Example

Permit the second bytes of the start of I3 is 0x4501. Permit the packets that the forth byte of the start of I4 is 0xFF.

Configure a rule in the same list to deny the packets that the fifth and the sixth bytes of the start of I3 is 0xFFAA.

```
Switch(config)#userdefined-access-list standard offset window1 I3 0 window2 I4 1
Switch(config)#userdefined-access-list standard 1200 permit window1 4501 FFFF window2 00FF 00FF
Switch(config)#userdefined-access-list standard offset window3 I3 2
Switch(config)#userdefined-access-list standard 1200 deny any-source-mac any-destination-mac untagged-eth2 window3 FFAA FFFF
```

userdefined access-group

Command	<pre> userdefined access-group <name> {in} [traffic-statistic] no userdefined access-group <name> {in} </pre>
Parameter	<pre> <name> the access-list name from 1200-1399 in decimal notation </pre>
Default	By default, userdefined-access-list is not bound to the port.
Mode	Physical Port Configuration Mode
Usage Guide	<p>Apply userdefined-access-list to one direction of the port. Decide whether the statistical counter should be added to the ACL according to the options.</p> <p>A self-defined access-list can be bound to the ingress of a port and can be configured at the ingress of the same port with other access-lists at the same time. The deny rule is precedent when different access-lists are matching, that means if there is a access-lists match the deny rule, the deny rule must be executed, the permit rule will be executed oppositely.</p> <p>The no command deletes the configuration bound to the port.</p>
Example	<p>The configured self-defined access-list is shown in the following:</p> <pre> Switch(config)#userdefined-access-list standard offset window1 l3 0 window2 l4 1 window3 l3 1 Switch(config)#userdefined-access-list standard 1300 permit window1 4501 FFFF window2 00FF 00FF Switch(config)#userdefined-access-list standard 1300 deny window1 FF000000 FFFF0000 </pre> <p>Bind the self-defined access-list to Ethernet1/1:</p> <pre> Switch(config)#interface ethernet1/1 Switch(config-if-ethernet1/1)#userdefined access-group 1300 in </pre>

vacl userdefined access-group

Command	<pre> vacl userdefined access-group <name> {in} vlan <vlanId> [traffic-statistic] no vacl userdefined access-group <name> {in} vlan <vlanId> </pre>
Parameter	<pre> <name> the access-list name from 1200 to 1399 in decimal notation vlanId the bound VLAN, the range is 1-4094 </pre>
Default	By default, userdefined-access-list is not bound to any VLAN.
Mode	Global Mode
Usage Guide	Apply userdefined-access-list to one direction of the specified VLAN, decide whether the

statistical counter should be added to the ACL according to the options or.

A self-defined access-list can be bound to the ingress of a VLAN and can be configured at the ingress of the same VLAN with other access-lists at the same time. The deny rule is precedent when different access-lists are matching, that means if there is a access-lists match the deny rule, the deny rule must be executed, the permit rule will be executed oppositely.

The no command deletes the configuration bound to the specified VLAN.

Example

The configured self-defined access-list is shown in the following:

```
Switch(config)#userdefined-access-list standard offset window1 l3 0 window2 l4 1
window3 l3 1
```

```
Switch(config)#userdefined-access-list standard 1300 permit window1 4501 FFFF window2
00FF 00FF
```

```
Switch(config)#userdefined-access-list standard 1300 deny window1 FFAA0000 FFFF0000
```

Bind the self-defined access-list to VLAN1:

```
Switch(config)#vACL userdefined access-group 1300 in vlan 1
```

3 Commands for 802.1x

dot1x accept-mac

Command	[no] dot1x accept-mac <mac-address> [interface <interface-name>]
Parameter	mac-address stands for MAC address interface-name for interface name and port number
Default	None.
Mode	Global Mode
Usage Guide	<p>Add a MAC address entry to the dot1x address filter table. If a port is specified, the entry added applies to the specified port only. If no port is specified, the entry added applies to all the ports.</p> <p>The dot1x address filter function is implemented according to the MAC address filter table, dot1x address filter table is manually added or deleted by the user.</p> <p>When a port is specified in adding a dot1x address filter table entry, that entry applies to the port only; when no port is specified, the entry applies to all ports in the switch. When dot1x address filter function is enabled, the switch will filter the authentication user by the MAC address. Only the authentication request initiated by the users in the dot1x address filter table will be accepted, the rest will be rejected.</p> <p>The no command deletes the entry from dot1x address filter table.</p>
Example	<p>Adding MAC address 00-01-34-34-2e-0a to the filter table of Ethernet 1/0/5.</p> <pre>Switch(config)#dot1x accept-mac 00-01-34-34-2e-0a interface ethernet 1/0/5</pre>

dot1x eapour enable

Command	[no] dot1x eapour enable
Parameter	none none
Default	EAP relay authentication is used by default.
Mode	Global Mode
Usage Guide	<p>Enables the EAP relay authentication function in the switch.</p> <p>The switch and RADIUS may be connected via Ethernet or PPP. If an Ethernet connection exists between the switch and RADIUS server, the switch needs to authenticate the user by EAP relay (EAPoR authentication); if the switch connects to the RADIUS server by PPP, the switch will use</p>

EAP local end authentication (CHAP authentication). The switch should use different authentication methods according to the connection between the switch and the authentication server.

The no command sets EAP local end authentication.

Example

Setting EAP local end authentication for the switch.

Switch(config)#no dot1x eapor enable

dot1x enable

Command

[no] dot1x enable

Parameter

none none

Default

802.1x function is not enabled in global mode by default; if 802.1x is enabled under Global Mode, 802.1x will not be enabled for the ports by default.

Mode

Global Mode and Port Mode

Usage Guide

Enables the 802.1x function in the switch and ports.
The 802.1x authentication for the switch must be enabled first to enable 802.1x authentication for the respective ports. If Spanning Tree or MAC binding is enabled on the port, or the port is a Trunk port or member of port aggregation group, 802.1x function cannot be enabled for that port unless such conditions are removed.

The no command disables the 802.1x function.

Example

Enabling the 802.1x function of the switch and enable 802.1x for port1/0/12.

Switch(config)#dot1x enable
Switch(config)#interface ethernet 1/0/12
Switch(config-if-ethernet1/0/12)#dot1x enable

dot1x ipv6 passthrough

Command

[no] dot1x ipv6 passthrough

Parameter

none none

Default

IPv6 passthrough function is disabled on the switch by default.

Mode	Port Mode
Usage Guide	<p>Enable IPv6 passthrough function on a switch port, only applicable when access control mode is userbased.</p> <p>The function can only be enabled when 802.1x function is enabled both globally and on the port, with userbased being the control access mode. After it is enabled, users can send IPv6 messages without authentication.</p> <p>The no operation of this command will disable the function.</p>
Example	<p>Enable IPv6 passthrough function on port Ethernet1/0/12.</p> <pre>Switch(config)#dot1x enable Switch(config)#interface ethernet 1/0/12 Switch(config-if-ethernet1/0/12)#dot1x enable Switch(config-if-ethernet1/0/12)#dot1x ipv6 passthrough</pre>

dot1x guest-vlan

Command	<pre>dot1x guest-vlan <vlanid> no dot1x guest-vlan</pre>
Parameter	<p>vlanid the specified VLAN id, ranging from 1 to 4094</p>
Default	By default, there is no 802.1x guest-vlan function on the port.
Mode	Port Mode
Usage Guide	<p>Set the guest-vlan of the specified port.</p> <p>The access device will add the port into Guest VLAN if there is no supplicant getting authenticated successfully in a certain stretch of time because of lacking exclusive authentication supplicant system or the version of the supplicant system being too low. In Guest VLAN, users can get 802.1x supplicant system software, update supplicant system or update some other applications (such as anti-virus software, the patches of operating system).</p> <p>When a user of a port within Guest VLAN starts an authentication, the port will remain in Guest VLAN in the case of a failed authentication.</p> <p>If the authentication finishes successfully, there are two possible results:</p> <ol style="list-style-type: none"> 1、 The authentication server assigns an Auto VLAN, causing the port to leave Guest VLAN to join the assigned Auto VLAN. After the user gets offline, the port will be allocated back into the specified Guest VLAN. 2、 The authentication server assigns an Auto VLAN, then the port leaves Guest VLAN and joins the specified VLAN. When the user becomes offline, the port will be allocated to the specified Guest VLAN again. <p>Attention:</p>

There can be different Guest VLAN set on different ports, while only one Guest VLAN is allowed on one port.

Only when the access control mode is portbased, the Guest VLAN can take effect. If the access control mode of the port is macbased or userbased, the Guest VLAN can be successfully set without taking effect.

The no command is used to delete the guest-vlan.

Example

Set Guest-VLAN of port Ethernet1/0/3 as VLAN 10.

```
Switch(config)#dot1x enable
Switch(config)#interface ethernet 1/0/3
Switch(config-if-ethernet1/0/3)#dot1x guest-vlan 10
```

dot1x macfilter enable

Command

[no] dot1x macfilter enable

Parameter

none none

Default

dot1x address filter is disabled by default.

Mode

Global Mode

Usage Guide

Enables the dot1x address filter function in the switch.

When dot1x address filter function is enabled, the switch will filter the authentication user by the MAC address. Only the authentication request initiated by the users in the dot1x address filter table will be accepted.

The no command disables the dot1x address filter function.

Example

Enabling dot1x address filter function for the switch.

```
Switch(config)#dot1x macfilter enable
```

dot1x macbased guest-vlan

Command

dot1x macbased guest-vlan <vlanid>
no dot1x macbased guest-vlan

Parameter

vlanid the configured vlan id, the range is from 1 to 4094

Default	Do not configure 802.1x macbased guest-vlan by default.
Mode	Port Mode
Usage Guide	<p>Configure to appoint the port's guest-vlan based on the mac authentication.</p> <p>If there is no dedicated authentication client or the client version was too low, and it makes no clients authenticate successfully on the port in some time, then the access device will make this user join to the guest VLAN. User can get the 802.1x client software in guest VLAN, update the client or do other updating things (such as anti-virus software, system patches and etc.) When the user under the port in Guest VLAN issues the authentication, this port will be stay in guest VLAN if the authentication failed;</p> <p>if it was successful, there are two situations as below:</p> <ol style="list-style-type: none"> 1、 The authentication server issues an auto VLAN, in this time, the user left the guest VLAN and joined to the auto VLAN. After the user was downline, this user will be assigned to the configured guest VLAN again. 2、 The authentication server did not issue the VLAN, in this time, the user left the guest VLAN and joined to the configured native VLAN. After the user was downline, this user will be assigned to the configured guest VLAN again. <p>Notice:</p> <ol style="list-style-type: none"> 1、 dot1x macbased guest-vlan can be configured only on the port based on mac authentication and in HYBRID mode. 2、 Different macbased guestVLAN can be configured on different ports, but only one macbased guestVLAN can be configured on one port. <p>The no command deletes this guest-vlan.</p>
Example	<p>Configure the guest-vlan of Ethernet1/0/3 as Vlan 10.</p> <pre>Switch(config-if-ethernet1/0/3)#dot1x macbased guest-vlan 10</pre>

dot1x macbased port-down-flush

Command	[no] dot1x macbased port-down-flush
Parameter	none none
Default	The command is not enabled by default.
Mode	Global Mode
Usage Guide	<p>Enables this command, when the dot1x certification according to mac is down, delete the user who passed the certification of the port</p> <p>When users who passed the certification according to mac changed among different ports, delete the user for the new certification. The command should be enable to delete the user.</p>

	The no command does not make the down operation.
Example	When the dot1x certification according to mac is down, delete the user who passed the certification of the port. Switch(config)#dot1x macbased port-down-flush

dot1x max-req

Command	dot1x max-req <count> no dot1x max-req
Parameter	count the times to re-transfer EAP request/ MD5 frames, the valid range is 1 to 10
Default	The default maximum for retransmission is 2.
Mode	Global Mode
Usage Guide	Sets the number of EAP request/MD5 frame to be sent before the switch re-initials authentication on no supplicant response. The default value is recommended in setting the EAP request/ MD5 retransmission times. The no command restores the default setting.
Example	Changing the maximum retransmission times for EAP request/ MD5 frames to 5 times. Switch(config)#dot1x max-req 5

dot1x user allow-movement

Command	[no] dot1x user allow-movement
Parameter	none none
Default	Disable the authentication function after the user moves the port.
Mode	Global Mode
Usage Guide	Enable the authentication function after the user moves the port, so the switch allows user to process this authentication. In the condition that the switch connects with hub, when the user will be moved to other port, dot1x user allow-movement command should be enabled.

The no command disables the function.

Example

Enable the authentication function after the user moves the port.

Switch(config)#dot1x user allow-movement

dot1x user free-resource

Command

dot1x user free-resource <prefix> <mask>
no dot1x user free-resource

Parameter

prefix	the segment for limited resource, in dotted decimal format
mask	the mask for limited resource, in dotted decimal format

Default

There is no free resource by default.

Mode

Global Mode

Usage Guide

To configure 802.1x free resource.

This command is available only if user based access control is applied. If user based access control has been applied, this command configures the limited resources which can be accessed by the un-authenticated users. For port based and MAC based access control, users could access no network resources before authentication.

If TrustView management system is available, the free resource can be configured in TrustView server, and the TrustView server will distribute the configuration to the switches.

To be noticed, only one free resource can be configured for the overall network.

The no form command closes this function.

Example

To configure the free resource segment as 1.1.1.0, the mask is 255.255.255.0.

Switch(config)#dot1x user free-resource 1.1.1.0 255.255.255.0

dot1x max-user macbased

Command

dot1x max-user macbased <number>
no dot1x max-user macbased

Parameter

number	the maximum users allowed, the valid range is 1 to 256
---------------	--

Default

The default maximum user allowed is 1.

