AX2200S / AX1250S / AX1240S Software Manual

Configuration Command Reference

For Version 2.4

AX1240S-S003X-60

AlaxalA

Relevant products

This manual applies to the AX2200S, AX1250S, and AX1240S models of switches, and describes the functionality in software version 2.4 of the AX2200S, AX1250S, and AX1240S series switches that is supported by the OS-LT4, OS-LT3, and OS-LT2 software and optional licenses.

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Reading and storing this manual

Before you use the equipment, carefully read the manual and make sure that you understand all safety precautions. After reading the manual, keep it in a convenient place for easy reference.

Notes

Information in this document is subject to change without notice.

Editions history

July 2012 (Edition 7) AX1240S-S003X-60

History of Amendments

Ver. 2.4 (Edition 7)

Table Summary of amendments

Location and title	Changes
Addition of series	A description of the AX2200S was added.
8. Ethernet	The following command was added. ● power inline system-allocation

In addition to the above changes, minor editorial corrections were made.

Ver. 2.3 (Edition 6)

Table Summary of amendments

Location and title	Changes
Login Security and RADIUS	The explanation of the following command was changed. ● ip access-group

Location and title	Changes
Ring Protocol	The following commands were added. ● multi-fault-detection mode ● multi-fault-detection vlan
Access Lists	The explanations of the following commands were changed. ● deny (ip access-list extended) ● ip access-group ● mac access-group ● permit (ip access-list extended)
QoS	The explanations of the following commands were changed. ● ip qos-flow-group ● mac qos-flow-group
Error messages displayed when editing the configuration	The error messages for the following information were changed. ● Ring Protocol information ● CFM information

In addition to the above changes, minor editorial corrections were made.

Ver. 2.3 (Edition 5)

Table Summary of amendments

Location and title	Changes
Login Security and RADIUS	The following commands was added. ● aaa authentication login end-by-reject
Device Management	The following commands was added. ● system fan mode ● system temperature-warning-level ● system temperature-warning-level average
Ethernet	The explanations of the following commands were changed. ● bandwidth ● mdix auto Notes on using the following commands were added. ● link debounce ● ip dhcp snooping limit rate ● ip dhcp snooping trust ● ip verify source
DHCP snooping	Notes on using the following commands were added. ● ip arp inspection limit rate ● ip dhcp snooping limit rate ● ip dhcp snooping trust ● ip verify source
Common to Layer 2 Authentication	Notes on using the following commands were added. ● authentication arp-relay
Web Authentication	The following command was added. ● aaa authentication web-authentication end-by-reject

Location and title	Changes
MAC-based Authentication	The following commands was added. ● aaa authentication mac-authentication end-by-reject

In addition to the above changes, minor editorial corrections were made.

Ver. 2.2 (Edition 4)

Table Summary of amendments

Location and title	Changes
Addition of series	● A description of AX1250S was added.
Reading the Manual	● A description of AX1250S was added.
Device Management	The explanation of the following command was changed. ● system recovery
Ethernet	Descriptions have been added with the support of the 100BASE-FX (SFP). ● duplex ● flowcontrol ● interface gigabitethernet ● media-type ● speed
Access Lists	Notes on using the following commands were added. ● deny (mac access-list extended) ● permit (mac access-list extended)
QoS	Note on using the following command was added. ● qos (mac qos-flow-list)
Uplink redundancy	The following command was added. ● switchport-backup startup-active-port-selection

In addition to the above changes, minor editorial corrections were made.

Ver. 2.2 (Edition 3)

Table Summary of amendments

Location and title	Changes
Reading the Manual	● The list of the command modes was changed.
Login Security and RADIUS	The following commands were added. ● aaa group server radius ● radius-server attribute station-id capitalize ● server The parameter was added to the following command. ● radius-server host

Location and title	Changes
Device Management	The following command was added. ● system recovery
Power Saving Functionality	The timing when the settings of the following command are applied was changed. ● system fan-control
Ethernet	The following command was added. ● linkscan-mode
VLAN	The explanation about the parameters of the following command was changed. ● switchport mode
Ring Protocol	This chapter was added.
IEEE802.1X	The following commands were added. ● aaa accounting dot1x ● dot1x authentication Notes on the following commands were changed. ● dot1x force-authorized ● dot1x force-authorized vlan ● dot1x vlan dynamic enable ● dot1x vlan dynamic radius-vlan The parameter was added to the following command. ● dot1x radius-server host The following command name was changed. ● `aaa authentication dot1x default` to `aaa authentication dot1x`
Web Authentication	The following commands were added. ● aaa accounting web-authentication ● web-authentication html-fileset ● web-authentication authentication ● web-authentication user-group ● web-authentication user replacement Notes on the following commands were changed. ● web-authentication force-authorized vlan ● web-authentication static-vlan force-authorized ● web-authentication vlan The parameter was added to the following command. ● web-authentication radius-server host The following command name was changed. ● `aaa authentication web-authentication default` to `aaa authentication web-authentication`

Location and title	Changes
MAC-based Authentication	The following commands were added. ● aaa accounting mac-authentication ● mac-authentication authentication The parameter was added to the following command. ● mac-authentication radius-server host Notes on the following commands were changed. ● mac-authentication interface ● mac-authentication force-authorized vlan ● mac-authentication vlan ● mac-authentication static-vlan force-authorized The following command name was changed. ● `aaa authentication web-authentication default` to `aaa authentication web-authentication`
Multistep authentication	The parameter was added to the following command. ● authentication multi-step
CFM	This chapter was added.
SNMP	The parameter was added to the following command. ● snmp-server host
Log Data Output Functionality	The following command was added. ● logging syslog-header
Error messages displayed when editing the configuration	The following information was added. ● Information about the login security and RADIUS ● Ring Protocol information ● CFM information The error messages for the following information were changed. ● Information about the power saving functionality ● Ethernet information ● Link aggregation information ● Spanning Tree information ● IEEE 802.1X information ● Web authentication information (including DHCP server information) ● MAC-based authentication information ● Uplink redundancy information

In addition to the above changes, minor editorial corrections were made.

Ver. 2.1 (Edition 2)

Table Summary of amendments

Location and title	Changes
Editing and Working with Configurations	The response messages for the following commands were added. ● end ● exit

Location and title	Changes
Login Security and RADIUS	The explanations of the following commands were changed. ● radius-server dead-interval ● radius-server host ● radius-server key ● radius-server retransmit ● radius-server timeout
Time Settings and NTP	Notes on the following commands were changed. ● clock timezone
Power Saving Functionality	The following commands were added. ● power-control port cool-standby ● schedule-power-control port cool-standby ● schedule-power-control port-led ● schedule-power-control shutdown interface ● schedule-power-control system-sleep ● schedule-power-control time-range ● system fan-control ● system port-led trigger console ● system port-led trigger interface ● system port-led trigger mc The explanation of the following command was changed. ● system port-led
Ethernet	Notes on the following commands were changed. ● shutdown
MAC Address Table	Notes on the following commands were changed. ● mac-address-table aging-time ● mac-address-table static
VLAN	Notes on the following commands were changed. ● switchport mac ● switchport mode ● vlan
IGMP Snooping	The explanation of the following command was changed. ● ip igmp snooping mrouter
MLD Snooping	The explanations of the following commands were changed. ● ipv6 mld snooping source ● ipv6 mld snooping mrouter
Common to Layer 2 Authentication	This chapter was moved. The following commands were added. ● authentication force-authorized enable ● authentication force-authorized vlan

Location and title	Changes
IEEE802.1X	The following commands were added. ● dot1x auto-logout ● dot1x radius-server dead-interval ● dot1x radius-server host The parameter was added to the following command. ● dot1x supplicant-detection Notes on the following commands were changed. ● dot1x force-authorized ● dot1x force-authorized eapol ● dot1x force-authorized vlan ● dot1x port-control ● dot1x vlan dynamic enable ● dot1x vlan dynamic radius-vlan
Web Authentication	The following commands were added. ● web-authentication radius-server dead-interval ● web-authentication radius-server host The parameter was added to the following command. ● aaa authentication web-authentication default Notes on the following commands were changed. ● web-authentication force-authorized vlan ● web-authentication static-vlan force-authorized ● web-authentication vlan
MAC-based Authentication	The following commands were added. ● mac-authentication radius-server dead-interval ● mac-authentication radius-server host The parameter was added to the following command. ● aaa authentication mac-authentication default Notes on the following commands were changed. ● mac-authentication force-authorized vlan ● mac-authentication interface ● mac-authentication static-vlan force-authorized ● mac-authentication timeout quiet-period ● mac-authentication vlan
Multistep authentication	This chapter was added.
Secure Wake-on-LAN [OP-WOL]	Notes on the following commands were changed. ● http-server
Uplink redundancy	The following commands were added. ● switchport backup mac-address-table update transmit ● switchport backup mac-address-table update exclude-vlan ● switchport backup mac-address-table update retransmit
Storm Control	The parameter was added to the following command. ● storm-control
Port Mirroring	Notes on the following commands were changed. ● monitor session

Location and title	Changes
Error messages displayed when editing the configuration	The following information was added. ● Information about the power saving functionality ● Multistep authentication information ● Storm control information The error messages for the following information were changed. ● Link aggregation information ● MAC address table information ● VLAN information ● IGMP snooping information ● MLD snooping information ● Layer 2 authentication common information ● IEEE 802.1X information ● Web authentication information (include DHCP server information) ● MAC-based authentication information ● Uplink redundancy information ● Port mirroring information

In addition to the above changes, minor editorial corrections were made.

Preface

Applicable products and software versions

This manual applies to the AX2200S, AX1250S, and AX1240S models of switches, and describes the functionality in software version 2.4 of the AX2200S, AX1250S, and AX1240S series switches that is supported by the OS-LT4, OS-LT3, OS-LT3-A, OS-LT2, and OS-LT2-A software and optional licenses.

Before you operate the equipment, carefully read the manual and make sure that you understand all instructions and cautionary notes. After reading the manual, keep it in a convenient place for easy reference.

Unless otherwise noted, this manual describes the functions applicable to the AX2200S, AX1250S, and AX1240S. Model-specific functions are indicated as follows:

[*AX2200S*]:

The description applies to the AX2200S switch.

[*AX1250S*]:

The description applies to the AX1250S switch.

[*AX1240S*]:

The description applies to the AX1240S switch.

Unless otherwise noted, this manual describes the functions of the OS-LT4, OS-LT3, and OS-LT2 base software. The functions of software supported by optional licenses are indicated as follows:

[*OP-WOL*]:

The description applies to the OP-WOL optional license.

[*OP-OTP*]:

The description applies to the OP-OTP optional license.

Corrections to the manual

Corrections to this manual might be contained in the *Release Notes* and *Manual Corrections* that come with the software.

Intended readers

This manual is intended for system administrators who wish to configure and operate a network system that uses the Switch.

Readers must have an understanding of the following:

- The basics of network system management

Manual URL

You can view this manual on our website at:

http://www.alaxala.com/en/

Reading sequence of the manuals

The following shows the manuals you need to consult according to your requirements determined from the following workflow for installing, setting up, and starting regular operation of the Switch.

- Details on basic settings at initial installation, hardware requirements, and instructions for handling the switch

  AX2200S/AX1250S/AX1240S Hardware Instruction Manual (AX1240S-H001X)

- Software functionality, configuration, and operation commands

  Configuration Guide Vol. 1 (AX1240S-S001X)
  Vol. 2 (AX1240S-S002X)

- Proper syntax for configuration commands and details on parameters

  Configuration Command Reference (AX1240S-S003X)

- Proper syntax for operation commands and details on parameters

  Operation Command Reference (AX1240S-S004X)

- Details on messages and logs

  Message Log Reference (AX1240S-S005X)

- Details on MIBs

  MIB Reference (AX1240S-S006X)

- Handling problems

  Troubleshooting Guide (AX1240S-T001X)

Abbreviations used in the manual

AC	Alternating Current
ACK	ACKnowledge
ADSL	Asymmetric Digital Subscriber Line
ALG	Application Level Gateway
ANSI	American National Standards Institute
ARP	Address Resolution Protocol
AS	Autonomous System
AUX	Auxiliary
BGP	Border Gateway Protocol
BGP4	Border Gateway Protocol - version 4
BGP4+	Multiprotocol Extensions for Border Gateway Protocol - version 4
bit/s	bits per second (can also appear as bps)
BPDU	Bridge Protocol Data Unit
BRI	Basic Rate Interface
CC	Continuity Check

CDP	Cisco Discovery Protocol
CFM	Connectivity Fault Management
CIDR	Classless Inter-Domain Routing
CIR	Committed Information Rate
CIST	Common and Internal Spanning Tree
CLNP	ConnectionLess Network Protocol
CLNS	ConnectionLess Network System
CONS	Connection Oriented Network System
CRC	Cyclic Redundancy Check
CSMA/CD	Carrier Sense Multiple Access with Collision Detection
CSNP	Complete Sequence Numbers PDU
CST	Common Spanning Tree
DA	Destination Address
DC	Direct Current
DCE	Data Circuit terminating Equipment
DHCP	Dynamic Host Configuration Protocol
DIS	Draft International Standard/Designated Intermediate System
DNS	Domain Name System
DR	Designated Router
DSAP	Destination Service Access Point
DSCP	Differentiated Services Code Point
DTE	Data Terminal Equipment
DVMRP	Distance Vector Multicast Routing Protocol
E-Mail	Electronic Mail
EAP	Extensible Authentication Protocol
EAPOL	EAP Over LAN
EFM	Ethernet in the First Mile
ES	End System
FAN	Fan Unit
FCS	Frame Check Sequence
FDB	Filtering DataBase
FQDN	Fully Qualified Domain Name
FTTH	Fiber To The Home
GBIC	GigaBit Interface Converter
GSRP	Gigabit Switch Redundancy Protocol
HMAC	Keyed-Hashing for Message Authentication
IANA	Internet Assigned Numbers Authority
ICMP	Internet Control Message Protocol
ICMPv6	Internet Control Message Protocol version 6
ID	Identifier
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers, Inc.
IETF	the Internet Engineering Task Force
IGMP	Internet Group Management Protocol
IP	Internet Protocol
IPCP	IP Control Protocol
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6
IPV6CP	IP Version 6 Control Protocol
IPX	Internetwork Packet Exchange
ISO	International Organization for Standardization
ISP	Internet Service Provider
IST	Internal Spanning Tree
L2LD	Layer 2 Loop Detection
LAN	Local Area Network
LCP	Link Control Protocol
LED	Light Emitting Diode
LLC	Logical Link Control
LLDP	Link Layer Discovery Protocol
LLQ+3WFQ	Low Latency Queueing + 3 Weighted Fair Queueing
LSP	Label Switched Path
LSP	Link State PDU
LSR	Label Switched Router

MA	Maintenance Association
MAC	Media Access Control
MC	Memory Card
MD5	Message Digest 5
MDI	Medium Dependent Interface
MDI-X	Medium Dependent Interface crossover
MEP	Maintenance association End Point
MIB	Management Information Base
MIP	Maintenance domain Intermediate Point
MRU	Maximum Receive Unit
MSTI	Multiple Spanning Tree Instance
MSTP	Multiple Spanning Tree Protocol
MTU	Maximum Transfer Unit
NAK	Not AcKnowledge
NAS	Network Access Server
NAT	Network Address Translation
NCP	Network Control Protocol
NDP	Neighbor Discovery Protocol
NET	Network Entity Title
NLA ID	Next-Level Aggregation Identifier
NPDU	Network Protocol Data Unit
NSAP	Network Service Access Point
NSSA	Not So Stubby Area
NTP	Network Time Protocol
OADP	Octpower Auto Discovery Protocol
OAM	Operations,Administration,and Maintenance
OSPF	Open Shortest Path First
OUI	Organizationally Unique Identifier
packet/s	packets per second (can also appear as pps)
PAD	PADding
PAE	Port Access Entity
PC	Personal Computer
PCI	Protocol Control Information
PDU	Protocol Data Unit
PICS	Protocol Implementation Conformance Statement
PID	Protocol IDentifier
PIM	Protocol Independent Multicast
PIM-DM	Protocol Independent Multicast-Dense Mode
PIM-SM	Protocol Independent Multicast-Sparse Mode
PIM-SSM	Protocol Independent Multicast-Source Specific Multicast
PoE	Power over Ethernet
PRI	Primary Rate Interface
PS	Power Supply
PSNP	Partial Sequence Numbers PDU
QoS	Quality of Service
RA	Router Advertisement
RADIUS	Remote Authentication Dial In User Service
RDI	Remote Defect Indication
REJ	REJect
RFC	Request For Comments
RIP	Routing Information Protocol
RIPng	Routing Information Protocol next generation
RMON	Remote Network Monitoring MIB
RPF	Reverse Path Forwarding
RQ	ReQuest
RSTP	Rapid Spanning Tree Protocol
SA	Source Address
SD	Secure Digital
SDH	Synchronous Digital Hierarchy
SDU	Service Data Unit
SEL	NSAP SELector
SFD	Start Frame Delimiter
SFP	Small Form factor Pluggable

SMTP	Simple Mail Transfer Protocol
SNAP	Sub-Network Access Protocol
SNMP	Simple Network Management Protocol
SNP	Sequence Numbers PDU
SNPA	Subnetwork Point of Attachment
SPF	Shortest Path First
SSAP	Source Service Access Point
STP	Spanning Tree Protocol
TA	Terminal Adapter
TACACS+	Terminal Access Controller Access Control System Plus
TCP/IP	Transmission Control Protocol/Internet Protocol
TLA ID	Top-Level Aggregation Identifier
TLV	Type, Length, and Value
TOS	Type Of Service
TPID	Tag Protocol Identifier
TTL	Time To Live
UDLD	Uni-Directional Link Detection
UDP	User Datagram Protocol
ULR	Uplink Redundant
UPC	Usage Parameter Control
UPC-RED	Usage Parameter Control - Random Early Detection
VAA	VLAN Access Agent
VLAN	Virtual LAN
VRRP	Virtual Router Redundancy Protocol
WAN	Wide Area Network
WDM	Wavelength Division Multiplexing
WFQ	Weighted Fair Queueing
WRED	Weighted Random Early Detection
WS	Work Station
WWW	World-Wide Web
XFP	10 gigabit small Form factor Pluggable

Conventions: KB, MB, GB, and TB

This manual uses the following conventions: 1 KB (kilobyte) is 1024 bytes. 1 MB (megabyte) is 1024^2 bytes. 1 GB (gigabyte) is 1024^3 bytes. 1 TB (terabyte) is 1024^4 bytes.