Mode	Port Mode
Usage Guide	<p>Sets the maximum users allowed connect to the port.</p> <p>This command is available for ports using MAC-based access management, if MAC address authenticated exceeds the number of allowed user, additional users will not be able to access the network.</p> <p>The no command restores the default setting.</p>
Example	<p>Setting port 1/0/3 to allow 5 users.</p> <pre>Switch(config-if-ethernet1/0/3)#dot1x max-user macbased 5</pre>

dot1x max-user userbased

Command	<pre>dot1x max-user userbased <number> no dot1x max-user userbased</pre>
Parameter	<p>number the maximum number of users allowed to access the network, ranging from 1 to 1~256</p>
Default	The maximum number of users allowed to access each port is 10 by default.
Mode	Port Mode
Usage Guide	<p>Set the upper limit of the number of users allowed access the specified port when using user-based access control mode.</p> <p>This command can only take effect when the port adopts user-based access control mode. If the number of authenticated users exceeds the upper limit of the number of users allowed access the network, those extra users can not access the network.</p> <p>the no command is used to reset the default value.</p>
Example	<p>Setting port 1/0/3 to allow 5 users.</p> <pre>Switch(config-if-ethernet1/0/3)#dot1x max-user userbased 5</pre>

dot1x portbased mode single-mode

Command	<pre>[no] dot1x portbased mode single-mode</pre>
----------------	--

Parameter	none none
Default	Disable the single-mode by default.
Mode	Port Mode
Usage Guide	<p>Set the single-mode based on portbase authentication mode.</p> <p>This command takes effect when the access mode of the port is set as portbase only. Before configuring the single-mode, if the port has enabled dot1x port-method portbased command and exist online users, the switch will enforce all users of this port are offline. After that, this port only allows a user to pass the authentication, the user can access the specified network resource, but other authentication users of this port will be denied and can not access the network. After disabling the single-mode, the switch also enforce the authenticated user is offline.</p> <p>The no command disables this function.</p>
Example	<p>Set port 1/0/1 based on port authentication mode to single mode.</p> <p>Switch(config-if-ethernet1/0/1)#dot1x portbased mode single-mode</p>

dot1x port-control

Command	dot1x port-control {auto force-authorized force-unauthorized} no dot1x port-control						
Parameter	<table border="1"> <tr> <td>auto</td> <td>enable 802.1x authentication, the port authorization status is determined by the authentication information between the switch and the supplicant</td> </tr> <tr> <td>force-authorized</td> <td>sets port to authorized status, unauthenticated data is allowed to pass through the port</td> </tr> <tr> <td>force-unauthorized</td> <td>will set the port to non-authorized mode, the switch will not provide authentication for the supplicant and prohibit data from passing through the port</td> </tr> </table>	auto	enable 802.1x authentication, the port authorization status is determined by the authentication information between the switch and the supplicant	force-authorized	sets port to authorized status, unauthenticated data is allowed to pass through the port	force-unauthorized	will set the port to non-authorized mode, the switch will not provide authentication for the supplicant and prohibit data from passing through the port
auto	enable 802.1x authentication, the port authorization status is determined by the authentication information between the switch and the supplicant						
force-authorized	sets port to authorized status, unauthenticated data is allowed to pass through the port						
force-unauthorized	will set the port to non-authorized mode, the switch will not provide authentication for the supplicant and prohibit data from passing through the port						
Default	When 802.1x is enabled for the port, auto is set by default.						
Mode	Port Mode						
Usage Guide	<p>Sets the 802.1x authentication status.</p> <p>If the port needs to provide 802.1x authentication for the user, the port authentication mode should be set to auto.</p> <p>The no command restores the default setting.</p>						
Example	Setting port1/0/1 to require 802.1x authentication mode.						

```
Switch(config-if-ethernet1/0/1)#dot1x port-control auto
```

dot1x port-method

Command	dot1x port-method {macbased portbased userbased {standard advanced}} no dot1x port-method										
Parameter	<table><tr><td>macbased</td><td>means the access control method based on MAC address</td></tr><tr><td>portbased</td><td>means the access control method based on port</td></tr><tr><td>userbased</td><td>means the access control method based on user, it can be divided into two types, one is standard access control method, and the other is advanced access control method</td></tr><tr><td>standard</td><td>Standard Access Control Method Based on User</td></tr><tr><td>advanced</td><td>Advanced User-Based Access Control</td></tr></table>	macbased	means the access control method based on MAC address	portbased	means the access control method based on port	userbased	means the access control method based on user, it can be divided into two types, one is standard access control method, and the other is advanced access control method	standard	Standard Access Control Method Based on User	advanced	Advanced User-Based Access Control
macbased	means the access control method based on MAC address										
portbased	means the access control method based on port										
userbased	means the access control method based on user, it can be divided into two types, one is standard access control method, and the other is advanced access control method										
standard	Standard Access Control Method Based on User										
advanced	Advanced User-Based Access Control										
Default	Advanced access control method based on user is used by default.										
Mode	Port Mode										
Usage Guide	<p>This command is used to configure the dot1x authentication method for the specified port. When port based authentication is applied, only one host can authenticate itself through one port. And after authentication, the host will be able to access all the resources. When MAC based authentication is applied, multiple host which are connected to one port can access all the network resources after authentication. When either of the above two kinds of access control is applied, un-authenticated host cannot access any resources in the network.</p> <p>When user based access control is applied, un-authenticated users can only access limited resources of the network. The user based access control falls into two kinds – the standard access control and the advanced access control. The standard user based access control does not limit the access to the limited resources when the host is not authenticated yet. While the user based advanced access control can control the access to the limited resources before authentication is done.</p> <p>Notes :</p> <p>For standard control method based on user, the 802.1x free resource must be configured first, and it needs to be used with dot1x privateclient enable.</p> <p>The no form command restores the default access control method.</p>										
Example	<p>To configure the access control method based on port for Ethernet1/0/4.</p> <pre>Switch(config-if-ethernet1/0/4)#dot1x port-method portbased</pre>										

dot1x privateclient enable

Command	[no] dot1x privateclient enable
Parameter	none none
Default	Private 802.1x authentication packet format is disabled by default.
Mode	Global Mode
Usage Guide	<p>To configure the switch to force the authentication client to use private 802.1x authentication protocol.</p> <p>To implement integrated solution, the switch must be enabled to use private 802.1x protocol, or many applications will not be able to function. For detailed information, please refer to DCBI integrated solution. If the switch forces the authentication client to use private 802.1x protocol, the standard client will not be able to work.</p> <p>The no prefix will disable the command and allow the authentication client to use the standard 802.1x authentication protocol.</p>
Example	<p>To force the authentication client to use private 802.1x authentication protocol.</p> <p>Switch(config)#dot1x privateclient enable</p>

dot1x privateclient protect enable

Command	[no] dot1x privateclient protect enable
Parameter	none none
Default	Disable the privateclient protect function by default.
Mode	Global Mode
Usage Guide	<p>Enable the privateclient protect function of the switch.</p> <p>Support the partial encryption of the privateclient protocol to advance the security of the privateclient.</p> <p>The no command disables the protect function.</p>
Example	<p>Enable the privateclient protect function of the switch.</p> <p>Switch(config)#dot1x privateclient protect enable</p>

dot1x re-authenticate

Command	dot1x re-authenticate [interface <interface-name>]
Parameter	interface-name stands for port number, omitting the parameter for all ports
Default	None
Mode	Global Mode
Usage Guide	Enables real-time 802.1x re-authentication (no wait timeout requires) for all ports or a specified port. It makes the switch to re-authenticate the client at once without waiting for re-authentication timer timeout. This command is no longer valid after authentication.
Example	Enabling real-time re-authentication on port1/0/8. Switch(config)#dot1x re-authenticate interface ethernet 1/0/8

dot1x re-authentication

Command	[no] dot1x re-authentication
Parameter	none none
Default	Periodical re-authentication is disabled by default.
Mode	Global Mode
Usage Guide	Enables periodical supplicant authentication. When periodical re-authentication for supplicant is enabled, the switch will re-authenticate the supplicant at regular interval. This function is not recommended for common use. The no command disables this function.
Example	Enabling the periodical re-authentication for authenticated users. Switch(config)#dot1x re-authentication

dot1x timeout quiet-period

Command	dot1x timeout quiet-period <seconds> no dot1x timeout quiet-period
Parameter	seconds the silent time for the port in seconds, the valid range is 1 to 65535
Default	The default value is 10 seconds.
Mode	Global Mode
Usage Guide	Sets time to keep silent on supplicant authentication failure. Default value is recommended. The no command restores the default value.
Example	Setting the silent time to 120 seconds. Switch(config)#dot1x timeout quiet-period 120

dot1x timeout re-authperiod

Command	dot1x timeout re-authperiod <seconds> no dot1x timeout re-authperiod
Parameter	seconds the interval for re-authentication, in seconds, the valid range is 1 to 65535
Default	The default value is 3600 seconds.
Mode	Global Mode
Usage Guide	Sets the supplicant re-authentication interval. dot1x re-authentication must be enabled first before supplicant re-authentication interval can be modified. If authentication is not enabled for the switch, the supplicant re-authentication interval set will not take effect. The no command restores the default setting.
Example	Setting the re-authentication time to 1200 seconds. Switch(config)#dot1x timeout re-authperiod 1200

dot1x timeout tx-period

Command	dot1x timeout tx-period <seconds> no dot1x timeout tx-period
Parameter	seconds the interval for re-transmission of EAP request frames, in seconds; the valid range is 1 to 65535
Default	The default value is 30 seconds.
Mode	Global Mode
Usage Guide	Sets the interval for the supplicant to re-transmit EAP request/identity frame. Default value is recommended. The no command restores the default setting.
Example	Setting the EAP request frame re-transmission interval to 1200 seconds. Switch(config)#dot1x timeout tx-period 1200

dot1x unicast enable

Command	[no] dot1x unicast enable
Parameter	none none
Default	The 802.1x unicast passthrough function is not enabled in global mode.
Mode	Global Mode
Usage Guide	Enable the 802.1x unicast passthrough function of switch. The 802.1x unicast passthrough authentication for the switch must be enabled first to enable the 802.1x unicast passthrough function, then the 802.1x function is configured. The no operation of this command will disable this function.
Example	Enabling the 802.1x unicast passthrough function of the switch and enable the 802.1x for port 1/0/1. Switch(config)#dot1x enable Switch(config)# dot1x unicast enable Switch(config)#interface ethernet1/0/1 Switch(Config-If-Ethernet1/0/1)#dot1x enable

show dot1x

Command	show dot1x [interface <interface-list>]
Parameter	interface-list the port list,If no parameter is specified, information for all ports is displayed.
Default	None.
Mode	Admin/Global Mode
Usage Guide	Displays dot1x parameter related information, if parameter information is added, corresponding dot1x status for corresponding port is displayed.
Example	<p>Display information about dot1x global parameter for the switch.</p> <pre> Switch#show dot1x Global 802.1x Parameters reauth-enabled no reauth-period 3600 quiet-period 10 tx-period 30 max-req 2 authenticator mode passive Mac Filter Disable MacAccessList : dot1x-EAPoR Enable dot1x-privateclient Disable dot1x-unicast Disable 802.1x is enabled on ethernet Ethernet1/0/1 Authentication Method:Port based Max User Number:1 Status Authorized Port-control Auto Supplicant 00-03-0F-FE-2E-D3 Authenticator State Machine State Authenticated Backend State Machine State Idle Reauthentication State Machine State Stop </pre>

4 Commands for the Number Limitation Function of MAC and IP in Port, VLAN

ip arp dynamic maximum

Command	ip arp dynamic maximum <value> no ip arp dynamic maximum
Parameter	value upper limit of the number of dynamic ARP in the VLAN, ranging from 1 to 4096
Default	The number limitation function of dynamic ARP in the VLAN is disabled.
Mode	VLAN Configuration Mode
Usage Guide	<p>Set the max number of dynamic ARP allowed in the VLAN, and, at the same time, enable the number limitation function of dynamic ARP in the VLAN.</p> <p>When configuring the max number of dynamic ARP allowed in the VLAN, if the number of dynamically learnt ARP in the VLAN is already larger than the max number to be set, the extra dynamic ARP will be deleted.</p> <p>The no command is used to disable the number limitation function of dynamic ARP in the VLAN.</p>
Example	<p>Enable the number limitation function of dynamic ARP in VLAN 1, the max number to be set is 50.</p> <pre>Switch(config)#interface vlan1 Switch(config-if-vlan1)# ip arp dynamic maximum 50</pre>

ipv6 nd dynamic maximum

Command	ipv6 nd dynamic maximum <value> no ipv6 nd dynamic maximum
Parameter	value upper limit of the number of dynamic NEIGHBOR in the VLAN, ranging from 1 to 4096
Default	The number limitation function of dynamic NEIGHBOR in the VLAN is disabled.
Mode	VLAN Configuration Mode
Usage Guide	Set the max number of dynamic NEIGHBOR allowed in the VLAN, and, at the same time, enable the number limitation function of dynamic NEIGHBOR in the VLAN.

When configuring the max number of dynamic NEIGHBOR allowed in the VLAN, if the number of dynamically learnt NEIGHBOR in the VLAN is already larger than the max number to be set, the extra dynamic NEIGHBOR will be deleted.

The no command is used to disable the number limitation function of dynamic NEIGHBOR in the VLAN.

Example

Enable the number limitation function of dynamic NEIGHBOR in VLAN 1, the max number to be set is 50.

```
Switch(config)#interface vlan1
Switch(config-if-vlan1)# ipv6 nd dynamic maximum 50
```

show arp-dynamic count

Command

```
show arp-dynamic count {vlan | interface ethernet <portName>}
```

Parameter

vlan	the specified vlan ID
portName	the name of layer-2 port

Default

None.

Mode

Admin/Global Mode

Usage Guide

Display the number of dynamic ARP of corresponding port and VLAN.