Conventions: The terms "Switch" and "switch"

The term *Switch* (upper-case "S") is an abbreviation for any or all of the following models:

- AX2200S series switch
- AX1250S series switch
- AX1240S series switch

The term *switch* (lower-case "s") might refer to a Switch, another type of switch from the current vendor, or a switch from another vendor. The context decides the meaning.

Contents

1. Reading the Manual

Command description format
Command mode list
Specifiable values for parameters
List of character codes

Command description format

Each command is described in the following format.

Function

Describes the purpose of the command.

Syntax

Defines the input format of the command. The format is governed by the following rules:

1. Parameters for setting values or character strings are enclosed in angle brackets (<>).
2. Characters that are not enclosed in angle brackets (<>) are keywords that must be typed exactly as they appear.
3. {A|B} indicates that either A or B must be selected.
4. Parameters or keywords enclosed in square brackets ([]) are optional and can be omitted.
5. For details about the parameter input format, see *Specifiable values for parameters*.

Input mode

Describes the mode in which a command can be entered by using the name displayed as the prompt.

Parameters

Describes in detail the parameters that can be set by the command. The default value and the values that can be specified for each parameter are described.

Default behavior

If there are default values for parameters, or a default behavior when a command is not entered, related information is provided here.

Impact on communication

If a setting has an impact on communication, such as interruptions to communication, that impact is described here.

When the change is applied

Describes, if configuration information in memory is changed, whether the changed value is immediately operational or whether the change takes effect only by temporarily stopping operation, such as by restarting the Switch.

Notes

Provides cautionary information on using the command.

Related commands

Describes the commands that must be set in order to use the applicable command.

Command mode list

The following table lists the command modes.

Table 1-1 Command mode list

#	Command mode name	Description	Command for mode transition
1	(config)	Global configuration mode.	`> enable` `# configure`
2	(config-line)	Configures remote login.	`(config)# line vty`
3	(config-group)	Configures a RADIUS server group.	`(config)# aaa group server radius`
4	(config-if)	Configures an interface.	`(config)# interface`
5	(config-if-range)	Configures multiple interfaces.	`(config)# interface range`
6	(config-vlan)	Configures VLAN.	`(config)# vlan`
7	(config-mst)	Configures Multiple Spanning Tree.	`(config)# spanning-tree mst configuration`
8	(config-axrp)	Configures the Ring Protocol.	`(config)# axrp`
9	(config-ext-nacl)	Configures an IPv4 packet filter.	`(config)# ip access-list extended`
10	(config-std-nacl)	Configures an IPv4 address filter.	`(config)# ip access-list standard`
11	(config-ext-macl)	Configures a MAC filter.	`(config)# mac access-list extended`
12	(config-ip-qos)	Configures IPv4 QoS.	`(config)# ip qos-flow-list`
13	(config-mac-qos)	Configures MAC QoS.	`(config)# mac qos-flow-list`
14	(dhcp-config)	Configuring the DHCP server.	`(config)# ip dhcp pool`
15	(config-auto-cf)	Configures AUTOCONF.	`(config)# auto-config`
16	(config-netconf)	Configures NETCONF.	`(config)# netconf`
17	(config-ether-cfm)	Configures the domain name and MA.	`(config)# ethernet cfm domain`

Specifiable values for parameters

The following table describes the values that can be specified for parameters. If there are no limitations on parameter names, see *Any character string*.

Table 1-2 Specifiable values for parameters

Parameter type	Description	Input example
Any character string	See *List of character codes*.	`name "PORT BASED VLAN-1"`
Access list name QoS flow list name	See *List of character codes*. The first character must be an alphabetical character. Subsequent characters can be alphanumeric characters, hyphens (-), underscores (_), and periods (.). It is possible to enter other characters, but use only the characters mentioned above. In addition, do not specify a character string beginning with `resequence`.	`mac access-list extended list101`
QoS queue list name DHCP address pool name	See *List of character codes*. The first character must be an alphabetical character. Subsequent characters can be alphanumeric characters, hyphens (-), underscores (_), and periods (.). It is possible to enter other characters, but use only the characters mentioned above.	`ip dhcp pool floorA`
Host name	The first character must be an alphabetical character. Subsequent characters can be alphanumeric characters, hyphens (-), and periods (.).	`domain name dns DNS-1`
MAC address, MAC address mask	Specify these items in hexadecimal format, separating 2-byte hexadecimal values by periods (`.`).	`1234.5607.08ef` `0000.00ff.ffff`
IPv4 address, IPv4 subnet mask	Specify a 4-byte address in decimal format, separating 1-byte decimal values by a period (`.`).	`192.168.0.14` `255.255.255.0`
IPv4 address wildcard	The same input format as IPv4 addresses. Setting a bit indicates permission.	`255.255.0.0`
IPv6 address	Specify this item in hexadecimal format, separating 2-byte hexadecimal values by colons (`:`).	`3ffe:501:811:ff03::87ff:fed0:c7e0`

Parameter type	Description	Input example

Specification of multiple interfaces	Set the information about multiple interfaces. You can specify fastethernet, gigabitethernet, vlan, and port-channel interfaces. However, you cannot specify both fastethernet and gigabitethernet.
	The following are the input formats:
	● For fastethernet
	`interface range fastethernet <IF# list>`
	● For gigabitethernet
	`interface range gigabitethernet <IF# list>`
	● For vlan
	`interface range vlan <VLAN ID list>`
	● For port-channel
	`interface range port-channel <Channel group# list>`
		`interface range fastethernet 0/1-3`
		
		`interface range gigabitethernet 0/25-26`
		
		`interface range vlan 1-100`

add/remove specification	Add to or delete from the information when multiple interfaces have been specified.
	The add specification adds information to the current information.
	The remove specification deletes information from the current information.
	When the add and remove specifications are used, if the show command displays duplicated information, delete the duplicated information to optimize the information.
	
	The following shows an optimization example of information when multiple interfaces are specified:
	● Information before entering a command:
	`switchport trunk allowed vlan 100,101`
	● Input command:
	`switchport trunk allowed vlan add 103`
	● Information after entering a command:
	`switchport trunk allowed vlan 100,101,103`
		`switchport trunk allowed vlan add 100,200-210`
		
		`switchport trunk allowed vlan remove 100,200-210`
		
		`switchport isolation interface add fastethernet 0/1-3`
		
		`switchport isolation interface add gigabitethernet 0/25-26`
		
		`switchport isolation interface remove fastethernet 0/1-3`
		
		`switchport isolation interface remove gigabitethernet 0/25-26`

<IF#> Parameter range

Specify the *<IF#>* parameter in the format *NIF-No./Port-No.* (include the last period). *NIF-No.* of the Switch is fixed at zero.

The following tables list the range of *<IF#>* values.

Table 1-3 Range of <IF#> values [AX2200S]

#	Model	Ethernet type	Range of values
1	AX2230S-24T/AX2230S-24P	gigabitethernet	0/1 to 0/28

Table 1-4 Range of <IF#> values for AX1250S series switches

#	Model	Ethernet type	Range of values
1	AX1250S-24T2C	fastethernet	0/1 to 0/24
		gigabitethernet	0/25 to 0/26

Table 1-5 Range of <IF#> values for AX1240S series switches

#	Model	Ethernet type	Range of values
1	AX1240S-24T2C/AX1240S-24P2C	fastethernet	0/1 to 0/24
		gigabitethernet	0/25 to 0/26
2	AX1240S-48T2C	fastethernet	0/1 to 0/48
		gigabitethernet	0/49 to 0/50

How to specify <IF# list> and the range of values that can be set

If *<IF# list>* is written in parameter input format, you can use hyphens (-) or commas (,) in the *<IF#>* format to specify multiple fastethernet interfaces and gigabitethernet interfaces. You can also specify one fastethernet interface and gigabitethernet interface, in the same way as when *<IF#>* is written in parameter input format. The range of specifiable values is the same as the range of *<IF#>* values in the above table.

Example of a range specification that uses a hyphen (`-`) and commas (`,`):

```
0/1-3, 0/5
```

Range of values that can be set for <VLAN ID>

The following table describes the range for the *<VLAN ID>* value.

Table 1-6 Range of <VLAN ID> values

#	Range of values
1	1 to 4094

How to specify <VLAN ID list >and the range for values that can be set

If *<VLAN ID list>* is written in parameter input format, use a hyphen (-) or commas (,) to specify multiple VLAN IDs. You can also specify one VLAN ID, as when *<VLAN ID>* is written as the parameter input format. The range of values that can be set is the same as the range of *<VLAN ID>* values above.

Example of a range specification that uses "`-`" or "`,`":

```
1-3, 5, 10
```

Range of values that can be set for <Channel group#>

The following tables list the range of *<Channel group#>* values.

Table 1-7 Range of <Channel group#> values

#	Model	Range of values
1	All models	1 to 8

How to specify <Channel group# list> and the range of values that can be set

If *<Channel group# list>* is written in parameter input format, use hyphens (`-`) or commas (`,`) to specify multiple channel group numbers. You can also specify one channel group number, as when *<Channel group#>* is written. The range of specifiable values is the same as the range of *<Channel group#>* values above.

Example of a range specification that uses "`-`" or "`,`":

```
1-3, 5
```

List of character codes

Character codes are listed in the following table.

Characters other than alphanumeric characters in the following list of character codes are special characters.

Table 1-8 List of character codes

Character	Code	Character	Code	Character	Code	Character	Code	Character	Code	Character	Code
Space	0x20[#1]	0	0x30	@	0x40	P	0x50	`	0x60	p	0x70
!	0x21	1	0x31	A	0x41	Q	0x51	a	0x61	q	0x71
"	0x22[#2]	2	0x32	B	0x42	R	0x52	b	0x62	r	0x72
#	0x23	3	0x33	C	0x43	S	0x53	c	0x63	s	0x73
$	0x24	4	0x34	D	0x44	T	0x54	d	0x64	t	0x74
%	0x25	5	0x35	E	0x45	U	0x55	e	0x65	u	0x75
&	0x26	6	0x36	F	0x46	V	0x56	f	0x66	v	0x76
'	0x27	7	0x37	G	0x47	W	0x57	g	0x67	w	0x77
(	0x28	8	0x38	H	0x48	X	0x58	h	0x68	x	0x78
)	0x29	9	0x39	I	0x49	Y	0x59	i	0x69	y	0x79
*	0x2A	:	0x3A	J	0x4A	Z	0x5A	j	0x6A	z	0x7A
+	0x2B	;	0x3B	K	0x4B	[	0x5B	k	0x6B	{	0x7B
,	0x2C	<	0x3C	L	0x4C	¥	0x5C	l	0x6C	|	0x7C
-	0x2D	=	0x3D	M	0x4D	]	0x5D	m	0x6D	}	0x7D
.	0x2E	>	0x3E	N	0x4E	^	0x5E	n	0x6E	~	0x7E
/	0x2F	?	0x3F[#1]	O	0x4F	_	0x5F	o	0x6F	---	---

#1: To use this character in a character string, you must enclose the entire character string in double quotation marks (").

#2: Use this character to enclose an entire character string. You cannot enter it as part of a character string.

2. Connecting from an Operation Terminal

ftp-server
line vty
transport input

ftp-server

Permits access from remote operation terminals by using FTP. To set the IPv4 address of a remote operation terminal to permit or deny logging in to a Switch, set a common access list that is shared by Telnet access in config-line mode.

Syntax

To set information:

```
ftp-server
```

To delete information:

```
no ftp-server
```

Input mode

```
(config)
```

Parameters

None

Default behavior

Does not allow remote FTP access.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

When an access list has been configured in config-line mode, the IPv4 addresses of remote operation terminals for which logging in to a Switch using FTP is permitted or denied are restricted according to the same access list.

Related commands

line vty

ip access-group

line vty

Permits Telnet remote access to a switch. This command is also used to limit the number of remote users that can be simultaneously logged in to the switch.

Configuration with this command enables remote access using the Telnet protocol from any remote operation terminal to be accepted. To limit access, set `ip access-group` and `transport input`.

Syntax

To set or change information:

```
line vty <Start allocation> <End allocation>
```

To delete information:

```
no line vty
```

Input mode

```
(config)
```

Parameters

<Start allocation>

Sets permission for remote login.

- Default value when this parameter is omitted:

  This parameter cannot be omitted.
- Range of values:

  0 (fixed)

<End allocation>

Sets the number of users who are able to log in simultaneously.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.
2. Range of values:

   0 to 1 (The number of users able to log in can be set to 1 or 2 users.)

Default behavior

Does not accept remote access that uses the Telnet protocol.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. Configuration with this command enables remote access using the Telnet protocol from any remote operation terminal to be accepted. To limit access, set `ip access-group` and `transport input`.

Related commands

transport input

ip access-group

transport input

Restricts access from remote operation terminals based on protocol.

Syntax

To set or change information:

```
transport input {telnet | all | none}
```

To delete information:

```
no transport input
```

Input mode

```
(config-line)
```

Parameters

`{telnet | all | none}`

`telnet`

Accepts remote access that uses the Telnet protocol.

`all`

Accepts remote access using any protocol (currently only Telnet is supported).

`none`

Does not accept remote access using any protocol.

1. Default value when this parameter is omitted:

   `all` (Accepts remote access that uses the Telnet protocol.)

2. Range of values:

   `telnet`, `all`, or `none`.

Default behavior

Accepts remote access that uses the Telnet protocol.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. To permit or restrict FTP connections, use the `ftp-server` command in `config` mode.

Related commands

line vty

ftp-server

ip access-group

3. Editing and Working with Configurations

end
exit
save (write)
show
top

end

Ends configuration command mode and returns you to administrator mode.

Syntax

```
end
```

Parameters

None

Response messages

The following table describes the response messages for the `end` command.

Table 3-1 Response messages for the end command

Message	Description
Unsaved changes would be lost when the machine goes to sleep! Do you exit "configure" without save ? (y/n):	When the following commands are configured, configuration command mode will end without any changes being saved: ● `schedule-power-control system-sleep` ● `schedule-power-control time-range` The configuration changes you made will be lost when the Switch switches to sleep mode. Enter `y` to finish editing. Enter `n` to cancel the `end` command. If necessary, use the `save` command to save the edited configuration.
The machine is just going to sleep! Do you exit ? (y/n):	If configuration command mode ends, the Switch will switch to sleep mode. Enter `y` to switch to the sleep state. If you do not want to switch to the sleep state, enter `n` to cancel the `end` command, and then use the `(config)# $set power-control schedule disable` command to set the power saving schedule functionality to suppression mode.

Notes

1. You can use the `end` command to temporarily exit configuration command mode without saving the configuration file to internal flash memory. Because the configuration file at this time is still being edited, first edit the configuration file, and then save it.
2. After editing the running configuration, if you execute the `end` command without saving the changes you made to internal flash memory, the startup configuration file in internal flash memory and the running configuration will no longer be the same. After editing the configuration, you must always save your changes.

Related commands

None

exit

Returns to the previous mode. If you are editing data in config mode, configuration command mode ends and administrator mode resumes. If you are editing data in subcommand mode, you are returned to the next higher level.

Syntax

```
exit
```

Parameters

None

Response messages

The following table describes the response messages for the `exit` command.

Table 3-2 Response messages for the exit command

Message	Description
Unsaved changes would be lost when the machine goes to sleep! Do you exit "configure" without save ? (y/n):	When the following commands are configured, configuration command mode will end without any changes being saved: ● `schedule-power-control system-sleep` ● `schedule-power-control time-range` The configuration changes you made will be lost when the Switch switches to sleep mode. Enter `y` to finish editing. Enter `n` to stop the `exit` command. If necessary, use the `save` command to save the edited configuration.
The machine is just going to sleep! Do you exit ? (y/n):	If configuration command mode ends, the Switch will switch to sleep mode. Enter `y` to switch to the sleep state. If you do not want to switch to the sleep state, enter `n` to cancel the `exit` command, and then use the `(config)# $set power-control schedule disable` command to set the power saving schedule functionality to suppression mode.