Example

Display the number of dynamic ARP of the port and VLAN which are configured with number limitation function of ARP.

```
Switch(config)# show arp-dynamic count interface ethernet 1/0/3
```

Port	MaxCount	CurrentCount
Ethernet1/0/3	5	1

```
Switch(config)# show arp-dynamic count vlan 1
```

Vlan	MaxCount	CurrentCount
1	55	15

show mac-address dynamic count

Command	show mac-address dynamic count { vlan interface ethernet <portName>}												
Parameter	<table border="1"> <tr> <td>vlan</td> <td>display the specified VLAN ID</td> </tr> <tr> <td>portName</td> <td>the name of layer-2 port</td> </tr> </table>	vlan	display the specified VLAN ID	portName	the name of layer-2 port								
vlan	display the specified VLAN ID												
portName	the name of layer-2 port												
Default	None.												
Mode	Admin/Global Mode												
Usage Guide	Display the number of dynamic MAC of corresponding port and VLAN.												
Example	<p>Display the number of dynamic MAC of the port and VLAN which are configured with number limitation function of MAC.</p> <pre>Switch(config)# show mac-address dynamic count interface ethernet 1/0/3</pre> <table border="1"> <thead> <tr> <th>Port</th> <th>MaxCount</th> <th>CurrentCount</th> </tr> </thead> <tbody> <tr> <td>Ethernet1/0/3</td> <td>5</td> <td>1</td> </tr> </tbody> </table> <pre>Switch(config)# show mac-address dynamic count vlan 1</pre> <table border="1"> <thead> <tr> <th>Vlan</th> <th>MaxCount</th> <th>CurrentCount</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>55</td> <td>15</td> </tr> </tbody> </table>	Port	MaxCount	CurrentCount	Ethernet1/0/3	5	1	Vlan	MaxCount	CurrentCount	1	55	15
Port	MaxCount	CurrentCount											
Ethernet1/0/3	5	1											
Vlan	MaxCount	CurrentCount											
1	55	15											

show nd-dynamic count

Command	show nd-dynamic count { vlan interface ethernet <portName>}						
Parameter	<table border="1"> <tr> <td>vlan</td> <td>display the specified VLAN ID</td> </tr> <tr> <td>portName</td> <td>the name of layer-2 port</td> </tr> </table>	vlan	display the specified VLAN ID	portName	the name of layer-2 port		
vlan	display the specified VLAN ID						
portName	the name of layer-2 port						
Default	None.						
Mode	Admin/Global Mode						
Usage Guide	Display the number of dynamic ND of corresponding port and VLAN.						
Example	<p>Display the number of dynamic ND of the port and VLAN which are configured with number limitation function of ND.</p> <pre>Switch(config)# show nd-dynamic dynamic count interface ethernet 1/0/3</pre> <table border="1"> <thead> <tr> <th>Port</th> <th>MaxCount</th> <th>CurrentCount</th> </tr> </thead> <tbody> <tr> <td>Ethernet1/0/3</td> <td>5</td> <td>1</td> </tr> </tbody> </table>	Port	MaxCount	CurrentCount	Ethernet1/0/3	5	1
Port	MaxCount	CurrentCount					
Ethernet1/0/3	5	1					

Switch(config)# show nd-dynamic dynamic count vlan 1

Vlan	MaxCount	CurrentCount
1	55	15

switchport arp dynamic maximum

Command	switchport arp dynamic maximum <value> no switchport arp dynamic maximum
Parameter	value upper limit of the number of dynamic ARP of the port, ranging from 1 to 4096
Default	The number limitation function of dynamic ARP on the port is disabled.
Mode	Port Mode
Usage Guide	<p>Set the max number of dynamic ARP allowed by the port, and, at the same time, enable the number limitation function of dynamic ARP on the port.</p> <p>When configuring the max number of dynamic ARP allowed by the port, if the number of dynamically learnt ARP on the port is already larger than the max number to be set, the extra dynamic ARP will be deleted. TRUNK ports do not supports this function.</p> <p>The no command is used to disable the number limitation function of dynamic ARP on the port.</p>
Example	<p>Enable the number limitation function of dynamic ARP in port 1/0/2 mode, the max number to be set is 20.</p> <pre>Switch(config)#interface ethernet 1/0/2 Switch(config-if-ethernet1/0/2)# switchport arp dynamic maximum 20</pre>

switchport mac-address dynamic maximum

Command	switchport mac-address dynamic maximum <value> no switchport mac-address dynamic maximum
Parameter	value upper limit of the number of dynamic MAC address of the port, ranging from 1 to 4096
Default	The number limitation function of dynamic MAC address on the port is disabled.

Mode	Port Mode
Usage Guide	<p>Set the max number of dynamic MAC address allowed by the port, and at the same time, enable the number limitation function of dynamic MAC address on the port.</p> <p>When configuring the max number of dynamic MAC address allowed by the port, if the number of dynamically learnt MAC address on the port is already larger than the max number of dynamic MAC address to be set, the extra dynamic MAC addresses will be deleted. This function is mutually exclusive to functions such as dot1x, MAC binding, if the functions of dot1x, MAC binding or TRUNK are enabled on the port, this function will not be allowed.</p> <p>The no command is used to disable the number limitation function of dynamic MAC address on the port.</p>
Example	<p>Enable the number limitation function of dynamic MAC address in port 1/0/2 mode, the max number to be set is 20.</p> <pre>Switch(config)#interface ethernet 1/0/2 Switch(config-if-ethernet1/0/2)# switchport mac-address dynamic maximum 20</pre>

switchport mac-address violation

Command	<pre>switchport mac-address violation {protect shutdown} [recovery <5-3600>] no switchport mac-address violation</pre>								
Parameter	<table border="1"> <tr> <td>protect</td> <td>protect mode</td> </tr> <tr> <td>shutdown</td> <td>shutdown mode</td> </tr> <tr> <td>recovery</td> <td>Configure the border port to automatically restore after execute shutdown violation mode</td> </tr> <tr> <td><5-3600></td> <td>Recovery time, do not restore by default</td> </tr> </table>	protect	protect mode	shutdown	shutdown mode	recovery	Configure the border port to automatically restore after execute shutdown violation mode	<5-3600>	Recovery time, do not restore by default
protect	protect mode								
shutdown	shutdown mode								
recovery	Configure the border port to automatically restore after execute shutdown violation mode								
<5-3600>	Recovery time, do not restore by default								
Default	By default, the port is protected mode.								
Mode	Port Mode								
Usage Guide	<p>Set the violation mode of the port.</p> <p>The port sets the violation mode after enable the number limit function of MAC only. If the violation mode is protect, the port only disable the dynamic MAC address learning function when the MAC address number of the port exceeds the upper limit of secure MAC. If the violation mode is shutdown, the port will be disabled when the MAC address number exceeds the upper limit of secure MAC, and the user can enable the port by configuring no shutdown command manually or the automatic recovery timeout.</p> <p>The no command restores the violation mode to protect.</p>								

Example	Set the violation mode as shutdown, the recovery time as 60s for port1. Switch(config)#interface ethernet 1/0/1 Switch(config-if-ethernet1/0/1)# switchport mac-address violation shutdown recovery 60
----------------	--

switchport nd dynamic maximum

Command	switchport nd dynamic maximum <value> no switchport nd dynamic maximum
Parameter	value upper limit of the number of dynamic NEIGHBOR of the port, ranging from 1 to 4096
Default	The number limitation function of dynamic ARP on the port is disabled.
Mode	Port Mode
Usage Guide	Set the max number of dynamic NEIGHBOR allowed by the port, and, at the same time, enable the number limitation function of dynamic NEIGHBOR on the port. When configuring the max number of dynamic NEIGHBOR allowed by the port, if the number of dynamically learnt NEIGHBOR on the port is already larger than the max number to be set, the extra dynamic NEIGHBOR will be deleted. TRUNK ports do not supports this function. The no command is used to disable the number limitation function of dynamic NEIGHBOR on the port.
Example	Enable the number limitation function of dynamic NEIGHBOR in port 1/0/2 mode, the max number to be 20. Switch(config)#interface ethernet 1/0/2 Switch(config-if-ethernet1/0/2)# switchport nd dynamic maximum 20

vlan mac-address dynamic maximum

Command	vlan mac-address dynamic maximum <value> no vlan mac-address dynamic maximum
Parameter	value upper limit of the number of MAC address in the VLAN, ranging from 1 to 4096

Default	The number limitation function of dynamic MAC address in the VLAN is disabled.
Mode	VLAN Configuration Mode
Usage Guide	<p>Set the max number of dynamic MAC address allowed in the VLAN, and, at the same time, enable the number limitation function of dynamic MAC address in the VLAN.</p> <p>When configuring the max number of dynamic MAC allowed in the VLAN,if the number of dynamically learnt MAC address in the VLAN is already larger than the max number to be set, the extra dynamic MAC addresses will be deleted. After enabling number limitation function of dynamic MAC in the VLAN, the number limitation of MAC is only applied to general access port, the number of MAC on TURNK ports and special ports which has enabled dot1x, MAC binding function will not be limited or counted.</p> <p>The no command is used to disable the number limitation function of dynamic MAC address in the VLAN.</p>
Example	<p>Enable the number limitation function of dynamic MAC address in VLAN 1, the max number to be set is 50.</p> <pre> Switch(config)#vlan1 Switch(config-if-vlan1)#vlan mac-address dynamic maximum 50 </pre>

5 Commands for AM Configuration

am enable

Command	[no] am enable
Parameter	none none
Default	AM function is disabled by default.
Mode	Global Mode
Usage Guide	Globally enable/disable AM function. The no command disables AM function.
Example	Enable AM function on the switch. Switch(config)#am enable

am port

Command	[no] am port
Parameter	none none
Default	AM function is disabled on all port.
Mode	Port Mode
Usage Guide	Enable/disable AM function on port. The no command disables AM function on the port.
Example	Enable AM function on interface 1/0/3 of the switch. Switch(config-if-ethernet 1/0/3)#am port

am ip-pool

Command	[no] am ip-pool <ip-address> <num>
----------------	---

Parameter	ip-address the starting address of an address segment in the IP address pool
	num the number of consecutive addresses following ip-address, less than or equal with 32
Default	By default, IP address pool is empty.
Mode	Port Mode
Usage Guide	Set the AM IP segment of the interface, allow/deny the IP messages or APR messages from a source IP within that segment to be forwarded via the interface. The no command delete configuration.
Example	Configure that interface 1/0/3 of the switch will forward data packets from an IP address which is one of 10 consecutive IP addresses starting from 10.10.10.1. Switch(config-if-ethernet 1/0/3)#am ip-pool 10.10.10.1 10

am mac-ip-pool

Command	[no] am mac-ip-pool <mac-address> <ip-address>
Parameter	mac-address the source MAC address
	ip-address the source IP address of the packets, which is a 32 bit binary number represented in four decimal numbers
Default	By default, MAC-IP address pool is empty.
Mode	Port Mode
Usage Guide	Set the AM MAC-IP address of the interface, allow/deny the IP messages or APR messages from a source IP within that segment to be forwarded via the interface. The no command delete configuration.
Example	Configure that the interface 1/0/3 of the switch will allow data packets with a source MAC address of 11-22-22-11-11-11 and a source IP address of 10.10.10.1 to be forwarded. Switch(config-if-ethernet 1/0/3)#am mac-ip-pool 11-22-22-11-11-11 10.10.10.1

no am all

Command	no am all [ip-pool mac-ip-pool]
Parameter	ip-pool the IP address pool mac-ip-pool the MAC-IP address pool
Default	By default, both address pools are empty at the beginning.
Mode	Global Mode
Usage Guide	Delete MAC-IP address pool or IP address pool or both pools configured by all users.
Example	Delete all configured IP address pools. Switch(config)#no am all ip-pool

show am

Command	show am [interface <interface-name>]
Parameter	interface-name the name of the interface of which the configuration information will be displayed
Default	None.
Mode	Admin/Global Mode
Usage Guide	Display the configured AM entries. No parameter means to display the AM configuration information of all interfaces.
Example	Display all configured AM entries. Switch#show am interface ethernet 1/0/5 AM is enabled Interface Etherme1/0/5 am interface am ip-pool 50.10.10.1 30 am mac-ip-pool 00-02-04-06-08-09 20.10.10.5 am ip-pool 50.20.10.1 20

6 Commands for Security Feature

dosattack-check srcip-equal-dstip enable

Command	[no] dosattack-check srcip-equal-dstip enable
Parameter	none none
Default	Disable the function by which the switch checks if the source IP address is equal to the destination IP address.
Mode	Global Mode
Usage Guide	<p>Enable the function by which the switch checks if the source IP address is equal to the destination IP address.</p> <p>By enabling this function, data packet whose source IP address is equal to its destination address will be dropped.</p> <p>The “no” form of this command disables this function.</p>
Example	<p>Drop the data packet whose source IP address is equal to its destination address.</p> <p>Switch(config)# dosattack-check srcip-equal-dstip enable</p>

dosattack-check tcp-flags enable

Command	[no] dosattack-check srcip-equal-dstip enable
Parameter	none none
Default	This function disable on the switch by default.
Mode	Global Mode
Usage Guide	<p>Enable the function by which the switch will check the unauthorized TCP label function.</p> <p>With this function enabled, the switch will be able to drop follow four data packets containing unauthorized TCP label: SYN=1 while source port is smaller than 1024;TCP label positions are all 0 while its serial No. =0;FIN=1,URG=1,PSH=1 and the TCP serial No.=0;SYN=1 and FIN=1. This function can be used associating the “dosattack-check ipv4-first-fragment enable” command.</p> <p>The “no” form of this command will disable this function.</p>
Example	Drop one or more types of above four packet types.

Switch(config)# dosattack-check tcp-flags enable

dosattack-check srcport-equal-dstport enable

Command	[no] dosattack-check srcport-equal-dstport enable
Parameter	none none
Default	Disable the function by which the switch will check if the source port is equal to the destination port.
Mode	Global Mode
Usage Guide	<p>Enable the function by which the switch will check if the source port is equal to the destination port.</p> <p>With this function enabled, the switch will be able to drop TCP and UDP data packet whose destination port is equal to the source port. This function can be used associating the “dosattack-check ipv4-first-fragment enable” function so to block the IPv4 fragment TCP and UDP data packet whose destination port is equal to the source port.</p> <p>The no command disables this function.</p>
Example	<p>Drop the non-fragment TCP and UDP data packet whose destination port is equal to the source port.</p> <p>Switch(config)#dosattack-check srcport-equal-dstport enable</p>

dosattack-check icmp-attacking enable

Command	[no] dosattack-check icmp-attacking enable
Parameter	none none
Default	By default, disable the ICMP fragment attack checking function on the switch.
Mode	Global Mode
Usage Guide	<p>Enable the ICMP fragment attack checking function on the switch.</p> <p>With this function enabled the switch will be protected from the ICMP fragment attacks, dropping the fragment ICMPv4/v6 data packets whose net length is smaller than the specified value.</p> <p>The “no” form of this command disables this function.</p>

Example	<p>Enable the ICMP fragment attack checking function.</p> <pre>Switch(config)#dosattack-check icmp-attacking enable</pre>
----------------	---

dosattack-check icmpV4-size

Command	dosattack-check icmpV4-size <64-1023>
Parameter	<64-1023> the max net length of the ICMPv4 data packet permitted by the switch
Default	The value is 0x200 by default.
Mode	Global Mode
Usage Guide	<p>Configure the max net length of the ICMPv4 data packet permitted by the switch.</p> <p>To use this function you have to enable “dosattack-check icmp-attacking enable” first.</p>
Example	<p>Set the max net length of the ICMPv4 data packet permitted by the switch to 100.</p> <pre>Switch(config)#dosattack-check icmp-attacking enable Switch(config)#dosattack-check icmpV4-size 100</pre>

7 Commands for TACACS+

tacacs-server authentication host

Command	tacacs-server authentication host <ip-address> [port <port-number>][timeout <seconds>] [key {0 7} <string>] [primary] no tacacs-server authentication host <ip-address>										
Parameter	<table border="1"><tr><td>ip-address</td><td>the IP address of the server</td></tr><tr><td>port-number</td><td>the listening port number of the server, the valid range is 0~65535, amongst 0 indicates it will not be an authentication server</td></tr><tr><td>seconds</td><td>the value of TACACS+ authentication timeout timer, shown in seconds and the valid range is 1~60</td></tr><tr><td>string</td><td>the key string, If key option is set as 0, the key is not encrypted and its range should not exceed 64 characters, if key option is set as 7, the key is encrypted and its range should not exceed 64 characters</td></tr><tr><td>primary</td><td>indicates it's a primary server</td></tr></table>	ip-address	the IP address of the server	port-number	the listening port number of the server, the valid range is 0~65535, amongst 0 indicates it will not be an authentication server	seconds	the value of TACACS+ authentication timeout timer, shown in seconds and the valid range is 1~60	string	the key string, If key option is set as 0, the key is not encrypted and its range should not exceed 64 characters, if key option is set as 7, the key is encrypted and its range should not exceed 64 characters	primary	indicates it's a primary server
ip-address	the IP address of the server										
port-number	the listening port number of the server, the valid range is 0~65535, amongst 0 indicates it will not be an authentication server										
seconds	the value of TACACS+ authentication timeout timer, shown in seconds and the valid range is 1~60										
string	the key string, If key option is set as 0, the key is not encrypted and its range should not exceed 64 characters, if key option is set as 7, the key is encrypted and its range should not exceed 64 characters										
primary	indicates it's a primary server										
Default	No TACACS+ authentication configured on the system by default.										
Mode	Global Mode										
Usage Guide	<p>This command is for specifying the IP address, port number, timeout timer value and the key string of the TACACS+ server used on authenticating with the switch.</p> <p>The parameter port is for define an authentication port number which must be in accordance with the authentication port number of specified TACACS+ server which is 49 by default. The parameters key and timeout is used to configure the self-key and self-timeout, if the switch is not configure the timeout<seconds> and key<string>, it will use the global value and key by command tacacs-server timeout<seconds> and tacacs-server key <string>. This command can configure several TACACS+ servers communicate with the switch. The configuration sequence will be used as authentication server sequence. And in case primary is configured on one TACACS+ server, the server will be the primary server.</p> <p>The no form of this command deletes TACACS+ authentication server.</p>										
Example	<p>Configure the TACACS+ authentication server address to 192.168.1.2, and use the global configured key.</p> <pre>Switch(config)#tacacs-server authentication host 192.168.1.2</pre>										

tacacs-server key

Command	tacacs-server key {0 7} <string> no tacacs-server key
----------------	--

Parameter	string	the key string of the TACACS+ server. If key option is set as 0, the key is not encrypted and its range should not exceed 64 characters, if key option is set as 7, the key is encrypted and its range should not exceed 64 characters.
Default	None.	
Mode	Global Mode	
Usage Guide	<p>Configure the key of TACACS+ authentication server.</p> <p>The key is used on encrypted packet communication between the switch and the TACACS+ server. The configured key must be in accordance with the one on the TACACS+ server or else no correct TACACS+ authentication will be performed. It is recommended to configure the authentication server key to ensure the data security.</p> <p>The no command deletes the TACACS+ server key.</p>	
Example	<p>Configure test as the TACACS+ server authentication key.</p> <pre>Switch(config)#tacacs-server key 0 test</pre>	

tacacs-server nas-ipv4

Command	<pre>tacacs-server nas-ipv4 <ip-address> no tacacs-server nas-ipv4</pre>	
Parameter	ip-address	the source IP address of TACACS+ packet, in dotted decimal notation, it must be a valid unicast IP address
Default	By default, no specific source IP address for TACACS+ packet is configured, the IP address of the interface from which the TACACS+ packets are sent is used as source IP address of TACACS+ packet.	
Mode	Global Mode	
Usage Guide	<p>Configure the source IP address of TACACS+ packet sent by the switch.</p> <p>The source IP address must belongs to one of the IP interface of the switch, otherwise an failure message of binding IP address will be returned when the switch send TACACS+ packet. We suggest using the IP address of loopback interface as source IP address, it avoids that the packets from TACACS+ server are dropped when the interface link-down.</p> <p>The no command deletes the configuration.</p>	
Example	Configure the source ip address of TACACS+ packet as 192.168.2.254.	

```
Switch(config)#tacacs-server nas-ipv4 192.168.2.254
```

tacacs-server timeout

Command	tacacs-server timeout <seconds> no tacacs-server timeout
Parameter	seconds the value of TACACS+ authentication timeout timer, shown in seconds and the valid range is 1~60
Default	3 seconds by default.
Mode	Global Mode
Usage Guide	<p>Configure a TACACS+ server authentication timeout timer.</p> <p>The command specifies the period the switch wait for the authentication through TACACS+ server. When connected to the TACACS+, and after sent the authentication query data packet to the TACACS+ server, the switch waits for the response. If no replay is received during specified period, the authentication is considered failed.</p> <p>The no command restores the default configuration.</p>
Example	<p>Configure the timeout timer of the tacacs+ server to 30 seconds.</p> <pre>Switch(config)#tacacs-server timeout 30</pre>

8 Commands for RADIUS

aaa enable

Command	[no] aaa enable
Parameter	none none
Default	AAA authentication is not enabled by default.
Mode	Global Mode
Usage Guide	<p>Enables the AAA authentication function in the switch.</p> <p>The AAA authentication for the switch must be enabled first to enable IEEE 802.1x authentication for the switch.</p> <p>The no command disables the AAA authentication function.</p>
Example	<p>Enabling AAA function for the switch.</p> <p>Switch(config)#aaa enable</p>

aaa-accounting enable

Command	[no] aaa-accounting enable
Parameter	none none
Default	AAA accounting is not enabled by default.
Mode	Global Mode
Usage Guide	<p>Enables the AAA accounting function in the switch.</p> <p>When accounting is enabled in the switch, accounting will be performed according to the traffic or online time for port the authenticated user is using. The switch will send an “accounting started” message to the RADIUS accounting server on starting the accounting, and an accounting packet for the online user to the RADIUS accounting server every five seconds, and an “accounting stopped” message is sent to the RADIUS accounting server on accounting end.</p> <p>Note: The switch send the “user offline” message to the RADIUS accounting server only when accounting is enabled, the “user offline”message will not be sent to the RADIUS authentication server.</p> <p>The no command disables the AAA accounting function.</p>

Example	Enabling AAA accounting for the switch. Switch(config)#aaa-accounting enable
----------------	--

aaa-accounting update

Command	aaa-accounting update {enable disable}
Parameter	none none
Default	By default, Enable the AAA update accounting function.
Mode	Global Mode
Usage Guide	Enable or disable the AAA update accounting function. After the update accounting function is enabled, the switch will sending accounting message to each online user on time.
Example	Disable the AAA update accounting function for switch. Switch(config)#aaa-accounting update disable

radius nas-ipv4

Command	radius nas-ipv4 <ip-address> no radius nas-ipv4
Parameter	ip-address the source IP address of the RADIUS packet, in dotted decimal notation, it must be a valid unicast IP address
Default	By default, No specific source IP address for RADIUS packet is configured, the IP address of the interface from which the RADIUS packets are sent is used as source IP address of RADIUS packet.
Mode	Global Mode
Usage Guide	Configure the source IP address for RADIUS packet sent by the switch. The source IP address must belongs to one of the IP interface of the switch, otherwise an failure message of binding IP address will be returned when the switch send RADIUS packet. We suggest using the IP address of loopback interface as source IP address, it avoids that the packets from RADIUS server are dropped when the interface link-down.

The no command deletes the configuration.

Example

Configure the source ip address of RADIUS packet as 192.168.2.254.

```
Switch(config)#radius nas-ipv4 192.168.2.254
```

radius nas-ipv6

Command

```
radius nas-ipv6 <ipv6-address>  
no radius nas-ipv6
```

Parameter

ipv6-address	the source IPv6 address of the RADIUS packet, it must be a valid unicast IPv6 address
---------------------	---

Default

By default, No specific source IPv6 address for RADIUS packet is configured, the IPv6 address of the interface from which the RADIUS packets are sent is used as source IPv6 address of RADIUS packet.

Mode

Global Mode

Usage Guide

Configure the source IPv6 address for RADIUS packet sent by the switch.
The source IPv6 address must belongs to one of the IPv6 interface of the switch, otherwise a failure message of binding IPv6 address will be returned when the switch send RADIUS packet.
We suggest using the IPv6 address of loopback interface as source IPv6 address, it avoids that the packets from RADIUS server are dropped when the interface link-down.

The no command deletes the configuration.

Example

Configure the source ipv6 address of RADIUS packet as 2001:da8:456::1.

```
Switch(config)#radius nas-ipv6 2001:da8:456::1
```

radius-server accounting host

Command

```
radius-server accounting host {<ipv4-address> | <ipv6-address>} [port <port-number>]  
[key {0 | 7} <string>] [primary]  
no radius-server accounting host {<ipv4-address> | <ipv6-address>}
```

Parameter

ipv4-address	stands for the server IPv4 address
ipv6-address	stands for the server IPv6 address

port-number	server listening port number from 0 to 65535
string	the key string. If key option is set as 0, the key is not encrypted and its range should not exceed 64 characters, if key option is set as 7, the key is encrypted and its range should not exceed 64 characters
primary	for primary server. Multiple RADIUS sever can be configured and would be available. RADIUS server will be searched by the configured order if primary is not configured, otherwise, the specified RADIUS server will be used first
Default	No RADIUS accounting server is configured by default.
Mode	Global Mode
Usage Guide	<p>Specifies the IPv4/IPv6 address and the port number, whether be primary server for RADIUS accounting server.</p> <p>This command is used to specify the IPv4/IPv6 address and port number of the specified RADIUS server for switch accounting, multiple command instances can be configured. The <port-number> parameter is used to specify accounting port number, which must be the same as the specified accounting port in the RADIUS server; the default port number is 1813. If this port number is set to 0, accounting port number will be generated at random and can result in invalid configuration. This command can be used repeatedly to configure multiple RADIUS servers communicating with the switch, the switch will send accounting packets to all the configured accounting servers, and all the accounting servers can be backup servers for each other. If primary is specified, then the specified RADIUS server will be the primary server. It only configures a RADIUS primary server whether the server use IPv4 address or IPv6 address.</p> <p>The no command deletes the RADIUS accounting server.</p>
Example	<p>Sets the RADIUS accounting server of IPv6 address to 2004:1:2:3::2, as the primary server, with the accounting port number as 3000.</p> <pre>Switch(config)#radius-server accounting host 2004:1:2:3::2 port 3000 primary</pre>

radius-server authentication host

Command	<pre>radius-server authentication host {<ipv4-address> <ipv6-address>}[port <port-number>] [key {0 7} <string>] [primary] [access-mode {dot1x telnet}] no radius-server authentication host {<ipv4-address> <ipv6-address>}</pre>
Parameter	<p>ipv4-address stands for the server IPv4 address</p> <p>ipv6-address stands for the server IPv6 address</p> <p>port-number server listening port number from 0 to 65535</p> <p>string the key string. If key option is set as 0, the key is not encrypted and its range should not exceed 64 characters, if key option is set as 7, the key</p>

	is encrypted and its range should not exceed 64 characters
primary	for primary server. Multiple RADIUS sever can be configured and would be available. RADIUS server will be searched by the configured order if primary is not configured, otherwise, the specified RADIUS server will be used first
dot1x telnet	designates the current RADIUS server only use 802.1x authentication or telnet authentication, all services can use current RADIUS server by default
Default	No RADIUS authentication server is configured by default.
Mode	Global Mode
Usage Guide	<p>Specifies the IPv4 address or IPv6 address and listening port number, cipher key, whether be primary server or not and access mode for the RADIUS server.</p> <p>This command is used to specify the IPv4 address or IPv6 address and port number, cipher key string and access mode of the specified RADIUS server for switch authentication, multiple command instances can be configured. The port parameter is used to specify authentication port number, which must be the same as the specified authentication port in the RADIUS server, the default port number is 1812. If this port number is set to 0, the specified server is regard as non-authenticating. This command can be used repeatedly to configure multiple RADIUS servers communicating with the switch, the configured order is used as the priority for the switch authentication server. When the first server has responded (whether the authentication is succeeded or failed), switch does not send the authentication request to the next. If primary is specified, then the specified RADIUS server will be the primary server. It will use the cipher key which be configured by radius-server key <string> global command if the current RADIUS server not configure key<string>. Besides, it can designate the current RADIUS server only use 802.1x authentication or telnet authentication via access-mode option. It is not configure access-mode option and all services can use current RADIUS server by default.</p> <p>The no command deletes the RADIUS authentication server.</p>
Example	<p>Setting the RADIUS authentication server address as 2004:1:2:3::2.</p> <pre>Switch(config)#radius-server authentication host 2004:1:2:3::2</pre>

radius-server dead-time

Command	radius-server dead-time <minutes> no radius-server dead-time
Parameter	minutes the down -restore time for RADIUS server in minutes, the valid range is 1 to 255
Default	The default value is 5 minutes.