Notes

Note the following if you use the `exit` command in `config` mode:

1. You can use the `exit` command to temporarily exit configuration command mode without saving the configuration file to internal flash memory. Because the configuration file at this time is still being edited, first edit the configuration file, and then save it.
2. After editing the running configuration, if you execute the `exit` command without saving the changes you made to internal flash memory, the startup configuration file in internal flash memory and the running configuration will no longer be the same. After editing the configuration, you must always save your changes.

Related commands

None

save (write)

Saves the edited configuration to the startup configuration file.

Syntax

```
save
write
```

Parameters

None

Response messages

None

Notes

1. Saving the configuration file does not end configuration command mode. To finish editing and exit configuration command mode, use the `exit` command or `end` command.

Related commands

None

show

Displays the configuration being edited.

Syntax

```
show [ <Command> [ <Parameter> ] ]
```

Parameters

<Command>

Specifies a configuration command.

<Parameter>

Use this parameter to limit the number of items to be displayed.

Notes

1. If there are many items in the configuration, the command might take time to execute.
2. In global configuration mode, *<Command>* [*<Parameter>*] can be specified for a command that switches to level-2 configuration mode. The command line completion, Help, and abbreviated-command execution functionality can also be used.
3. In level-2 configuration mode, *<Command>* [*<Parameter>*] can be specified for a command that switches modes, as in global configuration mode.In this case, however, the command line completion functionality and Help functionality cannot be used.

Related commands

None

top

After a switch to configuration command mode, enter this command restores level-1 global configuration mode.

Syntax

```
top
```

Parameters

None

Notes

None

Related commands

None

4. Login Security and RADIUS

aaa group server radius
aaa authentication login
aaa authentication login end-by-reject
ip access-group
radius-server attribute station-id capitalize
radius-server dead-interval
radius-server host
radius-server key
radius-server retransmit
radius-server timeout
server

aaa group server radius

Configures a RADIUS server group. Entering this command switches to config-group mode in which the RADIUS server group information can be set.

Syntax

To set or change information:

```
aaa group server radius <Group name>
```

To delete information:

```
no aaa group server radius <Group name>
```

Input mode

```
(config)
```

Parameters

<Group name>

Configures the RADIUS server group name.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a character string that is no more than 32 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

   We recommend that you use an upper-case letter for the first character.

   However, you cannot use the following character strings:

   `radius` or a character string beginning with `radius`

   `tacacs+` or a character string beginning with `tacacs+`

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If a valid RADIUS server is not set for the RADIUS server group, the server will not operate.
2. A maximum of four RAIDUS server groups can be set.

Related commands

aaa authentication

dot1x authentication

mac-authentication authentication

web-authentication authentication

web-authentication user-group

aaa authentication login

Sets one or more authentication methods to be used for remote login. If the first specified method fails, the second specified method is used. You can change how authentication works when the first method failed by using the `aaa authentication login end-by-reject` command.

Syntax

To set or change information:

```
aaa authentication login default <Method> [<Method>]
```

To delete information:

```
no aaa authentication login
```

Input mode

```
(config)
```

Parameters

`default <Method> [<Method>]`

Specify the following parameters for *<Method>*. You cannot specify the same *<Method>* more than once.

`group radius`

RADIUS authentication is used.

General-purpose RADIUS servers are used.

`local`

Local password authentication is used.

`group group-name`

RADIUS authentication is used.

The RADIUS server to use is a RADIUS server group. Specify the group name set by the `aaa group server radius` command.

However, you cannot use the following character strings:

`radius` or a character string beginning with `radius`

`tacacs+` or a character string beginning with `tacacs+`

Default behavior

Local password authentication is performed.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If `group radius` or `group` *<Group name>* is specified for the authentication method, communication failure with the RADIUS server or authentication failure at the RADIUS server disables login to the Switch. Therefore, we recommend that you specify local password authentication at the same time.

2. You cannot simultaneously specify both `group radius` (general-purpose RADIUS server authentication) and `group` *group-name* (RADIUS server group authentication), because both methods are treated as RADIUS authentication service. Use either of them in combination with local password authentication.

Related commands

radius-server

aaa authentication login end-by-reject

aaa authentication login end-by-reject

Terminates authentication if login authentication is denied. If authentication fails due to communication not being possible, such as an unresponsive RADIUS server, the next authentication method specified by the `aaa authentication login` command is used to perform authentication.

Syntax

To set information:

```
aaa authentication login end-by-reject
```

To delete information:

```
no aaa authentication login end-by-reject
```

Input mode

```
(config)
```

Parameters

None

Default behavior

If authentication fails, regardless of the reason for failure, the next authentication method specified by the `aaa authentication login` command is used to perform authentication.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. This command is only valid for authentication methods specified by the `aaa authentication login` command.

Related commands

aaa authentication login

ip access-group

Sets the access list that specifies the IPv4 addresses of the remote operation terminals for which remote login to the Switch is to be permitted or denied is set. This setting is common to all types of remote access (Telnet or FTP).

Multiple lines for no more than 16 entries can be set.

Syntax

To set or change information:

```
ip access-group <ACL ID> in
```

To delete information:

```
no ip access-group <ACL ID>
```

Input mode

```
(config-line)
```

Parameters

<ACL ID>

Specifies an IPv4 address filter identifier (identifier for `ip access-list standard`).

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify an access list name that is 3 to 31 characters.

   For details about the characters that can be specified, see *Specifiable values for parameters*.

Default behavior

Access from all remote operation terminals is permitted.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. This setting is common to all types of remote access (Telnet or FTP).
2. To allow FTP connections, set `ftp-server` in config mode.
3. When `ip access-group` is not set, access from all remote operation terminals is permitted.
4. Note that changing the registered IP addresses does not close the sessions of users who have already logged in. The change is applied to users who will log in after this setting.

Related commands

ip access-list standard

line vty

ftp-server

transport input

radius-server attribute station-id capitalize

Sends the MAC address that is used for sending data to a RADIUS server with the RADIUS attribute in upper case. The applicable RADIUS attribute names are as follows:

- Called-Station-Id
- Calling-Station-Id

Syntax

To set information:

```
radius-server attribute station-id capitalize
```

To delete information:

```
no radius-server attribute station-id capitalize
```

Input mode

```
(config)
```

Parameters

None

Default behavior

Sends the MAC address with the RADIUS attribute set in lower case.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. The configuration in this command is applied to authentication requests and accounting requests.
2. The configuration in this command is common to all authentication types (IEEE 802.1X, Web authentication, and MAC-based authentication).
3. The MAC address with the `User-Name` and `User-Password` RADIUS attributes set that is used for MAC-based authentication follows the `mac-authentication id-format` command usage.

Related commands

None

radius-server dead-interval

Configures a monitoring timer that operates for automatically restoring the primary general RADIUS server as the current general RADIUS server.

The monitoring timer starts when either of the following occurs: The currently operating server (the destination for RADIUS authentication requests) switches to a valid secondary general RADIUS server, or all servers are disabled. When the period of time set by this command elapses (the monitoring timer expires), the primary general RADIUS server is restored.

Syntax

To set or change information:

```
radius-server dead-interval <Minutes>
```

To delete information:

```
no radius-server dead-interval
```

Input mode

```
(config)
```

Parameters

<Minutes>

Specifies the monitoring timer value for automatic restoration of operation to the primary general RADIUS server from the secondary general RADIUS server.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 1440 (minutes)

   If 0 is set, RADIUS authentication requests are always initiated on the primary general RADIUS server.

Default behavior

The primary general RADIUS server is automatically restored 10 minutes after the currently operating server switches to the secondary general RADIUS server.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

1. If the monitoring timer value is changed when the secondary general RADIUS server is operating as the current server, the progress to that time is used for judgment purposes and the result is applied.
2. If this command configuration is deleted after the monitoring timer starts, the monitoring timer counter continues without being reset and runs for 10 minutes (default value).

Notes

1. If more than three general RADIUS servers are configured and another general RADIUS server becomes the current server after the monitoring timer starts, the

monitoring timer is not reset and continues to run.

2. In general, when the monitoring timer has started, it does not reset until it expires. However, as exceptions, it resets in the following cases:
   - When `radius-server dead-interval 0` is configured by using this command.
   - When information about the general RADIUS server running as the current server is deleted by using the `radius-server host` command
   - When the `clear radius-server` operation command is executed
3. If the monitoring timer expires while the authentication sequence is being executed on the terminal subject to authentication, restoration of the primary general RADIUS server is not performed until the executed authentication sequence has been completed.

Related commands

aaa authentication

radius-server host

radius-server key

radius-server retransmit

radius-server timeout

radius-server host

Configures the general RADIUS server used for authentication.

Syntax

To set or change information:

```
radius-server host <IP address> [auth-port <Port>]  [acct-port <Port>]
[timeout <Seconds>] [retransmit <Retries>] [key <String>]
```

To delete information:

```
no radius-server host <IP address>
```

Input mode

```
(config)
```

Parameters

<IP address>

Specifies the IPv4 address of the RADIUS server.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Sets the IPv4 address (dot notation).

   1.0.0.0 to 126.255.255.255, 128.0.0.0 to 223.255.255.255

`key` *<String>*

Specifies the RADIUS key used for encryption or for authentication of communication with the RADIUS server. The same RADIUS key must be set for the client and the RADIUS server.

1. Default value when this parameter is omitted:

   The RADIUS key set by using `radius-server key` is used. If no key is set, the RADIUS server is disabled.

2. Range of values:

   Specify a character string that is no more than 64 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

`auth-port` *<Port>*

Specifies the RADIUS server port number.

1. Default value when this parameter is omitted:

   Port number 1812 is used.

2. Range of values:

   1 to 65535

`acct-port` *<Port>*

Specifies the port number for RADIUS server accounting.

1. Default value when this parameter is omitted:

   Port number 1813 is used.

2. Range of values:

   1 to 65535

`retransmit <Retries>`

Specifies the number of times an authentication request is resent to the RADIUS server.

1. Default value when this parameter is omitted:

   The number of times configured by using `radius-server retransmit` is used. If no value is set, the initial value is 3.

2. Range of values:

   0 to 15 (times)

`timeout <Seconds>`

Specifies the timeout period (in seconds) for a response from the RADIUS server.

1. Default value when this parameter is omitted:

   The period configured by using `radius-server timeout` is used. If no period is set, the initial value is 5.

2. Range of values:

   1 to 30 (seconds)

Default behavior

Because the RADIUS server has not been configured, even if `group radius` is specified for `aaa`, communication with the RADIUS server cannot be established.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. A maximum of 20 general RADIUS servers can be specified for each Switch.
2. `127.*.*.*` cannot be set as an IPv4 address.
3. If the `key` parameter is omitted and the `radius-server key` command is not set, the RADIUS server is disabled.
4. If multiple general RADIUS servers are configured, the address displayed first by using the `show radius-server` operation command is the address of the primary general RADIUS server. The primary general RADIUS server is used as the initial current server (the destination for RADIUS authentication requests during operation).

   If a failure occurs on the primary general RADIUS server, the current server becomes the next valid general RADIUS server (the secondary general RADIUS server). For details about automatic restoration of the primary general RADIUS server, see the description about the `radius-server dead-interval` command.
5. If a RADIUS server with the matching IP address has already been registered in the general RADIUS server configuration, authentication-specific RADIUS server configuration, or the RADIUS server group configuration, all of these parameters are automatically replaced by the new commands that were entered.

Related commands

aaa authentication

radius-server dead-interval

radius-server key

radius-server retransmit

radius-server timeout

radius-server key

Configures the default RADIUS server key used for authentication on a general RADIUS server or an authentication-specific RADIUS server.

Syntax

To set or change information:

```
radius-server key <String>
```

To delete information:

```
no radius-server key
```

Input mode

```
(config)
```

Parameters

<String>

Specifies the RADIUS key used for encryption or for authentication of communication with the RADIUS server. The same RADIUS key must be set for the client and the RADIUS server.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a character string that is no more than 64 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. The `radius-server host`, `dot1x radius-server host`, `mac-authentication radius-server host`, and `web-authentication radius-server host` key configurations have precedence over this configuration.

Related commands

aaa authentication

dot1x radius-server host

mac-authentication radius-server host

radius-server host

radius-server retransmit

radius-server timeout

web-authentication radius-server host

radius-server retransmit

Configures the default number of times an authentication request is resent to the general RADIUS server used for authentication or to an authentication-specific RADIUS server.

Syntax

To set or change information:

```
radius-server retransmit <Retries>
```

To delete information:

```
no radius-server retransmit
```

Input mode

```
(config)
```

Parameters

<Retries>

Specifies the number of times an authentication request is resent to the RADIUS server.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 15 (times)

Default behavior

The default value for the number of times an authentication request is retransmitted to a RADIUS server is 3.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. The `retransmit` configurations of `radius-server host`, `dot1x radius-server host`, `mac-authentication radius-server host`, and `web-authentication radius-server host` have precedence over this configuration.

Related commands

aaa authentication

dot1x radius-server host

mac-authentication radius-server host

radius-server host

radius-server key

radius-server timeout

web-authentication radius-server host

radius-server timeout

Configures the default response timeout value for the general RADIUS server used for authentication or for an authentication-specific RADIS server.

Syntax

To set or change information:

```
radius-server timeout <Seconds>
```

To delete information:

```
no radius-server timeout
```

Input mode

```
(config)
```

Parameters

<Seconds>

Specifies the timeout period for a response from the RADIUS server.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 30 (seconds)

Default behavior

The default response timeout value for the RADIUS server is 5 seconds.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. The `timeout` configurations of `radius-server host`, `dot1x radius-server host`, `mac-authentication radius-server host`, and `web-authentication radius-server host` have precedence over this configuration.

Related commands

aaa authentication

dot1x radius-server host

mac-authentication radius-server host

radius-server host

radius-serve key

radius-server retransmit

web-authentication radius-server host

server

Configures a RADIUS server host in the RADIUS server group.

Syntax

To set or change information:

```
server <IP address> [auth-port <Port>] [acct-port <Port>]
```

To delete information:

```
no server <IP address>
```

Input mode

```
(config-group)
```

Parameters

<IP address>

Specifies the IPv4 address of the RADIUS server.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify the IPv4 address (dot notation).

   1.0.0.0 to 126.255.255.255, 128.0.0.0 to 223.255.255.255

`auth-port` *<Port>*

Specifies the RADIUS server port number.

1. Default value when this parameter is omitted:

   Port number 1812 is used.

2. Range of values:

   1 to 65535

`acct-port` *<Port>*

Specifies the port number for RADIUS server accounting.

1. Default value when this parameter is omitted:

   Port number 1813 is used.

2. Range of values:

   1 to 65535

Default behavior

Because no RADIUS server is set, no communication is performed by the RADIUS server group.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. A maximum of four RADIUS servers can be specified for each group.
2. `127.*.*.*` cannot be set as an IPv4 address.
3. The configuration of this command must meet both of the following conditions:
   - The value in this command is the same as the value in the `radius-server host` command (the values of `auth-port` and `acct-port` are also the same).
   - The `radius-server host` command configuration is enabled (the key parameter has been set or the `radius-server key` command has been configured).
4. If multiple RADIUS servers are configured in the same RADIUS server group, the address displayed by using the `show radius-server` operation command is the primary RADIUS server in the RADIUS server group. This primary RADIUS server is used as the first current server (the destination for RADIUS authentication requests). The current server becomes the next RADIUS server in the primary RADIUS server group.

   Note that automatic restoration of the primary RADIUS server is governed by the configuration of the `radius-server dead-interval` command.

Related commands

aaa group server radius

dot1x authentication

mac-authentication authentication

radius-server host

web-authentication authentication

web-authentication user-group

5. Time Settings and NTP

clock timezone
ntp client server
ntp client broadcast
ntp client multicast
ntp interval

clock timezone

Sets the time zone.

The Switch maintains the date and time internally in Coordinated Universal Time (UTC). This clock timezone setting affects only time set using the `set clock` command, and the time displayed by using an operation command.

Syntax

To set or change information:

`clock timezone` *<Zone name>* *<Hours offset>* [*<Minutes offset>*]

To delete information:

`no clock timezone`

Input mode

`(config)`

Parameters

<Zone name>

Sets the name used to identify a time zone.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   A maximum of seven alphanumeric characters

   (It is possible to enter other characters, but use only the characters mentioned above.)

<Hours offset>

Sets an offset in hours from UTC in decimal.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   -12 to -1, 0, 1 to 12

<Minutes offset>

Sets an offset in minutes from UTC.

1. Default value when this parameter is omitted:

   0

2. Range of values:

   0 to 59 in decimal

Default behavior

UTC is used.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

If you change the Switch's time zone, statistics on CPU usage collected by the Switch will be cleared to zero.

Related commands

set clock

ntp client server

Sets the address of the NTP server from which time information can be obtained. A maximum of two entries can be set.

The address that is set first is called primary, and the address that is set later is called secondary. If a request to acquire the time from the primary NTP server address fails, a request to acquire time information is sent to the secondary NTP server address.

Syntax

To set or change information:

```
ntp client server <Server IP>
```

To delete information:

```
no ntp client server <Server IP>
```

Input mode

```
(config)
```

Parameters

<Server IP>

Sets the IP address of the NTP server from which the time information can be obtained.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1.0.0.0 to 126.255.255.255, 128.0.0.0 to 223.255.255.255

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If `ntp client server` and `ntp client broadcast` or `ntp client multicast` are both set, the `ntp client server` setting is effective.
2. `127.*.*.*` cannot be set as an IPv4 address.

Related commands

ntp client broadcast

ntp client multicast

ntp interval

ntp client broadcast

Sets acceptance of time information broadcast from an NTP server.

Syntax

To set information:

```
ntp client broadcast
```

To delete information:

```
no ntp client broadcast
```

Input mode

```
(config)
```

Parameters

None

Default behavior

The time information broadcast from the NTP server is not accepted.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

If `ntp client server` and `ntp client broadcast` or `ntp client multicast` are both set, the `ntp client server` setting is effective.

Related commands

ntp client server

ntp client multicast

ntp client multicast

Sets acceptance of time information multicast from an NTP server.

Syntax

To set information:

```
ntp client multicast
```

To delete information:

```
no ntp client multicast
```

Input mode

```
(config)
```

Parameters

None

Default behavior

The time information multicast from the NTP server is not accepted.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

If `ntp client server` and `ntp client broadcast` or `ntp client multicast` are both set, the `ntp client server` setting is effective.

Related commands

ntp client server

ntp client broadcast

ntp interval

Sets the interval for regularly obtaining time information from an NTP server.

Syntax

To set or change information:

```
ntp interval <Interval>
```

To delete information:

```
no ntp interval
```

Input mode

```
(config)
```

Parameters

<Interval>

Sets the interval for obtaining time information from the NTP server. The interval is set in seconds in decimal.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   120 to 604800 (seconds)

Default behavior

3600 seconds is set as the interval for obtaining time information from the NTP server.

Impact on communication

None

When the change is applied

When the `ntp client server` command has been set, the change takes effect immediately after the setting value is changed.

Notes

The setting takes effect if the `ntp client server` command has been set.

Related commands

ntp client server

6. Device Management

system fan mode
system function [AX1250S] [AX1240S]
system l2-table mode
system recovery
system temperature-warning-level
system temperature-warning-level average

system fan mode

Sets the operating mode of the Switch fan.

Syntax

To set information:

```
system fan mode <mode>
```

To delete information:

```
no system fan mode
```

Input mode

```
(config)
```

Parameters

<mode>

Specifies operating mode 1 or 2 for the fan.

1: Low-noise setting

2: Low-temperature setting

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 and 2

Default behavior

Operating mode 1 (Low-noise setting) is set.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. Operation when this command is set differs depending on the Switch model.

Table 6-1 Operation when system fan mode 2 (Low-temperature setting) is set

Model	Fan operation type	Behavior when the command is set
AX2230S-24T AX1250S-24T2C AX1240S-24T2C	Fanless	Because these models do not have fans, this command is invalid even if it is used.
AX1240S-48T2C	Semi-fanless	When the low-temperature setting is selected, the `system fan-control` command setting is invalid (fixed fan speed).

Model	Fan operation type	Behavior when the command is set
AX2230S-24P AX1240S-24P2C	Fixed fan speed	Behavior for the low-temperature setting is performed if the command is omitted or the low-noise setting is specified.

Related commands

system fan-control

system function [AX1250S] [AX1240S]

All functionality of the AX1250S and AX1240S can be used even if the `system function` command is not set.

To maintain configuration compatibility with the AX1230S, the `system function` command can be entered for the AX1250S and AX1240S.

system l2-table mode

Sets the search method for the Layer 2 hardware table.

Syntax

To set or change information:

```
system l2-table mode <Mode>
```

To delete information:

```
no system l2-table mode
```

Input mode

```
(config)
```

Parameters

<Mode>

Selects the method for searching a table used for registration in the hardware table.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 5

   Sets the value that specifies the method used to search the Layer 2 hardware table.

`auto`

Sets the auto-selection mode.#

#: Auto-selection mode

If a hash entry overflow occurs due to a hash conflict in the hardware table, the search method for the hardware table is changed automatically.

Default behavior

`1` is set as the method for searching the table.

Impact on communication

Because the Switch has to be restarted, communication via the Switch stops until the restart process is complete.

In auto-selection mode, frame forwarding and incoming communication stop temporarily when the table search method is changed.

When the change is applied

If you have changed any values, save the configuration and restart the Switch. The new setting values take effect when the Switch is restarted.

Note that if the form of the command changes to `no system l2-table mode` and the Switch is restarted, the operational table search becomes 1.

Notes

1. When this command is entered, the message below appears. Save the configuration and restart the Switch before entering another configuration command.

```
Please execute the reload command after save,
because this command becomes effective after reboot.
```

Related commands

None

system recovery

When the `no system recovery` form of the command is set and a failure is detected, the Switch is not restarted and remains in the failure state.

For details about the entities subject to failure and restoration, see *10 Switch Management* in the *Configuration Guide Vol. 1*.

Syntax

To set information:

```
no system recovery
```

To delete information:

```
system recovery
```

Input mode

```
(config)
```

Parameters

None

Default behavior

Restarts the Switch when a failure is detected.

Impact on communication

The link status of all ports is down-link and communication stops.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. Automatic restoration stops when system recovery is disabled (`no system-recovery`). If a critical failure (FATAL-level error) occurs, the Switch is not restarted after the failure log is collected. For details about the automatic restoration disabled status, see *10. Switch Management* in the *Configuration Guide Vol. 1*.

Related commands

None

system temperature-warning-level

Outputs a warning message when the intake temperature of the switch exceeds the specified temperature.

Syntax

To set information:

```
system temperature-warning-level <temperature>
```

To delete information:

```
no system temperature-warning-level
```

Input mode

```
(config)
```

Parameters

<temperature>

Sets the temperature (in Celsius).

The temperature can be set in units of one degree Celsius.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For AX2230S-24P and AX1250S-24T2C

   25 to 50 (°C)

   For AX2230S-24T, AX1240S-24T2C, AX1240S-24P2C, and AX1240S-48T2C

   25 to 45 (°C)

Default behavior

An operation message is not output when the specified temperature is exceeded.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If the following operating environment conditions are not met, the log might be output at a temperature lower than the specified intake temperature:
   - Provide sufficient ventilation to efficiently remove the heat from around the Switches.
   - Do not stack Switches.
   - Do not install Switches vertically.
   - Do not place Switches near heat sources.
2. If the intake temperature of the Switch exceeds the specified temperature, an operation message is immediately output.

Related commands

None

system temperature-warning-level average

Outputs an operation message when the average temperature during the specified period exceeds the specified temperature.

Syntax

To set information:

```
system temperature-warning-level average [<temperature>] [ period <days> ]
```

To delete information:

```
no system temperature-warning-level average
```

Input mode

```
(config)
```

Parameters

<temperature>

Sets the average temperature (in Celsius).

The temperature can be set in units of one degree Celsius.

1. Default value when this parameter is omitted:

   For AX1250S-24T2C

   43 (°C)

   For AX2230S-24T, AX2230S-24P, AX1240S-24T2C, AX1240S-24P2C, and AX1240S-48T2C

   38 (°C)

2. Range of values:

   For AX2230S-24P and AX1250S-24T2C

   25 to 50 (°C)

   For AX2230S-24T, AX1240S-24T2C, AX1240S-24P2C, and AX1240S-48T2C

   25 to 45 (°C)

`period` *<days>*

Sets the number of days to be used to calculate the average temperature.

1. Default value when this parameter is omitted:

   30

2. Range of values:

   1 to 30

Default behavior

An operation message is not output when the specified average temperature is exceeded.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

The threshold of the average temperature is checked at noon or when the Switch is started.

Notes

1. If the following operating environment conditions are not met, the log might be output at a temperature lower than the specified average temperature:
   - Provide sufficient ventilation to efficiently remove the heat from around the Switches.
   - Do not stack Switches.
   - Do not install Switches vertically.
   - Do not place Switches near heat sources.
2. If the average temperature of the Switch already exceeds the specified value, no operation message is output until the next threshold check is performed.

Related commands

None

system temperature-warning-level average

7. Power Saving Functionality

power-control port cool-standby
schedule-power-control port cool-standby
schedule-power-control port-led
schedule-power-control shutdown interface
schedule-power-control system-sleep [AX1250S] [AX1240S]
schedule-power-control time-range
system fan-control [AX1240S]
system port-led
system port-led trigger console
system port-led trigger interface
system port-led trigger mc

power-control port cool-standby

Enables power saving operation of the link-down port.

Syntax

To set information:

```
power-control port cool-standby
```

To delete information:

```
no power-control port cool-standby
```

Input mode

```
(config)
```

Parameters

None

Default behavior

Operation is at normal power consumption.

Impact on communication

Yes

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If this command is set, link-up of the Fast Ethernet port takes about 3 seconds. [AX1250S] [AX1240S]
2. During scheduled operation of the power saving functionality, the Switch operates according to the configuration of the `schedule-power-control port cool-standby` command. [AX1250S] [AX1240S]
3. This command sets the link status of all Fast Ethernet ports changes, which affects communication. [AX1250S] [AX1240S]
4. The power saving functionality is disabled for Fast Ethernet ports with the fixed speed setting or automatic MDIX functionality disabled. To enable the port power saving functionality, enable auto-negotiation and the automatic MDIX functionality (`mdix auto` specified) during operation. [AX1250S] [AX1240S]
5. Because the power saving functionality of link-down ports is not supported for 1000BASE-X ports, no operation is performed even if this command is set.

Related commands

None

schedule-power-control port cool-standby

Configures power saving operation for link-down ports during scheduled power saving operation.

Syntax

To set information:

```
schedule-power-control port cool-standby
```

To delete information:

```
no schedule-power-control port cool-standby
```

Input mode

```
(config)
```

Parameters

None

Default behavior

Operation is at normal power consumption when the port is in the link-down state.

Impact on communication

Yes

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If this command is set, link-up of the Fast Ethernet port takes about 3 seconds. [AX1250S] [AX1240S]
2. This command sets the link status of all Fast Ethernet ports changes, which affects communication. [AX1250S] [AX1240S]
3. The power saving functionality is disabled for Fast Ethernet ports that are set for fixed speed or that have automatic MDIX functionality disabled. To enable the port power saving functionality, enable auto-negotiation and the automatic MDIX functionality (`mdix auto` specified) during operation. [AX1250S] [AX1240S]
4. With the scheduled port power saving functionality enabled, at the scheduled time, the link status of the Fast Ethernet ports changes in the same way as when using the `power-control port cool-standby` command. If you do not want the link status to change at the scheduled time due to the port power saving functionality, also specify the `power-control port cool-standby` command. [AX1250S] [AX1240S]
5. Because the power saving functionality of link-down ports is not supported for 1000BASE-X ports, no operation is performed even if this command is set.

Related commands

None

schedule-power-control port-led

Configures LED operation during scheduled power saving.

Syntax

To set or change information:

```
schedule-power-control port-led { enable | disable }
```
[AX2200S]

```
schedule-power-control port-led { enable | economy | disable }
```
[AX1250S] [AX1240S]

To delete information:

```
no schedule-power-control port-led
```

Input mode

```
(config)
```

Parameters

`enable`

Turns on the Switch LED according to the operating status.

When the `system port-led trigger` command is not set:

Regardless of the operating status, the LED turns on and blinks with normal brightness.

When the `system port-led trigger` command is set:

Operates under the following conditions: [AX2200S]

1. The LED switches to normal brightness when automatic operation is triggered, and then it turns on and blinks.
2. The LED turns off 60 seconds after the operation ends automatically. If any automatic operation is triggered during this period, the LED switches to normal brightness, and then turns on and blinks.

Operates under the following conditions: [AX1250S] [AX1240S]

1. The LED switches to normal brightness when automatic operation is triggered, and then it turns on and blinks.
2. 60 seconds after automatic operation finishes, the LED switches to power saving brightness, and then turns on and blinks.
3. 10 minutes after power saving brightness started, the LED turns off. If any automatic operation is triggered during this period, the LED switches to normal brightness, and then turns on and blinks.

`economy` [AX1250S] [AX1240S]

Regardless of operation status, the Switch turns on and blinks with power saving brightness.

`disable`

Regardless of the operating status, the Switch LED turns off.

At this time, the ST1 LED blinks green at long intervals to indicate that the LED is about to turn off.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

`enable`, `disable` [AX2200S]

`enable`, `economy`, `disable` [AX1250S] and [AX1240S]

Default behavior

Regardless of operation status, the Switch turns on and blinks with normal brightness.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. When the LED has been disabled (turned off), ST1 and ACC (the memory card access LED) turn on with power saving brightness.
2. The PWR LED always on with normal brightness.

Related commands

schedule-power-control time-range

schedule-power-control shutdown interface

Sets the port that shuts down while the scheduled power saving functionality is used.

Shutting down the port turns off the power, reducing the amount of power consumed.

Syntax

To set information:

```
schedule-power-control shutdown interface <IF# list>
```

To change information:

```
schedule-power-control shutdown interface [ add | remove ] <IF# list>
```

To delete information:

```
no schedule-power-control shutdown interface
```

Input mode

```
(config)
```

Parameters

`interface` *<IF# list>*

Specifies the port to be shut down in list format.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to set *<IF# list>* and the specifiable values, see *Specifiable values for parameters*.

`interface add` *<IF# list>*

Adds a port to be shut down to the list.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to set *<IF# list>* and the specifiable values, see *Specifiable values for parameters*.

`interface remove` *<IF# list>*

Removes a port to be shut down from the list.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to set *<IF# list>* and the specifiable values, see *Specifiable values for parameters*.

Default behavior

The operating status of a port is a state other than shutdown.

For details about port statuses, see the description of the `show port` or `show interfaces` operation command.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If you want a port to be always shut down regardless of a schedule, you must set both the `shutdown` command and this command.

Related commands

schedule-power-control time-range

schedule-power-control system-sleep [AX1250S] [AX1240S]

Puts a Switch in the sleep state during the scheduled time range.

Putting the Switch in the sleep state reduces the amount of power consumed.

Syntax

To set information:

```
schedule-power-control system-sleep
```

To delete information:

```
no schedule-power-control system-sleep
```

Input mode

```
(config)
```

Parameters

None

Default behavior

The Switch does not switch to the sleep state.

Impact on communication

All communications stop during the scheduled time range.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. The Switch does not switch to the sleep state during operation in configuration command mode.

Related commands

schedule-power-control time-range

schedule-power-control time-range

Specifies the execution time of scheduled power saving functionality.

Syntax

To set or change information:

`schedule-power-control time-range` *<Entry number>* `{date | weekly | everyday} action { enable | disable }`

- When a date is specified:

  `date start-time` *<YYMMDD>* *<HHMM>* `end-time` *<YYMMDD>* *<HHMM>*

- When a day of the week is specified:

  `weekly start-time {sun | mon | tue | wed | thu | fri | sat}` *<HHMM>* `end-time {sun | mon | tue | wed | thu | fri | sat}` *<HHMM>*

- When daily is specified:

  `everyday start-time` *<HHMM>* `end-time` *<HHMM>*

To delete information:

`no schedule-power-control time-range` *<Entry number>*

Input mode

`(config)`

Parameters

<Entry number>

Specifies the identifier used to identify the time of execution.

This identifier is used to reference the time of execution.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 50

Execution time parameters (for specifying a date, a day of the week, or daily)

`{date | weekly | everyday}`

Sets the type of execution time to be specified.

`date`

Specify a date.

`weekly`

Specify a day of the week.

`everyday`

Specify a daily execution time.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   `date`, `weekly`, `everyday`

Parameters for specifying a date

`start-time` *<YYMMDD> <HHMM>*

Specifies the start date and time.

YY

Specify the last two digits of the year in the range from 00 to 38.

For example, 00 means the year 2000.

MM

Specify the month in the range from 01 to 12.

DD

Specify the day of the month in the range from 01 to 31.

HH

Specify the hour (00 to 23).

MM

Specify the minute (00 to 59).

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a date for *<YYMMDD>*, and a time for *<HHMM>*. The range of values is from 0:00 on January 1, 2000, to 23:59 on January 17, 2038.

`end-time` *<YYMMDD> <HHMM>*

Specifies the end date and time.

YY

Specify the last two digits of the year in the range from 00 to 38.

For example, 00 means the year 2000.

MM

Specify the month in the range from 01 to 12.

DD

Specify the day of the month in the range from 01 to 31.

HH

Specify the hour (00 to 23).

MM

Specify the minute (00 to 59).

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a date for *<YYMMDD>*, and a time for *<HHMM>*. The range of values is from 0:00 on January 1, 2000, to 23:59 on January 17, 2038.