Mode	Global Mode
Usage Guide	<p>This command specifies the time to wait for the RADIUS server to recover from inaccessible to accessible. When the switch acknowledges a server to be inaccessible, it marks that server as having invalid status, after the interval specified by this command; the system resets the status for that server to valid.</p> <p>The no command restores the default setting.</p>
Example	<p>Setting the down-restore time for RADIUS server to 3 minutes.</p> <p>Switch(config)#radius-server dead-time 3</p>

radius-server key

Command	radius-server key {0 7} <string> no radius-server key
Parameter	string a key string for RADIUS server, If key option is set as 0, the key is not encrypted and its range should not exceed 64 characters, if key option is set as 7, the key is encrypted and its range should not exceed 64 characters
Default	None.
Mode	Global Mode
Usage Guide	<p>Specifies the key for the RADIUS server (authentication and accounting). The key is used in the encrypted communication between the switch and the specified RADIUS server. The key set must be the same as the RADIUS server set, otherwise, proper RADIUS authentication and accounting will not perform properly.</p> <p>The no command deletes the key for RADIUS server.</p>
Example	<p>Setting the RADIUS authentication key to be “test”.</p> <p>Switch(config)#radius-server key 0 test</p>

radius-server retransmit

Command	radius-server retransmit <retries>
----------------	---

no radius-server retransmit

Parameter	retries a retransmission times for RADIUS server, the valid range is 0 to 100
Default	The default value is 3 times.
Mode	Global Mode
Usage Guide	<p>This command specifies the retransmission time for a packet without a RADIUS server response after the switch sends the packet to the RADIUS server. If authentication information is missing from the authentication server, AAA authentication request will need to be re-transmitted to the authentication server. If AAA request retransmission count reaches the retransmission time threshold without the server responding, the server will be considered to as not work, the switch sets the server as invalid.</p> <p>The no command restores the default setting.</p>
Example	<p>Setting the RADIUS authentication packet retransmission time to five times.</p> <pre>Switch(config)#radius-server retransmit 5</pre>

radius-server timeout

Command	radius-server timeout <seconds> no radius-server timeout
Parameter	seconds the timer value (second) for RADIUS server timeout, the valid range is 1 to 1000
Default	The default value is 3 seconds.
Mode	Global Mode
Usage Guide	<p>This command specifies the interval for the switch to wait RADIUS server response. The switch waits for corresponding response packets after sending RADIUS Server request packets. If RADIUS server response is not received in the specified waiting time, the switch resends the request packet or sets the server as invalid according to the current conditions.</p> <p>The no command restores the default setting.</p>
Example	<p>Setting the RADIUS authentication timeout timer value to 30 seconds.</p> <pre>Switch(config)#radius-server timeout 30</pre>

radius-server accounting-interim-update timeout

Command	radius-server accounting-interim-update timeout <seconds> no radius-server accounting-interim-update timeout												
Parameter	seconds the interval of sending fee-counting update messages, in seconds, ranging from 60 to 3600												
Default	The default interval of sending fee-counting update messages is 300 seconds.												
Mode	Global Mode												
Usage Guide	<p>This command set the interval at which NAS sends fee-counting update messages. In order to realize the real time fee-counting of users, from the moment the user becomes online, NAS will send a fee-counting update message of this user to the RADIUS server at the configured interval.</p> <p>The interval of sending fee-counting update messages is relative to the maximum number of users supported by NAS. The smaller the interval, the less the maximum number of the users supported by NAS; the bigger the interval, the more the maximum number of the users supported by NAS. The following is the recommended ratio of interval of sending fee-counting update messages to the maximum number of the users supported by NAS:</p> <table><thead><tr><th>The maximum number of users</th><th>The interval of sending fee-counting update messages(in seconds)</th></tr></thead><tbody><tr><td>1-299</td><td>300 (default)</td></tr><tr><td>300-599</td><td>600</td></tr><tr><td>600-1199</td><td>1200</td></tr><tr><td>1200-1799</td><td>1800</td></tr><tr><td>≥1800</td><td>3600</td></tr></tbody></table> <p>The no operation of this command will reset to the default configuration.</p>	The maximum number of users	The interval of sending fee-counting update messages(in seconds)	1-299	300 (default)	300-599	600	600-1199	1200	1200-1799	1800	≥1800	3600
The maximum number of users	The interval of sending fee-counting update messages(in seconds)												
1-299	300 (default)												
300-599	600												
600-1199	1200												
1200-1799	1800												
≥1800	3600												
Example	<p>The maximum number of users supported by NAS is 700, the interval of sending fee-counting update messages 1200 seconds.</p> <pre>Switch(config)#radius-server accounting-interim-update timeout 1200</pre>												

show aaa authenticated-user

Command	show aaa authenticated-user
Parameter	none none

Default	None.
Mode	Admin/Global Mode
Usage Guide	Displays the authenticated users online. Usually the administrator concerns only information about the online user, the other information displayed is used for troubleshooting by technical support.
Example	Displays the authenticated users online. Switch(config)#show aaa authenticated-user ----- authenticated users ----- UserName Retry RadID Port EapID ChapID OnTime UserIP MAC ----- ----- total: 0 -----

show aaa authenticating-user

Command	show aaa authenticating-user
Parameter	none none
Default	None.
Mode	Admin/Global Mode
Usage Guide	Display the authenticating users. Usually the administrator concerns only information about the authenticating user, the other information displays is used for troubleshooting by the technical support.
Example	Display the authenticating users. Switch(config)#show aaa authenticating-user ----- authenticating users ----- User-name Retry-time Radius-ID Port Eap-ID Chap-ID Mem-Addr State ----- ----- total: 0 -----

show aaa config

Command	show aaa config
Parameter	none none

Default	None.
Mode	Admin/Global Mode
Usage Guide	Displays whether aaa authentication, accounting are enabled and information for key, authentication and accounting server specified.
Example	<p>Display aaa configuration information.</p> <pre> Switch(config)#show aaa config ----- AAA config data ----- Is Aaa Enabled = 1 :1 means AAA authentication is enabled, 0 means is not enabled Is Account Enabled= 1 :1 means AAA account is enabled, 0 means is not enabled MD5 Server Key = yangshifeng : Authentication key authentication server sum = 2 :Configure the number of authentication server </pre>

show radius authenticated-user count

Command	show radius authenticated-user count
Parameter	none none
Default	None.
Mode	Admin/Global Mode
Usage Guide	Show the number of on-line users who have already passed the authentication.
Example	<p>Show the number of on-line users who have already passed the authentication.</p> <pre> Switch(config)#show radius authenticated-user count The authenticated online user num is: 105 </pre>

show radius authenticating-user count

Command	show radius authenticating-user count
Parameter	none none
Default	None.

Mode	Admin/Global Mode
Usage Guide	Show the number of the authenticating-user.
Example	Show the number of the authenticating-user. Switch(config)#show radius authenticating-user count The authenticating user num is: 10

show radius count

Command	show radius count {authenticated-user authenticating-user} count
Parameter	authenticated-user displays the authenticated users online authenticating-user displays the authenticating users
Default	None.
Mode	Admin/Global Mode
Usage Guide	Displays the statistics for users of RADIUS authentication.
Example	Displays the statistics for users of RADIUS authentication. Switch#show radius authenticated-user count The authenticated online user num is: 0

9 Commands for SSL Configuration

ip http secure-server

Command	[no] ip http secure-server
Parameter	none none
Default	By default, this function is disabled.
Mode	Global Mode
Usage Guide	<p>This command is used for enable and disable SSL function. After enable SSL function, the users visit the switch through https client, switch and client use SSL connect, can form safety SSL connect channel. After that, all the data which transmit of the application layer will be encrypted, then ensure the privacy of the communication.</p> <p>The no command disables SSL function.</p>
Example	<p>Enable SSL function.</p> <p>Switch(config)#ip http secure-server</p>

ip http secure-port

Command	ip http secure-port <port-number> no ip http secure-port
Parameter	port-number means configured port number, range between 1025 and 65535. 443 is for default
Default	By default, SSL port number is not configured.
Mode	Global Mode
Usage Guide	<p>Configure/delete port number by SSL used.</p> <p>If this command is used to configure the port number, then the configured port number is used to monitor. If the port number for https is changed, when users try to use https to connect, must use the changed one. For example:https://device:port_number.</p> <p>SSL function must reboot after every change.</p> <p>The no command removes the configured port number.</p>
Example	Configure the port number is 1028.

```
Switch(config)#ip http secure-port 1028
```

ip http secure- ciphersuite

Command	<pre>ip http secure-ciphersuite {des-cbc3-sha rc4-128-sha des-cbc-sha} no ip http secure-ciphersuite</pre>						
Parameter	<table><tr><td>des-cbc3-sha</td><td>encrypted algorithm DES_CBC3, summary algorithm SHA</td></tr><tr><td>rc4-128-sha</td><td>encrypted algorithm RC4_128, summary algorithm SHA</td></tr><tr><td>des-cbc-sha</td><td>encrypted algorithm DES_CBC, summary algorithm SHA</td></tr></table>	des-cbc3-sha	encrypted algorithm DES_CBC3, summary algorithm SHA	rc4-128-sha	encrypted algorithm RC4_128, summary algorithm SHA	des-cbc-sha	encrypted algorithm DES_CBC, summary algorithm SHA
des-cbc3-sha	encrypted algorithm DES_CBC3, summary algorithm SHA						
rc4-128-sha	encrypted algorithm RC4_128, summary algorithm SHA						
des-cbc-sha	encrypted algorithm DES_CBC, summary algorithm SHA						
Default	By default, SSL secure password suite is not configured.						
Mode	Global Mode						
Usage Guide	<p>Configure/delete secure cipher suite by SSL used.</p> <p>If this command is used to configure the secure cipher suite, specified encryption method will be used. The SSL should be restarted to take effect after changes on configuration. When des-cbc-sha is configured, IE 7.0 or above is required.</p> <p>No command removes the configured secure password suite.</p>						
Example	<p>Configure the secure cipher suite is rc4-128-sha.</p> <pre>Switch(config)#ip http secure- ciphersuite rc4-128-sha</pre>						

show ip http secure-server status

Command	<pre>show ip http secure-server status</pre>		
Parameter	<table><tr><td>none</td><td>none</td></tr></table>	none	none
none	none		
Default	None.		
Mode	Admin/Global Mode		
Usage Guide	Show the status for the configured SSL.		
Example	<p>Show the status for the configured SSL.</p> <pre>Switch(config)#show ip http secure-server status</pre>		

HTTP secure server status: Enabled
HTTP secure server port: 1028
HTTP secure server ciphersuite: rc4-128-sha

10 Commands for IPv6 Security RA

ipv6 security-ra enable

Command	[no] ipv6 security-ra enable
Parameter	none none
Default	The IPv6 security RA function is disabled by default.
Mode	Global Mode
Usage Guide	<p>Globally enable IPv6 security RA function, all the RA advertisement messages will not be forwarded through hardware, but only sent to CPU to handle.</p> <p>Only after enabling the global security RA function, the security RA on a port can be enabled. Globally disabling security RA will clear all the configured security RA ports. The global security RA function and the global IPv6 SAVI function are mutually exclusive, so they can not be enabled at the same time.</p> <p>The no operation of this command will globally disable IPv6 security RA function.</p>
Example	<p>Globally enable IPv6 security RA.</p> <p>Switch(config)#ipv6 security-ra enable</p>

ipv6 security-ra enable

Command	[no] ipv6 security-ra enable
Parameter	none none
Default	The IPv6 security RA function is disabled by default.
Mode	Port Configuration Mode
Usage Guide	<p>Enable IPv6 security RA on a port, causing this port not to forward the received RA message.</p> <p>Only after globally enabling the security RA function, can the security RA on a port be enabled. Globally disabling security RA will clear all the configured security RA ports.</p> <p>The no ipv6 security-ra enable will disable the IPv6 security RA on a port.</p>
Example	Enable IPv6 security RA on a port.

```
Switch(config-if-ethernet1/0/2)#ipv6 security-ra enable
```

show ipv6 security-ra

Command	show ipv6 security-ra [interface <interface-list>]
Parameter	interface-list Specifies the port number. No parameter will display all distrust ports, entering a parameter will display the corresponding distrust port.
Default	None.
Mode	Admin/Global Mode
Usage Guide	Display all the interfaces with IPv6 RA function enabled.
Example	Display all the interfaces with IPv6 RA function enabled. Switch# show ipv6 security-ra IPv6 security ra config and state information in the switch Global IPv6 Security RA State: Enable Ethernet1/0/1 IPv6 Security RA State: Yes Ethernet1/0/3 IPv6 Security RA State: Yes

11 Commands for MAB

authentication mab

Command	authentication mab {radius local} (none) no authentication mab
Parameter	radius means RADIUS authentication mode local means the local authentication none means the authentication is needless
Default	By default, using RADIUS authentication mode.
Mode	Global Mode
Usage Guide	<p>Configure the authentication mode and priority of MAC address authentication. none option is used to the fleeing function of MAC address authentication.</p> <p>If all configured RADIUS servers don't respond, switch will adopt none authentication mode to allow that MAC address authentication users access the network directly. The option of local is used for the local authentication of MAC address, it authenticates through the local user name and password. If configured as the method of authentication mab radius local none, judge if configured the user name and password used in mab authentication in local when the radius server has no response. If it has been configured, use the local authentication, if not, use the backup none authentication.</p> <p>The no command restores the default authentication mode.</p>
Example	<p>Configure the local authentication and the fleeing function of MAC address authentication.</p> <pre>Switch(config)#authentication mab radius local none</pre>

clear mac-authentication-bypass binding

Command	clear mac-authentication-bypass binding {mac WORD interface (ethernet IFNAME IFNAME) all}
Parameter	mac Delete MAB binding of the specified MAC address IFNAME Delete MAB binding of the specified port all Delete all MAB binding
Default	None.
Mode	Admin Mode

Usage Guide	Clear MAB binding information.
Example	Delete all MAB binding. Switch#clear mac-authentication-bypass binding all

mac-authentication-bypass binding-limit

Command	mac-authentication-bypass binding-limit <1-100> no mac-authentication-bypass binding-limit
Parameter	1-100 the max binding number of MAB, ranging from 1 to 100
Default	By default, the max binding number of MAB is 3.
Mode	Port Configuration Mode
Usage Guide	Set the max binding number of MAB. Set the max binding number of MAB. When the binding number reaches to the max value, the port will stop binding, if the max binding number is less than the current binding number of the port, the setting will be unsuccessful. The no command will restore the default binding number as 3.
Example	Configure the max binding number as 10. Switch(config)#interface ethernet 1/0/1 Switch(config-if-ethernet1/0/1)#mac-authentication-bypass binding-limit 10

mac-authentication-bypass enable

Command	[no] mac-authentication-bypass enable
Parameter	none none
Default	By default, disable the global and port MAB function.
Mode	Port Configuration Mode
Usage Guide	Enable the global and port MAB function. To process MAB authentication of a port, enable the global MAB function first, and then, enable

the MAB function of the corresponding port.

The no command disables MAB function.

Example

Enable the global and port Eth1/0/1 MAB function.

```
Switch(config)#mac-authentication-bypass enable
Switch(config)#interface ethernet 1/0/1
Switch(config-if-ethernet1/0/1)#mac-authentication-bypass enable
```

mac-authentication-bypass guest-vlan

Command

```
mac-authentication-bypass guest-vlan <1-4094>
no mac-authentication-bypass guest-vlan
```

Parameter

1-4094	guest vlan ID, ranging from 1 to 4094
---------------	---------------------------------------

Default

None.

Mode

Port Configuration Mode

Usage Guide

Set guest vlan of MAB authentication.

Set guest vlan of MAB authentication, only Hybrid port use this command, it is not take effect on access port. After MAB authentication is failing, if the existent guest vlan is configured by the port connecting to the MAB user, the MAB user can join and access guest vlan.

The no command deletes guest vlan.

Example

Configure guest vlan of MAB authentication for port 1/0/1.

```
Switch(config)#interface ethernet 1/0/1
Switch(config-if-ethernet1/0/1)#mac-authentication-bypass guest-vlan 10
```

mac-authentication-bypass spoofing-garp-check

Command

```
[no] mac-authentication-bypass spoofing-garp-check
```

Parameter

none	none
-------------	------

Default

By default, disable spoofing-garp-check function.

Mode

Global Mode

Usage Guide	<p>Enable the spoofing-garp-check function, MAB function will not deal with spoofing-garp any more</p> <p>When the terminal of Windows operating system detects the address conflict, it will sends a gratuitous ARP to correct the error ARP entries generated by gratuitous ARP of the conflict detection. This command is used to detect the spoofing-garp when occurring the address conflict, MAB function is not deal with the packet any more.</p> <p><i>Notice:</i> when enabling the check function, all ARP will be processed the software check, it will add switch's load.</p> <p>The no command disables the function.</p>
Example	<p>Enable spoofing-garp-check function.</p> <p>Switch(config)#mac-authentication-bypass spoofing-garp-check enable</p>

mac-authentication-bypass timeout linkup-period

Command	<p>mac-authentication-bypass timeout linkup-period <0-30> no mac-authentication-bypass timeout linkup-period</p>
Parameter	<p>0-30 After the port is shutdown automatically, the interval before it up again, the unit is second, 0 means there is no down/up operation</p>
Default	<p>By default, the interval is 0.</p>
Mode	<p>Global Mode</p>
Usage Guide	<p>Set the interval between down and up when VLAN binding in a port is changing to assure the user can obtain IP again.</p> <p>When MAB authentication is successful, belong to vlan according to auto-vlan setting, when MAB authentication is failing, belong to vlan according to guest-vlan setting. After linkup-period is set, when VLAN binding of a port is changing, the port will be shutdown automatically, and will be up again after linkup-period to assure the client obtain IP.</p> <p>The no command to restore default values.</p>
Example	<p>Configure down/up time as 12s.</p> <p>Switch(config)#mac-authentication-bypass timeout linkup-period 12</p>

mac-authentication-bypass timeout offline-detect

Command	mac-authentication-bypass timeout offline-detect (0 <60-7200>) no mac-authentication-bypass timeout offline-detect
Parameter	0 <60-7200> offline-detect time, the range is 0 or 60 to 7200s
Default	By default, offline-detect time is 180s.
Mode	Global Mode
Usage Guide	Configure offline-detect time. When offline-detect time is 0, the switch does not detect MAB binding, when offline-detect time is 60s to 7200s, the switch timely detects the flow corresponding to the MAB binding. If there is no flow in the period of offline-detect time, it will delete this binding and forbid the flow to pass. The no command restores the default value.
Example	Configure offline-detect time as 200s. Switch(config)#mac-authentication-bypass timeout offline-detect 200

mac-authentication-bypass timeout quiet-period

Command	mac-authentication-bypass timeout quiet-period <1-60> no mac-authentication-bypass timeout quiet-period
Parameter	1-60 quiet-period, ranging from 1 to 60s
Default	By default, quiet-period is 30s.
Mode	Global Mode
Usage Guide	Set quiet-period of MAB authentication. If MAB authentication is failing, within the quiet-period the switch will not respond the authentication request of this MAC, after quiet-period, it will respond the request again. The no command restores quiet-period as the default value.
Example	Configure quiet-period of MAB authentication as 60s. Switch(config)#mac-authentication-bypass timeout quiet-period 60

mac-authentication-bypass timeout reauth-period

Command	mac-authentication-bypass timeout reauth-period <1-3600> no mac-authentication-bypass timeout reauth-period
Parameter	1-3600 reauthentication interval, ranging from 1 to 3600s
Default	By default, reauthentication interval is 30s.
Mode	Global Mode
Usage Guide	<p>Set the reauthentication interval at failing authentication state.</p> <p>At failing authentication state, the user processes the reauthentication timely until the authentication is successful; at the successful state, the user can access the network resources.</p> <p>The no command restores the default value.</p>
Example	<p>Configure reauthentication time as 20s.</p> <p>Switch(config)#mac-authentication-bypass timeout reauth-period 20</p>

mac-authentication-bypass timeout stale-period

Command	mac-authentication-bypass timeout stale-period <0-60> no mac-authentication-bypass timeout stale-period
Parameter	0-60 The time that delete the binding, ranging from 0 to 60s
Default	By default, it takes 30 s. to delete the binding.
Mode	Global Mode
Usage Guide	<p>Set the time that delete the binding user after MAB port is down.</p> <p>If the time that delete the binding as 0, delete all user binding of this port as soon as the MAB port is down, if the time is bigger than 0, delete the user binding with a delay after the MAB port is down.</p> <p>The no command restores the default value.</p>
Example	<p>Configure the deletion time as 40s.</p> <p>Switch(config)#mac-authentication-bypass timeout stale-period 40</p>

mac-authentication-bypass username-format

Command	<code>[no] mac-authentication-bypass username-format {mac-address {fixed username WORD password WORD}}</code>				
Parameter	<table border="1"><tr><td>mac-address</td><td>Use MAC address of MAB user as username and password to authenticate</td></tr><tr><td>fixed username WORD password WORD</td><td>Use the specified username and password to authenticate, the length of username and password ranges between 1 and 32 characters</td></tr></table>	mac-address	Use MAC address of MAB user as username and password to authenticate	fixed username WORD password WORD	Use the specified username and password to authenticate, the length of username and password ranges between 1 and 32 characters
mac-address	Use MAC address of MAB user as username and password to authenticate				
fixed username WORD password WORD	Use the specified username and password to authenticate, the length of username and password ranges between 1 and 32 characters				
Default	By default, use MAC address of MAB user as username and password to authenticate.				
Mode	Global Mode				
Usage Guide	<p>Set the authenticate method of MAB authentication.</p> <p>There are two methods for MAB authentication: use MAC address of MAB user as username and password to authenticate or use the specified username and password to authenticate. If there is no specified username and password, the device uses the first method to authenticate by default.</p> <p>The no command to restore default values.</p>				
Example	<p>All MAB users use the same username and password to authenticate, the username is mab-user, the password is mab-pwd.</p> <pre>Switch(config)#mac-authentication-bypass username-format fixed username mab-user password mab-pwd</pre>				

show mac-authentication-bypass

Command	<code>show mac-authentication-bypass {interface {ethernet IFNAME IFNAME}}</code>				
Parameter	<table border="1"><tr><td>IFNAME</td><td>Port name</td></tr></table>	IFNAME	Port name		
IFNAME	Port name				
Default	None.				
Mode	Admin/Global Mode				
Usage Guide	Show the binding information of MAB authentication.				
Example	<p>Show the binding information of MAB authentication.</p> <pre>Switch#show mac-authentication-bypass</pre> <p>The Number of all binding is 5</p> <table border="1"><thead><tr><th>MAC</th><th>Interface</th><th>Vlan ID</th><th>State</th></tr></thead></table>	MAC	Interface	Vlan ID	State
MAC	Interface	Vlan ID	State		

```
-----
04-0a-eb-6a-7f-88    Ethernet1/0/1    1                MAB_QUIET
03-0a-eb-6a-7f-88    Ethernet1/0/1    1                MAB_QUIET
02-0a-eb-6a-7f-88    Ethernet1/0/1    1                MAB_AUTHENTICATED
00-0a-eb-6a-7f-8e    Ethernet1/0/1    1                MAB_AUTHENTICATED
```

Switch(config)#show mac-authentication-bypass int e1/0/1

Interface Ethernet1/0/1 user config:

MAB enable: Enable

Binding info: 1

```
-----
MAB Binding built at SUN JAN 01 01:14:48 2006
```

VID 1, Port: Ethernet1/1

Client MAC: 00-0a-eb-6a-7f-8e

Binding State: MAB_AUTHENTICATED

Binding State Lease: 164 seconds left

12 Commands for MAB PPPoE Intermediate Agent

pppoe intermediate-agent

Command	[no] pppoe intermediate-agent
Parameter	none none
Default	By default, disable global PPPoE intermediate agent function.
Mode	Global Mode
Usage Guide	Enable global PPPoE intermediate agent function. After enable global PPPoE IA function, process the packet of PPPoE discovery stage according to the related configuration. The no command disables global PPPoE intermediate agent function.
Example	Enable global PPPoE intermediate agent function. Switch(config)#pppoe intermediate agent

pppoe intermediate-agent (Port)

Command	[no] pppoe intermediate-agent
Parameter	none none
Default	By default, disable PPPoE intermediate agent function of the port.
Mode	Port Configuration Mode
Usage Guide	Enable PPPoE intermediate agent function of the port. After enable PPPoE IA function of the port, add vendor tag for PPPoE packet of the port. Note: 1. It must enable global pppoe intermediate-agent function. 2. At least one port is connected to PPPoE server, and the port mode is trust. The no command disables PPPoE intermediate agent function of the port.
Example	Enable PPPoE intermediate agent function of the port ethernet 1/0/2. Switch(config-if-ethernet1/0/2)#pppoe intermediate agent

pppoe intermediate-agent circuit-id

Command	[no] pppoe intermediate-agent circuit-id <string>
Parameter	string circuit-id, the max character number is 63 bytes
Default	This function is not configured by default.
Mode	Port Configuration Mode
Usage Guide	Configure circuit ID of the port. This command configures circuit-id alone for each port, the priority is higher than pppoe intermediate-agent identifier-string command. The no command cancels this configuration.
Example	Configure circuit-id as abcd/efgh on port ethernet1/0/3 of vlan3. Switch(config-if-ethernet1/0/3)#pppoe intermediate-agent circuit-id abcd/efgh

pppoe intermediate-agent delimiter

Command	pppoe intermediate-agent delimiter <WORD> no pppoe intermediate-agent delimiter
Parameter	WORD the delimiter, its range is (# . , ; : / space)
Default	By default, the fields is compared with '\0'.
Mode	Global Mode
Usage Guide	Configure the delimiter among the fields in circuit-id and remote-id. After configuring the delimiter, the added fields of circuit-id and remote-id use the configured delimiter to compare. <i>Notice:</i> The global pppoe intermediate-agent function must be enabled. The no command cancels the configuration.
Example	Configuration delimiter is space. Switch(config)#pppoe intermediate-agent delimiter space

pppoe intermediate-agent format

Command	pppoe intermediate-agent format (circuit-id remote-id) (hex ascii) no pppoe intermediate-agent format (circuit-id remote-id)
Parameter	hex hexadecimal ascii ASCII code
Default	This function is not configured by default.
Mode	Global Mode
Usage Guide	Configure the format with hex or ASCII for circuit-id and remote-id. Encapsulation circuit-id and remote-id with hex ASCII format to vendor tag. <i>Notice:</i> The global pppoe intermediate-agent function must be enabled. The no command cancels the configuration.
Example	Configure the trust port 1/0/1 to enable vendor-tag strip function. Switch(config)#pppoe intermediate-agent format remote-id ascii

pppoe intermediate-agent remote-id

Command	[no] pppoe intermediate-agent remote-id <string>
Parameter	string remote-id, the max character number is 63 bytes
Default	This function is not configured by default.
Mode	Port Configuration Mode
Usage Guide	Configure remote-id of the port. Configure remote-id for each port, if there is no configuration, use switch's MAC as remote-id value. The no command cancels this configuration.
Example	Configure remote-id as abcd on port ethernet1/0/2. Switch(config-if-ethernet1/0/2)# pppoe intermediate-agent remote-id abcd

pppoe intermediate-agent trust

Command	[no] pppoe intermediate-agent trust
Parameter	none none
Default	By default, the port is a untrust port.
Mode	Port Configuration Mode
Usage Guide	Configure the port as trust port. The port which connect to server must be configured as trust port. <i>Note:</i> At least one trust port is connected to PPPoE server. The no command configures the port as untrust port.
Example	Configure port ethernet1/0/1 as trust port. Switch(config-if-ethernet1/0/1)#pppoe intermediate-agent trust

pppoe intermediate-agent type self-defined circuit-id

Command	pppoe intermediate-agent type self-defined circuit-id {vlan port id (switch-id (mac hostname) remote-mac) string WORD} no pppoe intermediate-agent type self-defined circuit-id
Parameter	vlan VLAN ID port port number id switch-id mac the local MAC address id switch-id hostname the local host name remote-mac the remote MAC address string WORD the specified keyword
Default	By default, this configuration is null.
Mode	Global Mode
Usage Guide	Configure the self-defined circuit-id. This configuration and type tr-101 circuit-id are mutually exclusive, it will clear the corresponding configuration of type tr-101 circuit-id. The no command cancels the configuration.