Parameters for specifying weekly

`start-time {sun | mon | tue | wed | thu | fri | sat}` *<HHMM>*

Specifies the start day of the week and the time.

`sun`

Sets Sunday.

`mon`
Sets Monday.

`tue`
Sets Tuesday.

`wed`
Sets Wednesday.

`thu`
Sets Thursday.

`fri`
Sets Friday.

`sat`
Sets Saturday.

HH
Specify the hour (00 to 23).

MM
Specify the minute (00 to 59).

1. Default value when this parameter is omitted:
   This parameter cannot be omitted.
2. Range of values:
   Select `sun`, `mon`, `tue`, `wed`, `thu`, `fri`, or `sat`, and specify a time for *<HHMM>*.

`end-time {sun | mon | tue | wed | thu | fri | sat} <HHMM>`
Specifies the end day of the week and the time.

`sun`
Sets Sunday.

`mon`
Sets Monday.

`tue`
Sets Tuesday.

`wed`
Sets Wednesday.

`thu`
Sets Thursday.

`fri`
Sets Friday.

`sat`
Sets Saturday.

HH
Specify the hour (00 to 23).

MM
Specify the minute (00 to 59).

1. Default value when this parameter is omitted:
   This parameter cannot be omitted.
2. Range of values:

Select `sun`, `mon`, `tue`, `wed`, `thu`, `fri`, or `sat`, and specify a time for *<HHMM>*.

Parameters for specifying everyday

`start-time` *<HHMM>*

Specifies the start time.

HH

Specify the hour (00 to 23).

MM

Specify the minute (00 to 59).

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a time for *<HHMM>*.

`end-time` *<HHMM>*

Specifies the end time.

HH

Specify the hour (00 to 23).

MM

Specify the minute (00 to 59).

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a time for *<HHMM>*.

`action {enable | disable}`

Specifies the power control behavior for the execution time.

`enable`

Enables the setting specified by using a configuration command for the scheduled power saving functionality for the time of execution set by using this command.

`disable`

Disables the setting specified by using a configuration command for the scheduled power saving functionality for the time of execution set by using this command. Thereafter, the following configuration command settings are enabled:

- system port-led
- power-control port cool-standby
- shutdown

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   `enable`, `disable`

Default behavior

None

Impact on communication

If sleep mode is set, all communications stop when the scheduled time range starts.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If there is an overlap of time of execution between different `action` parameters, the `action disable` setting has precedence.
2. When the `schedule-power-control system-sleep` command has been set, note the following: [AX1250S] [AX1240S]
   - The Switch does not switch to the sleep state if the scheduled time of execution arrives during operation in configuration command mode. The Switch goes into sleep mode after exiting configuration command mode (after moving to administrator mode).
   - A configuration that is not saved is lost if the Switch switches to the sleep state. As a result, the following messages appear when configuration command mode ends:

     ```
     Unsaved changes would be lost when the machine goes to sleep!
     Do you exit "configure" without save ? (y/n):
     ```

     Press `n` to execute the save command.

     When time is set for executing scheduled power saving, if the configuration command has not ended, the Switch does not switch to the sleep state.
   - If no key input operations are performed for certain period of time (30 minutes by default), you are automatically logged out. If you are automatically logged out while editing the configuration and the Switch switches to the sleep state, an unsaved configuration will be lost.
   - If the sleep state continues for 20 days, the sleep state is canceled and the Switch is started. Then, it goes into sleep mode again after startup.

Related commands

None

system fan-control [AX1240S]

Enables the cooling fan control functionality, which operates by monitoring the internal temperature.

Syntax

To set information:

```
system fan-control
```

To delete information:

```
no system fan-control
```

Input mode

```
(config)
```

Parameters

None

Default behavior

The fan operates continuously.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Note, however, that when the `no system fan-control` command is executed, it might take more than ten seconds for the change to be applied.

Notes

1. This command applies only to the AX1240S-48T2C model.
2. Even if this command is set, the cooling fan always operates for the first 10 minutes after the Switch starts.
3. Operation when this command is set differs depending on the Switch model.

Table 7-1 Operation when system fan mode 2 (low-temperature setting) is set

Model	Fan operation type	Behavior when the command is set
AX2230S-24T AX1250S-24T2C AX1240S-24T2C	Fanless	Because these models do not have fans, this command is invalid even if it is used.
AX1240S-48T2C	Semi-fanless	When the low-temperature setting is selected, the `system fan-control` command setting becomes invalid (fixed fan speed).
AX2230S-24P AX1240S-24P2C	Fixed fan speed	Low-temperature operation is performed if this command is omitted or the low-noise setting is specified.

Related commands

system fan mode

system port-led

Configures a Switch's LED operation.

Syntax

To set or change information:

`system port-led { enable | disable }` [AX2200S]

`system port-led { enable | economy | disable }` [AX1250S] and [AX1240S]

To delete information:

`no system port-led`

Input mode

`(config)`

Parameters

`enable`

Turns on the Switch LED according to the operating status.

When the `system port-led trigger` command is not set:

Regardless of the operating status, the LED turns on and blinks with normal brightness.

When the `system port-led trigger` command is set:

Operates under the following conditions: [AX2200S]

1. The LED switches to normal brightness when automatic operation is triggered, and then it turns on and blinks.
2. The LED turns off 60 seconds after the operation ends automatically. If any automatic operation is triggered during this period, the LED switches to normal brightness, and then turns on and blinks.

Operates under the following conditions: [AX1250S] [AX1240S]

1. The LED switches to normal brightness when automatic operation is triggered, and then it turns on and blinks.
2. 60 seconds after automatic operation finishes, the LED switches to power saving brightness, and then turns on and blinks.
3. 10 minutes after power saving brightness started, the LED turns off. If any automatic operation is triggered during this period, the LED switches to normal brightness, and then turns on and blinks.

`economy` [AX1250S] [AX1240S]

Regardless of operation status, the Switch turns on and blinks with power saving brightness.

`disable`

Regardless of the operating status, the Switch LED turns off.

At this time, the ST1 LED blinks green at long intervals to indicate that the LED is about to turn off.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   `enable`, `disable` [AX2200S]

`enable`, `economy`, `disable` [AX1250S] and [AX1240S]

Default behavior

Regardless of operation status, the Switch turns on and blinks with normal brightness.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. When the LED has been disabled (turned off), ST1 and ACC (the memory card access LED) turn on with power saving brightness.
2. The PWR LED always on with normal brightness.
3. During scheduled operation of the power saving functionality, the Switch operates according to the configuration of the `schedule-power-control port-led` command.

Related commands

None

system port-led trigger console

Adds login to and logout from a Switch via a console (RS-232C) connection as a trigger for automatic LED operation.

Syntax

To set information:

```
system port-led trigger console
```

To delete information:

```
no system port-led trigger console
```

Input mode

```
(config)
```

Parameters

None

Default behavior

Login to and logout from a Switch via a console (RS-232C) connection are not regarded as conditions for automatic operation.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

system port-led

system port-led trigger interface

Adds link-up and link-down of the specified physical port as a trigger for automatic LED operation.

Syntax

To set or change information:

```
system port-led trigger interface <IF# list>
```

To delete information:

```
no system port-led trigger interface
```

Input mode

```
(config)
```

Parameters

<IF# list>

Specify the relevant port.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   See *Specifiable values for parameters*.

Default behavior

Link-up and link-down of a physical port are not regarded as conditions for automatic operation.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

system port-led

system port-led trigger mc

Adds insertion and removal of a memory card as a trigger for automatic LED operation.

Syntax

To set information:

```
system port-led trigger mc
```

To delete information:

```
no system port-led trigger mc
```

Input mode

```
(config)
```

Parameters

None

Default behavior

Insertion and removal of a memory card are not regarded as conditions for automatic operation.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

system port-led

8. Ethernet

bandwidth
description
duplex
flowcontrol
interface fastethernet [AX1250S] [AX1240S]
interface gigabitethernet
link debounce
linkscan-mode [AX1250S] [AX1240S]
mdix auto
media-type [AX1250S] [AX1240S]
mtu
power inline [AX2200S] [AX1240S]
power inline allocation [AX2200S] [AX1240S]
power inline priority-control disable [AX2200S] [AX1240S]
power inline system-allocation [AX2200S]
shutdown
speed
system mtu

bandwidth

Assigns the bandwidth of a line. This setting is used for calculating the line usage rate on a network monitoring device.

Syntax

To set or change information:

```
bandwidth <kbit/s>
```

To delete information:

```
no bandwidth
```

Input mode

```
(config-if)
```

Parameters

<kbit/s>

Assigns the line bandwidth in kbit/s.

This setting is used for the `ifSpeed`/`ifHighSpeed` (SNMP MIB) value of the applicable line, and has no impact on communication.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 100000 (kbit/s for `interface fastethernet`) [AX1250S] and [AX1240S]

   1 to 1000000 (kbit/s for `interface gigabitethernet`)

   Do not specify a value that exceeds the line speed of the applicable line.

Default behavior

The line speed of the applicable line is the bandwidth.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

description

Sets supplementary information. This command can be used as a comment about the line. Note that when this command is set, information can be checked by using the `show interfaces` or `ifDescr` (SNMP MIB) operation command.

Syntax

To set or change information:

```
description <String>
```

To delete information:

```
no description
```

Input mode

```
(config-if)
```

Parameters

<String>

Sets supplementary information for an Ethernet interface.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a character string that is no more than 64 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

Default behavior

`Null` is set.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

duplex

Sets the duplex mode of a port.

Syntax

To set or change information:

```
duplex {half | full |auto}
```

To delete information:

```
no duplex
```

Input mode

```
(config-if)
```

Parameters

`{half | full |auto}`

Sets the connection mode of a port to half duplex (fixed), full-duplex (fixed), or auto-negotiation.

The following table shows the combinations of line type and parameters that can be set. `auto` is selected if a non-specifiable parameter is specified.

Table 8-1 Parameters that can be set

Line type	Parameters that can be set
10BASE-T/ 100BASE-TX	`auto` (when `speed auto`, `auto 10`, `auto 100`, or `auto 10 100` is set) `half` (when `speed 10` or `speed 100` is set) `full` (when `speed 10` or `speed 100` is set)
10BASE-T/ 100BASE-TX/ 1000BASE-T	`auto` (when `speed auto`, `auto 10`, `auto 100`, `auto 1000`, `auto 10 100`, or `auto 10 100 1000` is set) `half` (when `speed 10` or `speed 100` is set) `full` (when `speed 10` or `speed 100` is set)
100BASE-FX [AX1250S]	`full` (when `speed 100` is set)
1000BASE-X	`auto` (when `speed auto` or `auto 1000` is set) `full` (when `speed 1000` is set)

`half`

Sets the port to half duplex (fixed) mode.

`full`

Sets the port to full duplex (fixed) mode.

`auto`

Determines the duplex mode by auto-negotiation.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   half, full, auto

Default behavior

`auto` is set.

Impact on communication

If this command is set for the port in use, the port goes down and communication stops temporarily. Thereafter, the port restarts.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If `auto` or a parameter containing `auto` is set for `speed` or `duplex`, auto-negotiation is performed.
2. For 1000BASE-X, if you do not want to use auto-negotiation, set `1000` for `speed` and `full` for `duplex`. If `auto` or `auto 1000` is set for speed, `full` is set for `duplex` as a result of the auto-negotiation.
3. If `media-type` is changed, the command settings return to the default state. [AX1250S] [AX1240S]
4. If `media-type auto` is set, this command cannot be set. [AX1250S] [AX1240S]
5. If the RJ45 port is used with fixed settings, MDI-X is selected.
6. For 100BASE-FX, set `full` for `duplex`. [AX1250S]

Related commands

speed

media-type

flowcontrol

Sets flow control.

Syntax

To set or change information:

```
flowcontrol send {desired | on | off}
flowcontrol receive {desired | on | off}
```

To delete information:

```
no flowcontrol send
no flowcontrol receive
```

Input mode

```
(config-if)
```

Parameters

`send {desired | on | off}`

Sets send operation for the pause packets of the flow control functionality. Specify the same settings as those for the receive operation for the pause packets of the flow control functionality at the destination.

`desired`

If fixed mode is set, pause packets are sent. If the auto-negotiation functionality is set, whether pause packets are sent is determined through communication with the connected Switch.

`on`

Pause packets are sent.

`off`

Pause packets are not sent.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   send desired, send on, send off

`receive {desired | on | off}`

Sets receive operation for the pause packets of the flow control functionality. Specify the same settings as those for the send operation for the pause packets of the flow control functionality at the destination.

`desired`

Pause packets are received. If the auto-negotiation functionality is set, whether pause packets are received is determined through communication with the connected Switch.

`on`

Pause packets are received.

`off`

Pause packets are not received.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   receive desired, receive on, receive off

Default behavior

Behavior varies depending on the line type.

- For 10BASE-T, 100BASE-TX, or 1000BASE-T:

  Receive operation is `off` but send operation is `desired`.

- For 1000BASE-X:

  Receive operation is `off` but send operation is `desired`.

  For 100BASE-FX [AX1250S]

  Receive operation is `off` but send operation is `on`.

Impact on communication

If this command is set for the port in use, the port goes down and communication stops temporarily. Thereafter, the port restarts.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If either `flowcontrol send` or `receive` is set to `on`, both are set to `on`.
2. If `desired` is set and auto-negotiation is set, operation is determined based on negotiation. For any setting other than auto-negotiation, `flowcontrol` is fixed to `on`.
3. For 100BASE-FX, no specific operation is performed when auto-negotiation is set because auto-negotiation is not supported. [AX1250S]

Related commands

None

interface fastethernet [AX1250S] [AX1240S]

Sets items related to 10BASE-T or 100BASE-TX. Entering this command switches to `config-if` mode, in which information about the relevant port can be set.

Syntax

To set or change information:

```
interface fastethernet <IF#>
```

Input mode

```
(config)
```

Parameters

IF#

Sets the interface port number.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   See *Specifiable values for parameters*.

Default behavior

None

Impact on communication

None

When the change is applied

None

Notes

1. The port name is `fastethernet` + *<Interface port number>*.

   Example: The name of the 0/1 port will be `fastethernet 0/1`.

2. This command cannot be deleted.

Related commands

None

interface gigabitethernet

Sets items related to 10BASE-T/100BASE-TX/1000BASE-T, 100BASE-FX, and 1000BASE-X. Entering this command switches to `config-if` mode, in which information about the relevant port can be set.

Syntax

To set or change information:

```
interface gigabitethernet <IF#>
```

Input mode

```
(config)
```

Parameters

IF#

Sets the interface port number.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   See *Specifiable values for parameters*.

Default behavior

None

Impact on communication

None

When the change is applied

None

Notes

1. The port name is `gigabitethernet` + *<Interface port number>*.

   Example: The name of the 0/25 port will be `gigabitethernet 0/25`.

2. This command cannot be deleted.

Related commands

None

link debounce

Sets the link-down detection time after a link failure is detected until the actual link-down occurs. When a large value is set for this command, temporary link-downs will not be detected so the link will be prevented from becoming unstable.

Syntax

To set or change information:

```
link debounce [time <Milli seconds>]
```

To delete information:

```
no link debounce
```

Input mode

```
(config-if)
```

Parameters

`time` *<Milli seconds>*

Sets the debounce timer value in milliseconds.

1. Default value when this parameter is omitted:

   3000 milliseconds

2. Range of values:

   Multiples of 100 from 0 to 10000 in milliseconds

Default behavior

2000 milliseconds is set.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If the link is stable even when a link-down detection timer is not set, you do not need to set one.
2. If a value smaller than the default value (2000 milliseconds) is set for 10BASE-T, 100BASE-TX, or 1000BASE-T, the link might become unstable.

Related commands

None

linkscan-mode [AX1250S] [AX1240S]

Sets the operating mode for monitoring the link status of a Switch.

Syntax

To set information:

```
linkscan-mode <Mode>
```

To delete information:

```
no linkscan-mode <Mode>
```

Input mode

```
(config)
```

Parameters

<Mode>

Sets the operating mode for monitoring the link status.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   `1` (The link status is monitored by hardware.)

Default behavior

The link status is monitored by software.

Impact on communication

Because of changes to the operating mode for monitoring the link status, communication might temporarily stop.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

mdix auto

Sets the MDI functionality of the port to be used. When `no mdix auto` is specified, the automatic MDIX functionality is disabled and the port is fixed to MDI-X.

Syntax

To set information:

```
no mdix auto
```

To delete information:

```
mdix auto
```

Input mode

```
(config-if)
```

Parameters

None

Default behavior

During auto-negotiation, MDI and MDI-X are switched automatically.

Impact on communication

If this command is set for the port in use, the port goes down and communication stops temporarily. Thereafter, the port restarts.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. This command is enabled during auto-negotiation.
2. This command is invalid for 100BASE-FX/1000BASE-X.
3. If `media-type` is `sfp`, this command is not valid. [AX1250S] [AX1240S]
4. If `media-type` is changed, the command settings return to the default state. [AX1250S] [AX1240S]
5. If `media-type auto` is set, this command cannot be set. Use the default value. [AX1250S] [AX1240S]

Related commands

media-type

media-type [AX1250S] [AX1240S]

Selects the type of port to be used as a port on which 10BASE-T/100BASE-TX/1000BASE-T (RJ45) and 100BASE-FX/1000BASE-X (SFP) can be switched.