Example	Configure the self-defined circuit-id as vlan port id switch-id hostname. Switch(config)#pppoe intermediate-agent type self-defined circuit-id vlan port id switch-id hostname
----------------	---

pppoe intermediate-agent type self-defined remoteid

Command	pppoe intermediate-agent type self-defined remoteid {mac vlan-mac hostname string WORD} no pppoe intermediate-agent type self-defined remote-id								
Parameter	<table border="1"> <tr> <td>mac</td> <td>Ethernet port MAC address</td> </tr> <tr> <td>vlan-mac</td> <td>IP interface MAC address</td> </tr> <tr> <td>hostname</td> <td>the local host name</td> </tr> <tr> <td>string WORD</td> <td>the specified keyword</td> </tr> </table>	mac	Ethernet port MAC address	vlan-mac	IP interface MAC address	hostname	the local host name	string WORD	the specified keyword
mac	Ethernet port MAC address								
vlan-mac	IP interface MAC address								
hostname	the local host name								
string WORD	the specified keyword								
Default	By default, this configuration is empty.								
Mode	Global Mode								
Usage Guide	Configure the self-defined remote-id. Configuration order of this command according to the fields order in remote-id. The no command cancels the configuration.								
Example	Configure the self-defined remote-id as string abcd mac hostname. Switch(config)#pppoe intermediate-agent type self-defined remoteid string abcd mac hostname								

pppoe intermediate-agent type tr-101 circuit-id access-node-id

Command	pppoe intermediate-agent type tr-101 circuit-id access-node-id <string> no pppoe intermediate-agent type tr-101 circuit-id access-node-id
Parameter	string access-node-id, the max character number is 47 bytes.
Default	By default, MAC address of the switch.
Mode	Global Mode

Usage Guide	<p>Configure access-node-id field value of circuit ID in the added vendor tag with tr-101 standard.</p> <p>Use this configuration to create access-node-id of circuit ID in vendor tag.circuit-id value is access-node-id +” eth “+ Slot ID + delimiter + Port Index + delimiter + Vlan ID, access-node-id occupies n bytes (n<48), “ eth “ is space + e + t + h + space, it occupies 5 bytes, Slot ID occupies 2 bytes, Port Index occupies 3 bytes, Vlan ID occupies 4 bytes, delimiter occupies 1 byte. In default state, access-node-id value of circuit-id is switch’s MAC, it occupies 6 bytes. For example: MAC address is “0a0b0c0d0e0f”, Slot ID is 12, Port Index is 34, Vlan ID is 567, the default circuit-id value is “0a0b0c0d0e0f eth 12/034:0567”.</p> <p>The no command unconfigured.</p>
Example	<p>Configure access-node-id value of circuit ID as abcd in vendor tag.</p> <p>Switch(config)#pppoe intermediate-agent access-node-id abcd</p> <p>After port ethernet1/0/3 of vlan3 receives PPPoE packets, circuit-id value of the added vendor tag is ”abcd eth 01/003:0003”.</p>

pppoe intermediate-agent type tr-101 circuit-id

identifier-string option delimiter

Command	<p>pppoe intermediate-agent type tr-101 circuit-id identifier-string <string> option {sp sv pv spv} delimiter <WORD> [delimiter <WORD>]</p> <p>no pppoe intermediate-agent type tr-101 circuit-id identifier-string option delimiter</p>						
Parameter	<table border="1"> <tr> <td>string</td> <td>identifier-string, the max character number is 47 bytes</td> </tr> <tr> <td>{sp sv pv spv}</td> <td>This option can select the combination format for slot, port, vlan, sp means slot and port, sv means slot and vlan, pv means port and vlan, spv means slot, port and vlan</td> </tr> <tr> <td>WORD</td> <td>The delimiter between slot, port and vlan, the range is (# . ; : / space). Note: There are two delimiter WORDs in spv combo mode, the first between slot and port, the second between port and vlan</td> </tr> </table>	string	identifier-string, the max character number is 47 bytes	{sp sv pv spv}	This option can select the combination format for slot, port, vlan, sp means slot and port, sv means slot and vlan, pv means port and vlan, spv means slot, port and vlan	WORD	The delimiter between slot, port and vlan, the range is (# . ; : / space). Note: There are two delimiter WORDs in spv combo mode, the first between slot and port, the second between port and vlan
string	identifier-string, the max character number is 47 bytes						
{sp sv pv spv}	This option can select the combination format for slot, port, vlan, sp means slot and port, sv means slot and vlan, pv means port and vlan, spv means slot, port and vlan						
WORD	The delimiter between slot, port and vlan, the range is (# . ; : / space). Note: There are two delimiter WORDs in spv combo mode, the first between slot and port, the second between port and vlan						
Default	By default, this configuration is empty.						
Mode	Global Mode						
Usage Guide	<p>Configure circuit-id of the added vendor tag with tr-101 standard.</p> <p>This command is used to configure global circuit id, the priority is higher than pppoe intermediate-agent access-node-id command. circuit-id value is access-node-id +” eth “+ Slot ID + delimiter + Port Index + delimiter + Vlan ID, access-node-id occupies n bytes (n<48), “ eth “ is space + e + t + h + space, it occupies 5 bytes, Slot ID occupies 2 bytes, Port Index occupies 3 bytes, Vlan ID occupies 4 bytes, delimiter occupies 1 byte.</p>						

The no command deletes this configuration.

Example

Configure access-node-id as xyz, use spv combination mode, delimiter with “#” between Slot ID and Port ID, delimiter with “/” between Port ID and Vlan ID.

```
Switch(config)#pppoe intermediate-agent identifier-string xyz option spv delimiter #  
delimiter /
```

```
Switch# show pppoe intermediate-agent identifier-string option delimiter  
config identifier string is : xyz
```

config option is : slot , port and vlan

the first delimiter is : "# "

the second delimiter is : "/ "

After port ethernet1/0/3 of vlan3 receives PPPoE packets, circuit-id value of the added vendor tag is "xyz eth 01#003/0003".

pppoe intermediate-agent vendor-tag strip

Command

[no] pppoe intermediate-agent vendor-tag strip

Parameter

none none

Default

By default, disable vendor-tag strip function of the port.

Mode

Port Configuration Mode

Usage Guide

Enable vendor-tag strip function of the port.

If the received packet includes vendor tag from server to client, strip this vendor tag.

Note:

1. Must enable global pppoe intermediate-agent function.
2. It must be configured on trust port.

The no command cancels this function.

Example

Trust port ethernet1/0/1 enables vendor tag strip function.

```
Switch(config-if-ethernet1/0/1)#pppoe intermediate-agent trust
```

```
Switch(config-if-ethernet1/0/1)#pppoe intermediate-agent vendor-tag strip
```

show pppoe intermediate-agent access-node-id

Command	show pppoe intermediate-agent access-node-id
Parameter	none none
Default	By default,the configuration information is null.
Mode	Admin mode
Usage Guide	This command is used to show access-node-id configured by user.
Example	Show access-node-id configuration information. Switch#pppoe intermediate-agent access-node-id abcd Switch#show pppoe intermediate-agent access-node-id pppoe intermediate-agent access-node-id is : abcd

show pppoe intermediate-agent identifier-string option delimiter

Command	show pppoe intermediate-agent identifier-string option delimiter
Parameter	none none
Default	By default,the configuration information is null.
Mode	Admin mode
Usage Guide	Show the configured identifier-string, the combo format and delimiter of slot, port and vlan.
Example	Show the configuration information for pppoe intermediate-agent identifier-string. Switch#pppoe intermediate-agent identifier-string abcd option spv delimiter # delimiter / Switch# show pppoe intermediate-agent identifier-string option delimiter config identifier string is : abcd config option is : slot , port and vlan the first delimiter is : "# " the second delimiter is : "/" "

show pppoe intermediate-agent info

Command	show pppoe intermediate-agent info [interface ethernet <interface-name>]
Parameter	interface-name port name

Default	By default,the configuration information is null.
Mode	Admin mode
Usage Guide	Show the related PPPoE IA configuration information of all ports or the specified port. Check the configuration information of the corresponding port, show whether the port is trust port, strip function is enabled, rate limit is enabled, show the configured circuit ID and remote ID.
Example	<p>Show pppoe intermediate-agent configuration information of port ethernet1/0/2.</p> <pre> Switch# show pppoe intermediate-agent info interface ethernet 1/0/2 Interface IA Trusted vendor Strip Rate limit circuit id remote id ----- - Ethernet1/0/2 yes no no no test1/port1 host1 </pre>

13 Commands for VLAN-ACL

clear vacl statistic vlan

Command	clear vacl [in out] statistic vlan [<1-4094>]
Parameter	in out Clear the traffic statistic of the ingress/egress 1-4094 The VLAN which needs to clear the VACL statistic information. If do not input VLAN ID, then clear all VLAN statistic information
Default	None.
Mode	Admin mode
Usage Guide	This command can clear the statistic information of VACL.
Example	Clear VACL statistic information of Vlan1. Switch#clear vacl statistic vlan 1

show vacl vlan

Command	show vacl [in out] vlan [<1-4094>] [begin include exclude <regular-expression>]
Parameter	in out Show ingress/egress configuration and statistic 1-4094 The VLAN which needs to show the configuration and the statistic information of VACL. If do not input VLAN ID, then show VACL configuration and statistic information of all VLANs. begin include exclude the regular expression <regular-expression> . match any characters except the line feed character ^ match the beginning of the row \$ match the end of the row match the character string at the left or right of upright line [0-9] match the number 0 to the number 9 [a-z] match the lowercase a to z [aeiou] match any letter in “aeiou” \ Escape Character is used to match the intervocalic character, for example, \\$ will match the \$ character, but it is not match the end of the character string \w match the letter, the number or the underline \b match the beginning or the end of the words \W match any characters which are not alphabet letter, number and underline \B match the locations which are not the begin or end of the word

[^x] match any characters except x
 [^aeiou] match any characters except including aeiou letters
 * repeat zero time or many times
 + repeat one time or many times
 (n) repeat n times
 (n,) repeat n or more times
 (n, m) repeat n to m times
At present, the regular expression used does not support the following syntaxes:
 \s match the blank character
 \d match the number
 \S match any characters except blank character
 \D match non-number character
 ? repeat zero time or one time

Default	None.
Mode	Admin Mode
Usage Guide	This command shows the configuration and the statistic information of VACL.
Example	Show vlan2 VACL statistics. Switch (config)#show vACL vlan 2 Vlan 2: IP Ingress access-list used is 100, traffic-statistics Disable.

vacl ip access-group

Command	vacl ip access-group {<1-299> WORD } {in out} [traffic-statistic] vlan WORD no vacl ip access-group {<1-299> WORD } {in out} vlan WORD
Parameter	<1-299> WORD Configure the numeric IP ACL (include: standard ACL rule <1-99>, extended ACL rule <100-299>) or the named ACL. in out Filter the ingress/egress traffic traffic-statistic Enable the statistic of matched packets number vlan WORD The VLAN will be bound to VACL
Default	None
Mode	Global Mode
Usage Guide	This command configure VACL of IP type on the specific VLAN. Use “;” or “-” to input the VLAN or multi-VLANs, but do not exceed 128, and CLI length cannot exceed 80 characters. Egress direction filtering is not supported by switch.

The no command unconfigured.

Example

Configure the numeric IP ACL and enable the statistic function for Vlan 1-5,6,7-9.

```
Switch(config)#vcl ip access-group 1 in traffic-statistic vlan 1-5; 6; 7-9
```

vacl ipv6 access-group

Command

vacl ipv6 access-group (<500-699> | **WORD**) {in } (traffic-statistic) **vlan WORD**
no ipv6 access-group {<500-699> | **WORD**} {in } **vlan WORD**

Parameter

<500-699> WORD	Configure the IPv6 numeric standard ACL or IPV6 standard ACL rule.
in out	Filter inlet/ outlet flow
traffic-statistic	Enable the statistic of matched packets number
vlan WORD	The VLAN will be bound to VACL.

Default

None.

Mode

Global Mode

Usage Guide

This command configure VACL of IPv6 on the specific VLAN.
Use “;” or “-” to input the VLAN or multi-VLANs, but do not exceed 128, and CLI length cannot exceed 80 characters. Egress direction filtering and extended IPv6 is not supported by switch.

The no command unconfigured.

Example

Configure the numeric IPv6 ACL for Vlan 5.

```
Switch(config)#vcl ipv6 access-group 600 in traffic-statistic vlan 5
```

vacl mac access-group

Command

vacl mac access-group {<700-1199> | **WORD**} {in } [traffic-statistic] **vlan WORD**
no vcl mac access-group {<700-1199> | **WORD**} {in } **vlan WORD**

Parameter

<700-1199> WORD	Configure the numeric IP ACL (include: <700-799> MAC standard access list, <1100-1199> MAC extended access list) or the named ACL
in	Filter the ingress traffic
traffic-statistic	Enable the statistic of matched packets number
vlan WORD	The VLAN will be bound to VACL

Default	None.
Mode	Global Mode
Usage Guide	<p>This command configure VACL of MAC type on the specific VLAN. Use “;” or “-” to input the VLAN or multi-VLANs, but do not exceed 128, and CLI length cannot exceed 80 characters. Egress direction filtering is not supported by switch.</p> <p>The no command unconfigured.</p>
Example	<p>Configure the numeric MAC ACL for Vlan 1-5</p> <pre>Switch(config)#vACL mac access-group 700 in traffic-statistic vlan 1-5</pre>

vacl mac-ip access-group

Command	<pre>vacl mac-ip access-group {<3100-3299> WORD} {in } [traffic-statistic] vlan WORD no vacl mac-ip access-group {<3100-3299> WORD} {in } vlan WORD</pre>										
Parameter	<table border="1"> <tr> <td><3100-3299></td> <td> Configure the numeric MAC-IP ACL or the named</td> </tr> <tr> <td>WORD</td> <td>ACL</td> </tr> <tr> <td>in</td> <td>Filter the ingress traffic</td> </tr> <tr> <td>traffic-statistic</td> <td>Enable the statistic of matched packets number</td> </tr> <tr> <td>vlan WORD</td> <td>The VLAN will be bound to VACL.</td> </tr> </table>	<3100-3299>	Configure the numeric MAC-IP ACL or the named	WORD	ACL	in	Filter the ingress traffic	traffic-statistic	Enable the statistic of matched packets number	vlan WORD	The VLAN will be bound to VACL.
<3100-3299>	Configure the numeric MAC-IP ACL or the named										
WORD	ACL										
in	Filter the ingress traffic										
traffic-statistic	Enable the statistic of matched packets number										
vlan WORD	The VLAN will be bound to VACL.										
Default	None.										
Mode	Global mode										
Usage Guide	<p>This command configure VACL of MAC-IP type on the specific VLAN. Use “;” or “-” to input the VLAN or multi-VLANs, but do not exceed 128, and CLI length cannot exceed 80 characters. Egress direction filtering is not supported by switch.</p> <p>The no command unconfigured.</p>										
Example	<p>Configure the numeric MAC-IP ACL for Vlan 1, 2, 5.</p> <pre>Switch(config)#vacl mac-ip access-group 3100 in traffic-statistic vlan 1;2;5</pre>										

14 Commands for SAVI

ipv6 cps prefix

Command	ipv6 cps prefix <ipv6-address> vlan <vid> no ipv6 cps prefix<ipv6-address>
Parameter	ipv6-address the address prefix of link, like 2001::/64 vid vlan ID of the current link
Default	None.
Mode	Global Mode
Usage Guide	Configure IPv6 address prefix of the link manually. Users should configure local address prefix: fe80::/64 of the link before enable the function of matching address prefix of the link, it accepts the packets of which source addresses are the local addresses of the link. The no command deletes IPv6 address prefix.
Example	Configure IPv6 address prefix of the link manually is 2001::/64。 Switch(config)#ipv6 cps prefix 2001::/64

ipv6 cps prefix check enable

Command	[no] ipv6 cps prefix check enable
Parameter	none none
Default	By default,disable SAVI address prefix check function.
Mode	Global Mode
Usage Guide	Enable SAVI address prefix check function. After enable the prefix check function, if the IPv6 address prefix of the packets does not accord with the link prefix, then do not establish the corresponding IPv6 address binding. If users enable the matched address prefix of the link, configure the local address prefix of fe80::/64 first to accept the packets with the source address as local link address. Disable address prefix check function by default. The no command will disable this function.