Syntax

To set or change information:

```
media-type {rj45 | sfp | auto}
```

To delete information:

```
no media-type
```

Input mode

```
(config-if)
```

Parameters

`media-type {rj45 | sfp | auto}`

Selects the type of port to be used as a port on which 10BASE-T/100BASE-TX/1000BASE-T (RJ45) and 100BASE-FX/1000BASE-X (SFP) can be switched.

`rj45`

An RJ45 port is used.

`sfp`

An SFP port is used.

`auto`

A port is automatically selected.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   `rj45`, `sfp`, and `auto`

Default behavior

`auto` (automatic selection) is set. The port operates as an sfp port when link-up occurs in 1000BASE-X.

Impact on communication

If the command is set for the line in use, the line goes down, but the line restarts on the specified port.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. This command cannot be set for non-gigabit interfaces.
2. If `media-type` is changed, the settings of the following commands return to the default state:

   `duplex`, `mdix auto`, and `speed`

3. If `media-type auto` is set, the following commands cannot be set. Use the default value.

   `duplex`, `mdix auto`, and `speed`

4. When `media-type auto` is set and RJ45 is used with a 1000BASE-SX2 SFP transceiver inserted, ports are not switched automatically because 1000BASE-X link-up does not occur. Therefore, for 1000BASE-SX2, use either of the following methods:

   - Use the fixed media setting.
   - Make sure an optical fiber cable and a UTP (RJ45) cable are not inserted at the same time.

5. If a 1000BASE-BX# SFP transceiver is inserted when `media-type auto` is set and a 10BASE-T, 100BASE-TX, or 1000BASE-T (RJ45) link is enabled, a link-down occurs temporarily for 10BASE-T, 100BASE-TX, or 1000BASE-T.

   #

   1000BASE-BX10-D, 1000BASE-BX10-U, 1000BASE-BX40-D, or 1000BASE-BX40-U

   When operation on the RJ45 side has precedence, insert the 1000BASE-BX SFP transceiver by using either of the following methods:

   - Insert an SFP transceiver with the fixed media (RJ45) setting.
   - Insert the SFP transceiver before turning on the Switch.

6. When inserting a 100BASE-FX SFP transceiver, use the following settings:

   - `media-type sfp`
   - `speed 100`
   - `duplex full`

In addition, if you use 10BASE-T, 100BASE-TX, 1000BASE-T or 1000BASE-X after using 100BASE-FX, change the following settings in the order given before starting use:

1) `no speed`
2) `no duplex`
3) `no media-type`

Related commands

duplex

mdix auto

speed

mtu

Sets the MTU for ports. With this configuration, jumbo frames can be used to improve the throughput of data transfers. As a result, the usability of a network and devices connected to the network improves.

Syntax

To set or change information:

```
mtu <Length>
```

To delete information:

```
no mtu
```

Input mode

```
(config-if)
```

Parameters

<Length>

Sets the MTU of ports in octets. The MTU is the maximum length of the data section# for frames in Ethernet V2 format.

#: For details about the frame format, see *13.1.3 Control on the MAC and LLC sublayers* in the *Configuration Guide Vol. 1*.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1500 to 9216

Default behavior

The following initial values are set.

Table 8-2 Initial values for the MTU of ports

Presence of the system mtu command	Initial value
Set	Setting value for `system mtu`
Not set	1500

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. The table below describes the MTU of the applicable port and the frame length that can be sent or received (the maximum length of frames in Ethernet V2 format#, excluding the FCS).

   #: For details about the frame format, see *13.1.3 Control on the MAC and LLC*

sublayers in the *Configuration Guide Vol. 1*.

Table 8-3 MTU and the length of frames that can be sent or received

Line type	mtu setting	system mtu setting	Length of a frame that can be sent or received (in octets)	Port MTU (in octets)
10BASE-T (full and half-duplex), 100BASE-TX (half-duplex)	Not related	Not related	Tagged 1518 Untagged 1514	1500
All other cases	Set	Not related	Tagged M1#1+18 Untagged M1#1+14	M1#1
	Not set	Set	Tagged M2#2+18 Untagged M2#2+14	M2#2
		Not set	Tagged 1518 Untagged 1514	1500

#1: The value set by using the `mtu` command of `interface`.

#2: The value set by using the `system mtu` command.

2. Use the same MTU value for the ports belonging to the VLAN. If the MTU is different, the following operation is performed:
   - If the MTU of the output port is smaller than the MTU of the input port, and the length of the frames to be forwarded exceeds the maximum length of frames that can be sent on the output port, the MTU on the output port is discarded.

Related commands

None

power inline [AX2200S] [AX1240S]

Sets the port priority. Setting the power priority for each port ensures that power is supplied to the appropriate ports.

Syntax

To set or change information:

```
power inline {critical | high | low | never}
```

To delete information:

```
no power inline
```

Input mode

```
(config-if)
```

Parameters

`critical`

Power is allocated to the most important port. Set this value for a port for which power must always be supplied.

`high`

Power is supplied to ports whose priority is set to `high`. If power becomes insufficient, the supply of power to ports with this specification stops only after power to ports with the `low` setting has stopped.

`low`

Power is supplied to ports whose priority is set to `low`. If power becomes insufficient, the supply of power to ports with this specification stops before the supply of power to ports with the `high` setting.

`never`

Disables the PoE functionality of ports. When power is supplied, power is no longer supplied and the PoE functionality is disabled. If a connected device is a power-receiving device, power is not supplied.

Default behavior

`high` is set.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. This command can be set for models that support the PoE functionality.
2. If the remote device is a power supply device, set `never` to disable the PoE functionality of the line.
3. If a port has been shut down, no power is supplied to it.
4. If the `inactivate` or `activate` operation command is executed, the supply of power continues.
5. If you execute the `activate power inline` operation command for a port with `never`

set, power is not supplied.

6. If more than one port has the same setting, the port with the lower port number has priority.
7. The priority is controlled separately for system 1 and system 2 according to their respective ranges. [AX2200S]

Related commands

power inline priority-control disable

power inline allocation [AX2200S] [AX1240S]

Sets power allocation for each port either based on its class or manually.

Syntax

To set or change information:

```
power inline allocation {auto | limit <Threshold>}
```

To delete information:

```
no power inline allocation
```

Input mode

```
(config-if)
```

Parameters

`auto`

Detects a power-receiving device and automatically categorizes power classes, and sets the amount of power allocated to the applicable port based on its class.

The following table lists the power classes and the maximum output power for each.

Power class	Maximum output power
Class0	15.4W
Class1	4.0W
Class2	7.0W
Class3	15.4W
Class4	30.0W

`limit`

Detects a power-receiving device and automatically categorizes power classes, and sets the amount of power allocated to the applicable port manually.

<Threshold> [AX2200S]

Sets the amount of power for a port and the amount of power consumption to be used for priority control in steps of 200 mW or 400 mW. This parameter becomes valid when `limit` is specified.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   See the table below.

Port	Setting range (in mW)	Increment (in mW)
0/1 to 0/4	4000 to 30000	200
	30000 to 60000	400

Port	Setting range (in mW)	Increment (in mW)
0/5 to 0/24	4000 to 30000	200

<Threshold> [AX1240S]

Sets the amount of power for a port and the amount of power consumption to be used for priority control in steps of 200 mW. This parameter becomes valid when `limit` is specified.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   4000 to 30000 (mW)

Default behavior

`auto` is set.

Impact on communication

Yes

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. When specifying manual allocation settings, read the documentation for the power-receiving device. The customer performs the operation at the customer's own risk.
2. Set a value for the maximum power consumption of the power-receiving device that leaves a margin.
3. If a value smaller than the minimum power consumption required by the power-receiving device is set manually, a power overload is detected and power to the power-receiving device might stop. To restore power, execute the `activate power inline` operation command.
4. When you specify `limit` for 0/1 to 0/4 ports, if you change the setting within the range from 30000 (mW) to 60000 (mW) and select a value smaller than 30000 (mW) before or after the setting change, the supply of the power to the applicable port stops temporarily. [AX2200S]

Related commands

power inline

power inline priority-control disable [AX2200S] [AX1240S]

Assigns priority to a powered port.

Syntax

To set information:

```
power inline priority-control disable
```

To delete information:

```
no power inline priority-control disable
```

Input mode

```
(config)
```

Parameters

None

Default behavior

The priority setting for ports is enabled.

Impact on communication

Power to all ports is temporarily stopped.

When the change is applied

If you have changed any values, save the configuration and restart the Switch. The new setting values take effect when the Switch is restarted.

Notes

1. When this command is entered, the message below appears. In response, save the settings, and then restart the Switch.

   ```
   Please execute the reload command after save,
   because this command becomes effective after reboot.
   ```

2. When a Switch is restarted, power is supplied to the ports in order from port 0/1. Because of this, the power might be supplied through a different powered port after a restart.
3. When this command is set, the priority setting established by the `power inline` command becomes invalid, and the port is recognized as a port to which the power is supplied. If the `power inline never` command is set, power is not supplied.
4. This command assigns priority to the powered ports of system 1 and system 2 respectively. [AX2200S]

Related commands

power inline

power inline system-allocation [AX2200S]

Manually sets the maximum amount of power that can be supplied to system 1.

The maximum amount of power for system 2 is calculated by subtracting the value set by this command from the maximum amount of power that can be supplied to this Switch.

Syntax

To set or change information:

```
power inline system-allocation limit <Threshold>
```

To delete information:

```
no power inline system-allocation
```

Input mode

```
(config)
```

Parameters

`limit`

Manually sets the maximum amount of power that can be supplied to system 1.

<Threshold>

Manually sets the maximum amount of power that can be supplied to system 1 in steps of 400 mW.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   16000 to 240000 (mW)

Default behavior

The maximum amount of power that can be supplied to system 1 is set to 61600 (mW).

Impact on communication

Yes

When the change is applied

If you have changed any values, save the configuration and restart the Switch. The new setting values take effect when the Switch is restarted.

Notes

1. When this command is entered, the message below appears. In response, save the settings, and then restart the Switch.

   ```
   Please execute the reload command after save,
   because this command becomes effective after reboot.
   ```

Related commands

power inline

shutdown

Places the port in the shutdown state. If a port with the PoE functionality is shut down, power is no longer supplied.

Syntax

To set information:

```
shutdown
```

To delete information:

```
no shutdown
```

Input mode

```
(config-if)
```

Parameters

None

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. When `Set` of `ifAdminStatus` is executed by the `SetRequest` operation of SNMP from the SNMP manager, the setting is applied to this command.
2. During scheduled operation of the power saving functionality, the Switch operates according to the configuration of the `schedule-power-control shutdown interface` command.
3. If you want a port to be always shut down regardless of a schedule, you must set both the `schedule-power-control shutdown interface` command and this command.

Related commands

None

speed

Sets the port speed.

Syntax

To set or change information:

```
speed { 10 | 100 | 1000 | auto | auto {10 | 100 | 1000 | 10 100 | 10 100 1000} }
```

To delete information:

```
no speed
```

Input mode

```
(config-if)
```

Parameters

```
{ 10 | 100 | 1000 | auto | auto {10 | 100 | 1000 | 10 100 | 10 100 1000} }
```

Sets the line speed.

The following table shows the combinations of line type and parameters that can be set. `auto` is selected if a non-specifiable parameter is specified.

Table 8-4 Parameters that can be set

Line type	Parameters that can be set
10BASE-T/ 100BASE-TX/	10 100 auto auto 10 auto 100 auto 10 100
10BASE-T/ 100BASE-TX/ 1000BASE-T	10 100 auto auto 10 auto 100 auto 1000 auto 10 100 auto 10 100 1000
100BASE-FX [AX1250S]	100
1000BASE-X	1000 auto auto 1000

`10`

Sets the line speed to 10 Mbit/s.

`100`

Sets the line speed to 100 Mbit/s.

`1000`

Sets the line speed to 1000 Mbit/s.

`auto`

Sets the line speed to auto-negotiation.

`auto {10 | 100 | 1000 | 10 100 | 10 100 1000}`

Auto-negotiation is performed at the specified line speed. This setting prevents the line speed from operating at an unexpected speed, so the line usage rate is prevented from increasing. If negotiation cannot be performed at the specified line speed, the status of the link does not switch to the link-up state.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   `100`, `100`, `1000`, `auto`, and `auto {10 | 100 | 1000 | 10 100 | 10 100 1000}`

Default behavior

`auto` is set.

Impact on communication

If this command is set for the port in use, the port goes down and communication stops temporarily. Thereafter, the port restarts.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If `auto` or a parameter containing `auto` is set for `speed` or `duplex`, auto-negotiation is performed.
2. If auto-negotiation is not used for 10BASE-T, 100BASE-TX, or 1000BASE-T, you must set `speed` to `10` or `100`, and set `duplex` to `full` or `half`.
3. For 1000BASE-X, if auto-negotiation is not used, you must set `speed` to `1000` and `duplex` to `full`.
4. If `media-type` is changed, the command settings return to the default state. [AX1250S] [AX1240S]
5. If `media-type auto` is set, this command cannot be set. Use the default value. [AX1250S] [AX1240S]
6. If the RJ45 port is used with fixed settings, MDI-X is selected.
7. Because 100BASE-FX does not support auto-negotiation, set `100` for `speed`. If `auto` is set, there will be no transition to the link-up state. [AX1250S]

Related commands

duplex

media-type

system mtu

Sets the MTU of all ports. With this configuration, jumbo frames can be used to improve the throughput of data transfers. As a result, the usability of a network and devices connected to the network improves.

Syntax

To set or change information:

```
system mtu <Length>
```

To delete information:

```
no system mtu
```

Input mode

```
(config)
```

Parameters

<Length>

Sets the MTU of all ports in octets. The MTU is the maximum length of the data section# for frames in Ethernet V2 format.

#: For details about the frame format, see *13.1.3 Control on the MAC and LLC sublayers* in the *Configuration Guide Vol. 1*.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1500 to 9216 (octets)

Default behavior

The MTU of all ports is set to 1500.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. The table below describes the port MTU and the length of a frame that can be sent or received (the maximum length of a frame in Ethernet V2 format#, excluding the FCS).

   #: For details about the frame format, see *13.1.3 Control on the MAC and LLC sublayers* in the *Configuration Guide Vol. 1*.

Table 8-5 MTU and the length of frames that can be sent or received

Line type	mtu setting	system mtu setting	Length of a frame that can be sent or received (in octets)	Line MTU (in octets)
10BASE-T (full and half-duplex), 100BASE-TX (half-duplex)	Not related	Not related	Tagged 1518 Untagged 1514	1500
All other cases	Set	Not related	Tagged M1[#1]+18 Untagged M1[#1]+14	M1[#1]
	Not set	Set	Tagged M2[#2]+18 Untagged M2[#2]+14	M2[#2]
		Not set	Tagged 1518 Untagged 1514	1500

#1: The value set by using the `mtu` command of `interface`.

#2: The value set by using the `system mtu` command.

Related commands

None

9. Link Aggregation

channel-group lacp system-priority
channel-group max-active-port
channel-group mode
channel-group periodic-timer
description
interface port-channel
lacp port-priority
lacp system-priority
shutdown

channel-group lacp system-priority

Sets the LACP system priority of a channel group for link aggregation.

Syntax

To set or change information:

```
channel-group lacp system-priority <Priority>
```

To delete information:

```
no channel-group lacp system-priority
```

Input mode

```
(config-if)
```

Parameters

<Priority>

Sets the LACP system priority. The lower the value, the higher the priority.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 65535

Default behavior

The setting of the `lacp system-priority` command is used.

Impact on communication

If a priority is set for the operating channel group, the channel group goes down, and then restarts.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. This command is effective only when LACP-based link aggregation is used.
2. If the LACP system priority is changed, the status of all ports registered for the channel group changes to `Blocking` (communication interrupted).

Related commands

interface port-channel

channel-group max-active-port

Sets the maximum number of ports actually used in a channel group for link aggregation.

Syntax

To set or change information:

```
channel-group max-active-port <Number> [no-link-down]
```

To delete information:

```
no channel-group max-active-port
```

Input mode

```
(config-if)
```

Parameters

<Number> `[no-link-down]`

Sets the maximum number of ports actually used in a channel group for link aggregation. If the number of ports that is actually used in a channel group exceeds the value set by this command, use only the number of ports that is specified and apply the standby link functionality to the rest of the ports. If you use the standby link functionality in link-not-down mode, set the `no-link-down` command. If you do not do so, the standby link switches to the link-down stats. The criteria for selecting which links are standby links are as follows:

- Select ports that have been assigned lower priority by using the `lacp port-priority` command.
- If the priority is the same, select a port with a larger interface port number.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 8

Default behavior

The maximum number is 8.

Impact on communication

The ports that are in use might be changed by the standby link functionality, and communication might stop temporarily.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. Use this command in static link aggregation mode.
2. If you set the `max-active-port` command, match its settings to the settings of the `max-active-port` and `lacp port-priority` commands on the destination device.
3. To change link-down or no-link-down for the standby link mode, first delete the parameter, and then set it again. To change the number of ports in link-not-down mode, you must set the `no-link-down` command.

Related commands

interface port-channel

channel-group lacp system-priority

lacp system-priority

lacp port-priority

channel-group mode

Creates a channel group for link aggregation.

Syntax

To set information:

```
channel-group <Channel group#> mode { on | { active | passive } }
```

To change information:

```
channel-group <Channel group#> mode { active | passive }
```

To delete information:

```
no channel-group
```

Input mode

```
(config-if)
```

Parameters

<Channel group#>

Sets the channel group number for link aggregation.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   See *Specifiable values for parameters*.

`mode { on | { active | passive } }`

Sets the mode for link aggregation.

`on`

Static link aggregation is performed.

`active`

LACP-based link aggregation is performed, and LACPDUs are always sent irrespective of the remote device.

`passive`

LACP-based link aggregation is performed, but LACPDUs are sent only when an LACPDU from the remote device is received.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   `on`, `active`, or `passive`

Default behavior

None

Impact on communication

If this setting is specified for the operating port, communication temporarily stops.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. To change static link aggregation to LACP-based link aggregation, or vice versa, delete this command, change the mode, and then set the command again.
2. When `channel-group mode` is set, the `port-channel` setting of the specified channel group is automatically generated. If `port-channel` has already been set, no specific operation is required.
3. If the `port-channel` setting of the specified channel group number already exists when you set this command, you must either specify the same setting for the applicable interface and the port channel interface with the specified channel group number or else not set a common configuration command for the applicable interface. For details, see *14.2.4 Configuration of a port channel interface* in the *Configuration Guide Vol. 1*.
4. If you want to delete this command, do so after executing the `shutdown` command for the applicable interface.
5. Deleting this command does not delete the `port-channel` configuration (deleting all ports in a channel group does not delete the `port-channel` configuration). When deleting a channel group, you must delete the `port-channel` configuration manually.

Related commands

interface fastethernet

interface gigabitethernet

channel-group periodic-timer

Sets the LACPDU sending interval.

Syntax

To set or change information:

```
channel-group periodic-timer { long | short }
```

To delete information:

```
no channel-group periodic-timer
```

Input mode

```
(config-if)
```

Parameters

`{ long | short }`

Sets the interval at which the remote device sends LACPDUs to a Switch.

`long`: 30 seconds

`short`: one second

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   `long` or `short`

Default behavior

`long` (30 seconds) is set as the sending interval.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. This command is effective only when LACP-based link aggregation is used.

Related commands

interface port-channel

channel-group mode

description

Sets supplementary information.

Syntax

To set or change information:

```
description <String>
```

To delete information:

```
no description
```

Input mode

```
(config-if)
```

Parameters

<String>

Sets supplementary information for the applicable channel group for link aggregation. Use this command to create and attach a note to the interface.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a character string that is no more than 64 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

Default behavior

`Null` is set.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

interface port-channel

Sets an item related to a port channel interface. Entering this command switches to config-if mode, which allows you to use configuration commands to specify the channel group number. A port channel interface is automatically generated when the `channel-group mode` command is set.

Syntax

To set or change information:

```
interface port-channel <Channel group#>
```

To delete information:

```
no interface port-channel <Channel group#>
```

Input mode

```
(config)
```

Parameters

<Channel group#>

Sets the channel group number.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   See *Specifiable values for parameters*.

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If you want to delete this command, do so after executing the `shutdown` command for all ports in the applicable channel group.

Related commands

interface fastethernet

interface gigabitethernet

interface range

lacp port-priority

Sets the port priority.

Syntax

To set or change information:

```
lacp port-priority <Priority>
```

To delete information:

```
no lacp port-priority
```

Input mode

```
(config-if)
```

Parameters

<Priority>

Sets the port priority. The lower the value, the higher the priority.

When `on` is set for the `channel-group mode` command

This parameter is used with the `max-active-port` command to select the standby links.

When `active` or `passive` is set for the `channel-group mode` command

This parameter applies to port priority for the LACP protocol.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 65535

Default behavior

`128` is set as the port priority.

Impact on communication

If you set the port priority for the operating port by setting `channel-group mode` to `active` or `passive`, communication is temporarily interrupted. If you set the port priority for the operating port by setting `channel-group mode` to `on`, the port in use is changed by the standby link functionality, and communication might temporarily stop.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If you set the `max-active-port` command, match its setting to the setting of `max-active-port` for the destination device.
2. If you change *<Priority>*, the status of the applicable port changes to `Blocking` (communication interrupted).

Related commands

interface fastethernet

interface gigabitethernet

channel-group mode

channel-group max-active-port

lacp system-priority

Sets the effective LACP system priority for a Switch.

Syntax

To set or change information:

```
lacp system-priority <Priority>
```

To delete information:

```
no lacp system-priority
```

Input mode

```
(config)
```

Parameters

<Priority>

Sets the LACP system priority. The lower the value, the higher the priority.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 65535

Default behavior

If the `channel-group lacp system-priority` command has been set, that setting is used.
If the `channel-group lacp system-priority` command has not been set, 128 is used.

Impact on communication

If a priority is set for the operating channel group, the channel group goes down, and then restarts.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. This command is effective only when LACP-based link aggregation is used.
2. If the LACP system priority is changed, the status of all ports registered for the channel group changes to `Blocking` (communication interrupted).

Related commands

None

shutdown

Always disables the applicable channel group for link aggregation, and stops communication.

Syntax

To set information:

```
shutdown
```

To delete information:

```
no shutdown
```

Input mode

```
(config-if)
```

Parameters

None

Default behavior

None

Impact on communication

If the priority is set for an operating channel group, the channel group goes down.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

When `Set` of `ifAdminStatus` is executed by the `SetRequest` operation of SNMP from the SNMP manager, the setting is applied to this command.

Related commands

interface port-channel

10. MAC Address Table

mac-address-table aging-time
mac-address-table static

mac-address-table aging-time

Sets the aging conditions for MAC address table entries.

Syntax

To set or change information:

```
mac-address-table aging-time <Seconds>
```

To delete information:

```
no mac-address-table aging-time
```

Input mode

```
(config)
```

Parameters

<Seconds>

Sets the aging time in seconds. If `0` is set, aging is not performed.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0, 10 to 1000000 (seconds)

Default behavior

300 seconds is set as the aging time.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. A Switch checks for received frames each time the specified aging time elapses. Accordingly, a maximum of twice the aging time might be required for the learned entries to be deleted.
2. When any of the following settings is in effect, an aging time of 10 to 300 seconds set by this command is set to 300 seconds.
   - When IEEE 802.1X port-based authentication (static) or port-based authentication (dynamic) is in effect, and `dot1x auto-logout` is valid.
   - When Web authentication fixed VLAN mode or dynamic VLAN mode is in effect, and `web-authentication auto-logout` is valid.
   - When MAC-based authentication fixed VLAN mode or dynamic VLAN mode is in effect, and `mac-authentication auto-logout` is valid.

Related commands

None

mac-address-table static

Sets static MAC address table information.

Syntax

To set or change information:

```
mac-address-table static <MAC> vlan <VLAN ID> interface
{gigabitethernet <IF#> | port-channel <Channel group#> } [AX2200S]
mac-address-table static <MAC> vlan <VLAN ID> interface {fastethernet
<IF#> | gigabitethernet <IF#> | port-channel <Channel group#> } [AX1250S]
[AX1240S]
```

To delete information:

```
no mac-address-table static <MAC> vlan <VLAN ID>
```

Input mode

```
(config)
```

Parameters

<MAC>

Sets the MAC address to be registered as a static entry.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0000.0000.0000 to feff.ffff.ffff

   Note, however, that a multicast MAC address (address whose lowest bit of the first-byte is set to 1) cannot be set.

`vlan` *<VLAN ID>*

Sets the VLAN ID of the VLAN for static entries.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   See *Specifiable values for parameters*.

`interface { gigabitethernet` *<IF#>* `| port-channel` *<Channel group#>* `}` [AX2200S]

`interface { fastethernet` *<IF#>* `| gigabitethernet` *<IF#>* `| port-channel` *<Channel group#>* `}` [AX1250S] [AX1240S]

Sets the output destination interface for static entries. A physical port or link aggregation can be set for the interface.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   <IF#>: See *Specifiable values for parameters*.

   <Channel group#>: See *Specifiable values for parameters*.

Default behavior

No static entries are set.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If you set a static entry for the default VLAN (VLAN ID = 1), explicitly set `vlan 1` for the output destination interface.
2. If `interface` has been set, a frame is output to the interface specified for frames matching the destination MAC address. In addition, if a frame is received from an interface other than the one specified for frames as matching the source MAC address, it is discarded.
3. If the output destination interface and the VLAN specified by using this command are operating using the automatic VLAN assignment functionality of the Layer 2 authentication functionality, the MAC address cannot be registered as a static entry.

Related commands

vlan

11. VLANs

interface vlan
l2protocol-tunnel eap
l2protocol-tunnel stp
mac-address
name
protocol
state
switchport access
switchport isolation
switchport mac
switchport mode
switchport protocol
switchport trunk
vlan
vlan-protocol

interface vlan

Configures a VLAN interface. Setting the VLAN interface allows you to set IP addresses for VLANs.

Syntax

To set or change information:

```
interface vlan <VLAN ID>
```

To delete information:

```
no interface vlan <VLAN ID>
```

Input mode

```
(config)
```

Parameters

<VLAN ID>

Sets the VLAN ID.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   See *Specifiable values for parameters*. Note that the default VLAN (VLAN ID = 1) cannot be set when information is deleted.

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If a VLAN ID which has not yet been set is set for *<VLAN ID>*, a VLAN is created. Created VLANs are port-based VLANs. For a protocol-based VLAN or MAC VLAN, the VLAN must be created beforehand by using the `vlan` command.
2. If you set information for multiple VLAN interfaces, use the `interface range` command to set *<VLAN ID list>*.
3. Setting `no vlan` for a VLAN generated by the `interface vlan` command deletes the VLAN. Also, setting the `no interface vlan` command for a VLAN generated by the `vlan` command deletes the VLAN.

Related commands

vlan

l2protocol-tunnel eap

Enables the EAPOL forwarding functionality. The functionality is set for a switch.

Syntax

To set information:

```
l2protocol-tunnel eap
```

To delete information:

```
no l2protocol-tunnel eap
```

Input mode

```
(config)
```

Parameters

None

Default behavior

The EAPOL forwarding functionality is disabled.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

l2protocol-tunnel stp

Enables the BPDU forwarding functionality. The functionality is set for a switch.

Syntax

To set information:

```
l2protocol-tunnel stp
```

To delete information:

```
no l2protocol-tunnel stp
```

Input mode

```
(config)
```

Parameters

None

Default behavior

The BPDU forwarding functionality is disabled.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

mac-address

Sets the MAC address used to identify a MAC VLAN.

Syntax

To set or change information:

```
mac-address <MAC>
```

To delete information:

```
no mac-address <MAC>
```

Input mode

```
(config-vlan) (MAC VLAN only)
```

Parameters

<MAC>

Sets the MAC address that will be set for the MAC VLAN. This command can be set only when the applicable VLAN is a MAC VLAN.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0000.0000.0000 to feff.ffff.ffff

   The lowest bit of the first byte (the multicast bit) must not be 1.

Default behavior

The MAC address is not set.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. A MAC address that has been assigned to another VLAN cannot be set. Delete the address, and then set it again.
2. If a MAC address dynamically configured by using the Layer 2 authentication functionality has been set, the Layer 2 authentication settings are disabled, and the `mac-address` settings take effect.
3. The number of MAC addresses that can be set for a Switch is 64.

Related commands

None

name

Sets a VLAN name.

Syntax

To set or change information:

```
name <String>
```

To delete information:

```
no name
```

Input mode

```
(config-vlan)
```

Parameters

<String>

Sets a VLAN name.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a character string that is no more than 32 characters. For details about the characters that can be specified, see *Specifiable values for parameters*. This parameter cannot be specified if *<VLAN ID list>* has been set by using the `vlan` command.

Default behavior

The initial value is `VLAN`*xxxx*. Note that *xxxx* is a four-digit numeric string, including any leading zeros, that indicates a VLAN ID.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. Note the following when using a VLAN name configured by using this command as a VLAN after RADIUS authentication:
   - Specify a unique VLAN name. If the same VLAN name is used for two or more VLANs, the smallest VLAN ID is allocated as the post-authentication VLAN in RADIUS authentication mode.
   - Do not specify a number at the beginning of the VLAN name. A number at the beginning will be recognized as the VLAN ID, which might result in an authentication failure.

Related commands

None

protocol

Sets the protocol for identifying VLANs in protocol VLANs.

Syntax

To set or change information:

```
protocol <Protocol name>
```

To delete information:

```
no protocol <Protocol name>
```

Input mode

```
(config-vlan)
```

Parameters

<Protocol name>

Sets the protocol name of a protocol VLAN. This command can be set only when the applicable VLAN is a protocol VLAN. If you want to use multiple protocol names for a single VLAN, set the command separately for each protocol name used.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Protocol name set by the `vlan-protocol` command.

Default behavior

No protocol is set.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. To use a protocol VLAN with an IPv4 address or IPv6 address set, you must use this command to specify the applicable protocol.

Related commands

vlan-protocol

state

Sets the VLAN status.

Syntax

To set or change information:

```
state {suspend | active}
```

To delete information:

```
no state
```

Input mode

```
(config-vlan)
```

Parameters

`{suspend | active}`

`suspend`

Disables the VLAN status and stops the sending and receiving of all frames on the VLAN.

`active`

Sets the VLAN status to `enable` and starts the sending and receiving of all frames.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   `suspend` or `active`

Default behavior

The VLAN status is `enable`.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

When `Set` of `ifAdminStatus` is executed by the `SetRequest` operation of SNMP from the SNMP manager, the setting is applied to this command.

Related commands

None

switchport access

Sets access port information.

Syntax

To set or change information:

```
switchport access vlan <VLAN ID>
```

To delete information:

```
no switchport access vlan
```

Input mode

```
(config-if)
```

Parameters

`vlan` *<VLAN ID>*

Sets the access port VLAN. Specifiable VLANs are port VLANs or MAC VLANs. A protocol VLAN cannot be set.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   See *Specifiable values for parameters*.

Default behavior

The access port of the default VLAN (VLAN ID = 1) is used.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If an untagged frame or tagged frame of a port VLAN is received, the frame is handled by the port VLAN. If a tagged frame of a VLAN other than a port VLAN is received, the frame is discarded.

Related commands

switchport mode

vlan

switchport isolation

Configures the inter-port relay isolation functionality.

Syntax

To set information:

```
switchport isolation interface fastethernet <IF# list>
```
[AX1250S] [AX1240S]

```
switchport isolation interface gigabitethernet <IF# list>
```

To change information:

```
switchport isolation interface { gigabitethernet <IF# list> | add gigabitethernet <IF# list> | remove gigabitethernet <IF# list>}
```
[AX2200S]

```
switchport isolation interface { fastethernet <IF# list> | gigabitethernet <IF# list> | add { fastethernet <IF# list> | gigabitethernet <IF# list>} | remove { fastethernet <IF# list> | gigabitethernet <IF# list>} }
```
[AX1250S] [AX1240S]

To delete information:

```
no switchport isolation
```

Input mode

```
(config-if)
```

Parameters

```
interface { gigabitethernet <IF# list> }
```
[AX2200S]

```
interface { fastethernet <IF# list> | gigabitethernet <IF# list> }
```
[AX1250S] [AX1240S]

Sets a list of physical ports forwarding from which can be isolated. Forwarding from a port set by this parameter to the applicable port is suppressed.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to specify *<IF# list>* and the specifiable range of values, see *Specifiable values for parameters*.

```
interface add { gigabitethernet <IF# list> }
```
[AX2200S]

```
interface add { fastethernet <IF# list> | gigabitethernet <IF# list> }
```
[AX1250S] [AX1240S]

Adds ports forwarding from which is to be isolated to the list.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to specify *<IF# list>* and the specifiable range of values, see *Specifiable values for parameters*.

```
interface remove { gigabitethernet <IF# list> }
```
[AX2200S]

```
interface remove { fastethernet <IF# list> | gigabitethernet <IF# list> }
```
[AX1250S] [AX1240S]

Removes ports forwarding from which is isolated from the list.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to specify *<IF# list>* and the specifiable range of values, see *Specifiable values for parameters*.

Default behavior

Forwarding between ports is not isolated.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. The functionality for suppressing inter-port forwarding is entered from the port set by `interface` of the `switchport isolation` command, and discards frames output from the port on which the Switch port isolation command is set. To suppress forwarding on both ends, set the command on both ports.

Related commands

None

switchport mac

Sets the MAC port information.