Example	Enable SAVI address prefix check function. Switch(config)#ipv6 cps prefix check enable
----------------	--

ipv6 dhcp snooping trust

Command	[no] ipv6 dhcp snooping trust
Parameter	none none
Default	By default, this function is disabled.
Mode	Port Mode
Usage Guide	Configure the port as dhcpv6 trust port, it does not establish dynamic DHCPv6 binding again and allows all DHCPv6 protocol packets to pass. Set the port as dhcpv6 trust attribute, enable uplink port of the switch with SAVI function for connecting dhcpv6 server or dhcpv6 relay generally. no command deletes the port trust function.
Example	Set ethernet1/0/1 to be DHCP trust port. Switch(config)#interface ethernet1/0/1 Switch(config-if-ethernet1/0/1)#ipv6 dhcp snooping trust

ipv6 nd snooping trust

Command	[no] ipv6 nd snooping trust
Parameter	none none
Default	By default, this function is disabled.
Mode	Port Mode
Usage Guide	Configure the port as slaac trust and RA trust port, this port will not establish dynamic slaac binding anymore and forwards RA packets. If the port disables ipv6 nd snooping trust function, it is considered to untrust RA packets port and discards all RA packets. Setting the port as trust attribute, enable the uplink port of the switch with SAVI or the conjoint port between switches with SAVI generally.

The no command deletes the port trust function.

Example

Set the port ethernet1/0/1 to be nd trust port.

```
Switch(config)#interface ethernet1/0/1
Switch(config-if-ethernet1/0/1)#ipv6 nd snooping trust
```

savi check binding

Command

savi check binding <simple | probe> mode
no savi check binding mode

Parameter

simple	only check the port state for conflict binding, if the state is up,keep the conflict binding and do not set new binding. If the state is down, delete the conflict binding to set a new one
probe	besides checking the port state for conflict binding, it will send NS packets to probe the usability of the corresponding user when the port state is up. If receiving the responded NA packets from users, it will keep the current conflict binding and does not set new binding, otherwise delete the conflict binding to set new one

Default

Disable the conflict binding check mode by default. It will adopt the mode that delete the conflict binding directly to set new one.

Mode

Global Mode

Usage Guide

Configure the check mode for conflict binding.
It is recommended to configure probe mode to prevent the attack that the spurious address conflict binding deletes the legal user binding.

The no command deletes the check mode.

Example

Configure the conflict binding check mode to probe mode.

```
Switch(config)#savi check binding probe mode
```

savi enable

Command

[no] savi enable

Parameter

none	none
-------------	------

Default	By default,disable the global SAVI function.
Mode	Global Mode
Usage Guide	<p>Enable the global SAVI function.</p> <p>Command configuration can be processed for SAVI function after enabling the global SAVI function. Because SAVI function has already contained security RA function, global SAVI function and security RA function are mutually exclusive in the global mode.</p> <p>The no command disables this global function.</p>
Example	<p>Enable SAVI function.</p> <pre>Switch(config)#savi enable</pre>

savi ipv6 binding num

Command	<pre>savi ipv6 binding num <limit-num> no savi ipv6 binding num</pre>
Parameter	<pre>limit-num</pre> <p>set the range from 0 to 65535</p>
Default	The default value of the port binding number is 65535.
Mode	Port Mode
Usage Guide	<p>Configure the number of the corresponding binding with the port.</p> <p>The configured binding number only include the dynamic binding type of slaac, dhcp. If the binding sum exceeds the configured number, this port does not create new dynamic binding any more, if the configured number is 0, this port does not create any dynamic binding.</p> <p>The no command restores the default value.</p>
Example	<p>Configure the binding number to be 100 for port ethernet1/0/1.</p> <pre>Switch(config)#interface ethernet1/0/1 Switch(config-if-ethernet1/0/1)# savi ipv6 binding num 100</pre>

savi ipv6 check source binding

Command	<pre>savi ipv6 check source binding ip <ip-address> mac <mac-address> interface</pre>
----------------	---

**<if-name> {type [slaac | dhcp] lifetime <lifetime> | type static}
no savi ipv6 check source binding ip <ip-address> interface <if-name>**

Parameter	ip-address the unicast IPv6 address, including local link and global unicast address
	mac-address the mac address of Ethernet
	if-name the port name, like interface ethernet 1/0/1
	slaac dhcp slaac means create the dynamic binding for slaac type, dhcp means create the dynamic binding for dhcp type
	lifetime configure the lifetime period for the dynamic binding, the unit is second
	static create the binding of the static type
Default	None.
Mode	Global Mode
Usage Guide	<p>Configure the static or dynamic binding function manually。</p> <p>After the dynamic binding configured by handwork is overtime, the corresponding binding will be deleted but the configuration is still be kept, so the binding still be shown. If the binding needs to take effect again, it should delete it first and configure a new binding again.</p> <p>When the binding type is static type, do not configure lifetime period, the lifetime period is infinite.</p> <p>The no command deletes the configured binding.</p>
Example	<p>Configure the dynamic binding of slaac type for SAVI manually.</p> <pre>Switch(config)#savi ipv6 check source binding ip 2001::10 mac 00-25-64-BB-8F-04 Interface ethernet1/0/1 type slaac lifetime 2010</pre> <p>Configure the static binding for SAVI manually.</p> <pre>Switch(config)#savi ipv6 check source binding ip 2001::20 mac 00-25-64-BB-8F-04 Interface ethernet1/0/1 type static</pre>

savi ipv6 check source ip-address mac-address

Command	savi ipv6 check source [ip-address mac-address ip-address mac-address] no savi ipv6 check source
Parameter	none none
Default	By default,disable the control filtering function of the port.

Mode	Port Mode
Usage Guide	<p>Enable the control authentication function for the packets of the port. The global SAVI function must be enabled before configuring this command.</p> <p>The no command disables this function.</p>
Example	<p>Enable the control filtering function of the packets on port ethernet1/0/1.</p> <pre>Switch(config)#interface ethernet1/0/1 Switch(config-if-ethernet1/0/1)# savi ipv6 check source ip-address mac-address</pre>

savi ipv6 {dhcp-only | slaac-only | dhcp-slaac} enable

Command	[no] savi ipv6 {dhcp-only slaac-only dhcp-slaac} enable						
Parameter	<table border="1"> <tr> <td>dhcp-only</td> <td>dhcp-only application scene</td> </tr> <tr> <td>slaac-only</td> <td>slaac-only application scene</td> </tr> <tr> <td>dhcp-slaac</td> <td>combination application scene of dhcp-only and slaac-only</td> </tr> </table>	dhcp-only	dhcp-only application scene	slaac-only	slaac-only application scene	dhcp-slaac	combination application scene of dhcp-only and slaac-only
dhcp-only	dhcp-only application scene						
slaac-only	slaac-only application scene						
dhcp-slaac	combination application scene of dhcp-only and slaac-only						
Default	By default,disable SAVI application scene.						
Mode	Global Mode						
Usage Guide	<p>Enable SAVI application scene function.</p> <p>dhcp-only application scene only detects DHCPv6 packets and DAD NS packets of link-local ipv6 address to be IPv6 address with target field, it does not detect DAD NS packets of non-link-local address. slaac-only application scene detects DAD NS packets of all types. dhcp-slaac combination application scene detects all DHCPv6 and DAD NS packets. Disable all kinds of application scene detection function for SAVI by default.</p> <p>The no command disables the function.</p>						
Example	<p>Enable the specified dhcp-only application scene for SAVI.</p> <pre>Switch(config)#savi ipv6 dhcp-only enable</pre>						

savi ipv6 mac-binding-limit

Command	<pre>savi ipv6 mac-binding-limit <limit-num> no savi ipv6 mac-binding-limit</pre>
----------------	---

Parameter	limit-num set the ranging from 1 to 10, the default dynamic binding number is 32 for the same MAC address
Default	The default dynamic binding number is 32 for the same MAC address.
Mode	Global Mode
Usage Guide	Configure the dynamic binding number of the same MAC address. This command is used to prevent the exhaust attack of the dynamic binding entry for SAVI. The no command restores the default value.
Example	Set the dynamic binding number to be 5 for the same MAC address. Switch(config)#isavi ipv6 mac-binding-limit 5

savi max-dad-dalaly

Command	savi max-dad-delay <max-dad-delay> no savi max-dad-delay
Parameter	max-dad-delay set the ranging between 1 and 65535 seconds, its default value is 1 second
Default	Its default value is 1 second.
Mode	Global Mode
Usage Guide	Configure the dynamic binding at DETECTION state and send lifetime period of DAD NS packet detection. It is recommended to use the default value. The no command restores the default value.
Example	Set the detection lifetime as 2 seconds. Switch(config)#savi max-dad-delay 2

savi max-dad-prepare-delay

Command	savi max-dad-prepare-delay <max-dad-prepare-delay>
----------------	---

no savi max-dad-prepare-delay

Parameter	max-dad-prepare-delay set the ranging between 1 and 65535 seconds, its default value is 1 second
Default	Its default value is 1 second.
Mode	Global Mode
Usage Guide	Configure lifetime period of redetection for the dynamic binding. It is recommended to user the default value. The no command restores the default value.
Example	Set the redetection lifetime as 2 seconds. Switch(config)#savi max-dad-prepare-delay 2

savi max-slaac-life

Command	savi max-slaac-life <max-slaac-life> no savi max-slaac-life
Parameter	max-slaac-life set the ranging between 1 and 31536000 seconds, its default value is 4 hours
Default	Its default value is 4 hours.
Mode	Global Mode
Usage Guide	Configure lifetime period of slaac dynamic binding at BOUND state. The no command restores the default value.
Example	Configure lifetime period of slaac binding type as 2010 seconds at BOUND state. Switch(config)#savi max-slaac-life 2000

savi timeout bind-protect

Command	savi timeout bind-protect <protect-time> no savi timeout bind-protect
----------------	--

Parameter	protect-time set the ranging between 1 and 300 seconds, its default value is 30 seconds
Default	Its default value is 30 seconds.
Mode	Global Mode
Usage Guide	<p>Configure the bind-protect lifetime period for a port after its state from up to down.</p> <p>After the configured lifetime period is overtime, the port is still at down state, the binding of this port will be deleted. If the port state is changed from down to up state during the configured lifetime period, the binding of the port will reset it as lifetime period of BOUND state. If the configured parameter is 0 second, all binding of the port will be deleted immediately.</p> <p>The no command restores the default value.</p>
Example	<p>Set bind-protect lifetime period to be 20 seconds.</p> <p>Switch(config)#savi timeout bind-protect 20</p>

show savi ipv6 check source binding

Command	show savi ipv6 check source binding [interface<if-name>]																												
Parameter	if-name port name such as interface ethernet 1/0/1																												
Default	None.																												
Mode	Admin Mode																												
Usage Guide	Show the global SAVI binding entry list.																												
Example	<p>Show the global binding state of SAVI.</p> <p>Switch(config)#show savi ipv6 check source binding</p> <p>Static binding count: 0 Dynamic binding count: 3 Binding count: 3</p> <table border="1"> <thead> <tr> <th>MAC</th> <th>IP</th> <th>VLAN</th> <th>Port</th> <th>Type</th> <th>State</th> <th>Expires</th> </tr> </thead> <tbody> <tr> <td>00-25-64-bb-8f-04</td> <td>fe80::225:64ff:febb:8f04</td> <td>1</td> <td>Ethernet1/0/5</td> <td>slaac</td> <td>BOUND</td> <td>14370</td> </tr> <tr> <td>00-25-64-bb-8f-04</td> <td>2001::13:1</td> <td>1</td> <td>Ethernet1/0/5</td> <td>slaac</td> <td>BOUND</td> <td>14370</td> </tr> <tr> <td>00-25-64-bb-8f-04</td> <td>2001::10:1</td> <td>1</td> <td>Ethernet1/0/5</td> <td>slaac</td> <td>BOUND</td> <td>14370</td> </tr> </tbody> </table>	MAC	IP	VLAN	Port	Type	State	Expires	00-25-64-bb-8f-04	fe80::225:64ff:febb:8f04	1	Ethernet1/0/5	slaac	BOUND	14370	00-25-64-bb-8f-04	2001::13:1	1	Ethernet1/0/5	slaac	BOUND	14370	00-25-64-bb-8f-04	2001::10:1	1	Ethernet1/0/5	slaac	BOUND	14370
MAC	IP	VLAN	Port	Type	State	Expires																							
00-25-64-bb-8f-04	fe80::225:64ff:febb:8f04	1	Ethernet1/0/5	slaac	BOUND	14370																							
00-25-64-bb-8f-04	2001::13:1	1	Ethernet1/0/5	slaac	BOUND	14370																							
00-25-64-bb-8f-04	2001::10:1	1	Ethernet1/0/5	slaac	BOUND	14370																							