Syntax

To set information:

```
switchport mac vlan <VLAN ID list>
switchport mac native vlan <VLAN ID>
switchport mac dot1q vlan <VLAN ID list>
```

To change information:

```
switchport mac {vlan <VLAN ID list> | vlan add <VLAN ID list> | vlan remove <VLAN ID list> | native vlan <VLAN ID> }
switchport mac dot1q vlan{<VLAN ID list> | add <VLAN ID list> | remove <VLAN ID list>}
```

To delete information:

```
no switchport mac vlan
no switchport mac native vlan
no switchport mac dot1q vlan
```

Input mode

```
(config-if)
```

Parameters

`vlan <VLAN-ID-list>`

Specifies the list of valid MAC VLANs that applies to a switch port. When this parameter is changed, the effective MAC VLAN list is replaced by the list set for the parameter.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to specify <*VLAN ID list*> and the specifiable range of values, see *Specifiable values for parameters*.

`native vlan <VLAN ID>`

Sets the VLAN that receives frames that have an unregistered source MAC address. Frames can also be sent from the specified VLAN. Specifiable VLANs are port VLANs.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   See *Specifiable values for parameters*.

`dot1q vlan <VLAN ID list>`

Sends the frames of the VLANs in the VLAN list set by using this parameter in the form of tagged frames. In addition, the tagged frames can be forwarded in the VLAN set by using this parameter. If a tagged frame is received by another VLAN, the frame is discarded.

Specifiable VLANs are port VLANs or MAC VLANs. A VLAN set by using the

`switchport mac vlan` command cannot be set.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to specify *<VLAN ID list>* and the specifiable values, see *Specifiable values for parameters*.

`vlan add` *<VLAN ID list>*

Adds the currently-valid MAC VLANs for this port to the VLAN list.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to specify *<VLAN ID list>* and the specifiable range of values, see *Specifiable values for parameters*.

`vlan remove` *<VLAN ID list>*

Removes the valid MAC VLANs for this port from the VLAN list.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to specify *<VLAN ID list>* and the specifiable range of values, see *Specifiable values for parameters*.

`dot1q vlan add` *<VLAN ID list>*

Adds a VLAN able to forward tagged frames on the port to the VLAN list. Specifiable VLANs are port VLANs or MAC VLANs. A VLAN set by using the `switchport mac vlan` command cannot be set.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to specify *<VLAN ID list>* and the specifiable range of values, see *Specifiable values for parameters*.

`dot1q vlan remove` *<VLAN ID list>*

Removes a VLAN able to forward tagged frames on the port from the VLAN list.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to specify *<VLAN ID list>* and the specifiable range of values, see *Specifiable values for parameters*.

Default behavior

None. If a MAC port has been set by using the `switchport mode mac` command and the `switchport mac` command has not been set, only the default VLAN operates.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If no valid MAC VLANs have been set, the port operates as an access port.
2. The `switchport mac dot1q vlan` setting takes effect when `switchport mode mac` is set.
3. If a VLAN is automatically assigned by automatic VLAN assignment of the Layer 2 authentication functionality to a MAC port subject to authentication and either of the following occurs, the authentication cannot be canceled:
   - Setting in the applicable VLAN by using `switchport mac vlan` or `switchport mac vlan add`
   - Deletion in the applicable VLAN by using `no switchport mac` or `switchport mac vlan remove`

Related commands

switchport mode

vlan mac-based

switchport mode

Configures the Layer 2 interface attribute (port type).

Syntax

To set or change information:

```
switchport mode {access | trunk | protocol-vlan | mac-vlan }
```

To delete information:

```
no switchport mode
```

Input mode

```
(config-if)
```

Parameters

`{access | trunk | protocol-vlan | mac-vlan}`

Configures the Layer 2 interface attribute (port type).

`access`

Sets the applicable interface as an access port. An access port sends untagged frames. An access port can be used by only one VLAN.

`trunk`

Sets the applicable interface as a trunk port. A trunk port sends and receives untagged frames and tagged frames.

`protocol-vlan`

Sets the applicable interface as a protocol port. A protocol port sends and receives untagged frames. When a frame is received, the VLAN is determined by the protocol type of the frame. Tagged frames are discarded.

`mac-vlan`

Sets the applicable interface as a MAC port. A MAC port sends and receives untagged frames. When a frame is received, the corresponding VLAN is determined from the source MAC address of the frame. Tagged frames are discarded. Note, however, that if the `switchport mac dot1q vlan` command is set, tagged frames are forwarded.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   `access`, `trunk`, `protocol-vlan`, or `mac-vlan`

Default behavior

`access` (access port) is set.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If the applicable interface is set as a trunk port, set `allowed vlan` by using the

`switchport trunk` command. If an interface is set as a trunk port and `allowed vlan` is not set, all frames on the applicable interface are discarded.

2. If the applicable interface is set as a protocol port, set the protocol VLAN by using the `switchport protocol` command. If the protocol VLAN is not set, the applicable interface operates as an access port.
3. You cannot make changes using this command if the following commands are set for the applicable interface:
   - dot1x port-control
   - mac-authentication port
   - web-authentication port

Related commands

None

switchport protocol

Sets the protocol port information.

Syntax

To set information:

```
switchport protocol vlan <VLAN ID list>
switchport protocol native vlan <VLAN ID>
```

To change information:

```
switchport protocol {vlan <VLAN ID list> | vlan add <VLAN ID list> | vlan remove <VLAN ID list> | native vlan <VLAN ID>}
```

To delete information:

```
no switchport protocol vlan
no switchport protocol native vlan
```

Input mode

```
(config-if)
```

Parameters

`vlan <VLAN-ID-list>`

Sets the currently-valid protocol VLANs on the port. When this parameter is changed, the effective protocol VLAN list is replaced by the list set for the parameter.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to specify <*VLAN ID list*> and the specifiable range of values, see *Specifiable values for parameters*.

`native vlan <VLAN ID>`

Sets a VLAN that sends and receives frames of a protocol that does not match the configuration. Specifiable VLANs are port VLANs.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   See *Specifiable values for parameters*.

`vlan add <VLAN ID list>`

Adds a currently-valid protocol VLAN on the port to the VLAN list.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to specify <*VLAN ID list*> and the specifiable range of values, see *Specifiable values for parameters*.

`vlan remove <VLAN ID list>`

Removes a currently-valid protocol VLAN on the port from the VLAN list.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

   For details about how to specify *<VLAN ID list>* and the specifiable range of values, see *Specifiable values for parameters*.

Default behavior

None. If a protocol port has been set by using the `switchport mode protocol` command and the `switchport protocol` command is omitted, the default VLAN is set.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If no currently-valid protocol VLANs are set, the port operates as an access port.
2. If multiple protocol VLANs are set for a protocol port, be careful that you do not duplicate the protocols for the protocol VLAN.

Related commands

switchport mode

vlan protocol-based

vlan-protocol

switchport trunk

Sets trunk port information.

Syntax

To set information:

```
switchport trunk allowed vlan <VLAN ID list>
switchport trunk native vlan <VLAN ID>
```

To change information:

```
switchport trunk native vlan <VLAN ID>
switchport trunk allowed vlan {<VLAN ID list> | add <VLAN ID list> | remove <VLAN ID list>}
```

To delete information:

```
no switchport trunk allowed vlan
no switchport trunk native vlan
```

Input mode

```
(config-if)
```

Parameters

`native vlan` *<VLAN ID>*

Sets the native VLAN (VLAN that sends and receives untagged frames). Specifiable VLANs are port VLANs. If the native VLAN is not set explicitly, the default VLAN becomes the native VLAN.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   See *Specifiable values for parameters*.

`allowed vlan` *<VLAN ID list>*

Sets the VLANs that use a trunk port for sending and receiving frames.

The frames of VLANs that have not been set are discarded.

To send and receive untagged frames, you must set the native VLAN. If you do not set the native VLAN to `allowed vlan`, untagged frames are discarded.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to specify *<VLAN ID list>* and the specifiable range of values, see *Specifiable values for parameters*.

`add` *<VLAN ID list>*

Adds a VLAN to the VLAN list that is set.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to specify *<VLAN ID list>* and the specifiable range of

values, see *Specifiable values for parameters*.

`remove <VLAN ID list>`

Removes a VLAN from the VLAN list that is set.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to specify *<VLAN ID list>* and the specifiable range of values, see *Specifiable values for parameters*.

Default behavior

None. If a trunk port has been set by using the `switchport mode trunk` command and the `switchport trunk` command is omitted, communication is impossible.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

If the applicable interface is set as a trunk port, you must set `allowed vlan`. If you do not set `allowed vlan`, no frames are sent or received through the applicable interface.

If untagged frames will also be sent and received, you must set the same VLAN ID for both of the following parameters:

- `allowed vlan`
- `native vlan`

If the ID is not set, the untagged frames on the applicable interface are discarded.

Related commands

switchport mode

vlan

vlan

Sets VLAN-related items.

Syntax

To set or change information:

`vlan` *<VLAN ID>*

`vlan` *<VLAN-ID-list>*

`vlan` *<VLAN ID>* `protocol-based`

`vlan` *<VLAN ID list>* `protocol-based`

`vlan` *<VLAN ID>* `mac-based`

`vlan` *<VLAN ID list>* `mac-based`

To delete information:

`no vlan` *<VLAN ID>*

`no vlan` *<VLAN ID list>*

Input mode

`(config)`

Parameters

<VLAN ID>

Sets the VLAN ID. When this command is entered, the mode switches to config-vlan mode.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   See *Specifiable values for parameters*. Note that the default VLAN (VLAN ID = 1) cannot be set when information is deleted.

<VLAN ID list>

Sets multiple VLAN-IDs at one time. If a VLAN ID that is being set for the first time is included, the applicable VLAN is created. When this command is entered, the mode switches to config-vlan mode.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to specify *<VLAN ID List>* and the specifiable values, see *Specifiable values for parameters*. Note that the default VLAN (VLAN ID = 1) cannot be set when information is deleted.

`protocol-based`

Set this parameter for protocol VLAN.

1. Default value when this parameter is omitted:

   The VLANs become port-based VLANs.

2. Note on using this parameter:

   - When configuring protocol VLANs, you must set `protocol-based`.

- You cannot specify this parameter for VLANs you have already created as port VLANs and MAC VLANs.

`mac-based`

Set this parameter for MAC VLANs.

1. Default value when this parameter is omitted:

   The VLANs become port-based VLANs.

2. Note on using this parameter:

   - When configuring MAC VLANs, you must set `mac-based`.

   - You cannot specify this parameter for VLANs you have already created as port VLANs and protocol VLANs.

Default behavior

No VLANs are configured.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. There is always a default VLAN (VLAN ID = 1). The configuration items for the default VLAN are different from those of other normal VLANs.
2. If you set a list by using *<VLAN ID list>*, you can configure multiple VLANs at one time. Note, however, that under some conditions (multi-command mode) lists cannot be set for some commands. For details, see the following table.

#	Command	Available in multi-command mode
1	state {suspend | active}	Y
2	name	N
3	protocol	Y
4	mac-address	N

Legend Y: Can be used; N: Cannot be used

3. The default VLAN setting (`VLAN ID=1`) always exists in the configuration file and cannot be deleted. The initial state of the default VLAN is for all ports to be available as access ports.
4. The table below explains parameter items that can be set for the default VLAN, and behavior specific to the default VLAN.

`vlan` command:

The following table applies to the `vlan` command.

#	Parameter	Whether specifiable by the user	Behavior specific to the default VLAN
1	*<VLAN ID>*	*F (fixed value)*	*Set when the Switch is started.* *Fixed at 1. Cannot be changed or deleted.*
2	*<VLAN ID list>*	F (fixed value)	--
3	protocol-based	N	Port VLAN
4	mac-based	N	Port VLAN

Legend F: Can be set as a fixed value; N: Cannot be set; --: Not applicable

`config-vlan` mode command:

The following table applies to the `config-vlan` mode command.

#	Command	Parameter	Whether specifiable by the user	Behavior specific to the default VLAN
1	state {suspend | active}	--	Y	--
2	name	*<string>*	Y	--
3	protocol	*<Protocol name>*	N	--
4	mac-address	*<MAC>*	N	--

Legend Y: Can be set; N: Cannot be set; --: Not applicable

5. When the `vlan` command is used to create a VLAN, information can be set for the VLAN interface by using the `interface vlan` command. For VLANs created by using the `vlan` command, use the `no interface vlan` command to delete information. For a VLAN created by using the `interface vlan` command, use the `no vlan` command to delete information.
6. If the automatic assignment of VLANs is specified by using the `no vlan` command, the VLAN automatically registered on the MAC port is deleted and authentication on the applicable terminal is canceled.

Related commands

None

vlan-protocol

Sets the protocol name and protocol value for a protocol VLAN.

Syntax

To set or change information:

`vlan-protocol` *<Protocol name>* `[ethertype` *<HEX enum>*`] [llc` *<HEX enum>*`] [snap-ethertype` *<HEX enum>*`]`

To delete information:

`no vlan-protocol` *<Protocol name>*

Input mode

`(config)`

Parameters

<Protocol name>

Sets the protocol name used for configuring the protocol VLAN.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a character string that is no more than 14 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

`ethertype` *<HEX enum>*

Sets the `ethertype` value for an Ethernet V2-format frame.

1. Default value when this parameter is omitted:

   None

2. Range of values:

   Four-digit hexadecimal

`llc` *<HEX enum>*

Sets the LLC value (DSAP, SSAP) of an 802.3-format frame.

1. Default value when this parameter is omitted:

   None

2. Range of values:

   Four-digit hexadecimal

`snap-ethertype` *<HEX enum>*

Sets the `ethertype` value for an 802.3-format frame.

1. Default value when this parameter is omitted:

   None

2. Range of values:

   Four-digit hexadecimal

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed. Note, however, that for protocols that have not been set by the `protocol` command for the protocol VLAN, the change is applied when the protocol name is set by the `protocol` command.

Notes

1. If a value smaller than 05ff is set for the `ethertype` value (four-digit hexadecimal), 0000 is set.
2. For *<HEX enum>*, one or more `ethertype` values (four-digit hexadecimal) can be set. When you specify multiple values, use a comma (`,`) as the delimiter.
3. `ethertype`, `llc`, and `snap-ethertype` can be entered in any order, but `ethertype`, `llc`, and `snap-ethertype` are displayed in this order for the `show running-config` operation command.
4. A maximum of 16 `ethertype` values can be specified on a single line.
5. The same protocol value cannot be specified multiple times on one line. (Example: `vlan-protocol xxx ethertype <HEX> llc<HEX> ethertype<HEX>`).
6. Protocol names set by the `protocol` command cannot be deleted.

Related commands

protocol

12. Spanning Tree Protocols

instance
name
revision
spanning-tree bpdufilter
spanning-tree bpduguard
spanning-tree cost
spanning-tree disable
spanning-tree guard
spanning-tree link-type
spanning-tree loopguard default
spanning-tree mode
spanning-tree mst configuration
spanning-tree mst cost
spanning-tree mst forward-time
spanning-tree mst hello-time
spanning-tree mst max-age
spanning-tree mst max-hops
spanning-tree mst port-priority
spanning-tree mst root priority
spanning-tree mst transmission-limit
spanning-tree pathcost method
spanning-tree port-priority
spanning-tree portfast
spanning-tree portfast bpduguard default
spanning-tree portfast default
spanning-tree single
spanning-tree single cost
spanning-tree single forward-time
spanning-tree single hello-time
spanning-tree single max-age
spanning-tree single mode
spanning-tree single pathcost method
spanning-tree single port-priority
spanning-tree single priority
spanning-tree single transmission-limit
spanning-tree vlan
spanning-tree vlan cost
spanning-tree vlan forward-time
spanning-tree vlan hello-time
spanning-tree vlan max-age

spanning-tree vlan mode
spanning-tree vlan pathcost method
spanning-tree vlan port-priority
spanning-tree vlan priority
spanning-tree vlan transmission-limit

instance

Sets VLANs belonging to Multiple Spanning Tree MST instances.

Syntax

To set or change information:

`instance` *<MSTI ID>* `vlans` *<VLAN ID list>*

To delete information:

`no instance` *<MSTI ID>*

Input mode

`(config-mst)`

Parameters

<MSTI ID>

Sets an MST instance ID.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 4095

`vlans` *<VLAN ID list>*

Sets VLANs belonging to MST instances. Either one VLAN ID or multiple VLAN IDs can be set at one time. For a multiple specification, use a hyphen (`-`) or a comma (`,`) to indicate the selection.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to set *<VLAN ID list>* and the specifiable values, see *Specifiable values for parameters*.

3. Note on using this parameter:

   - All VLANs that do not belong to other MST instances participate in MST instance ID0.

   - To configure the same MST region, the MST instance ID and the VLAN ID set by this parameter, as well as the values of the `name` parameter and the `revision` parameter, must match within the MST region.

Default behavior

All VLANs belong to MST instance ID0.

Impact on communication

When `mst` is set for the `spanning-tree mode` command, recalculation of the topology interrupts communication until the topology is formed.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. The `show` command does not display information about MST instance ID0.

Related commands

spanning-tree mst configuration

name

Sets a string to identify a Multiple Spanning Tree region.

Syntax

To set or change information:

```
name <Name>
```

To delete information:

```
no name
```

Input mode

```
(config-mst)
```

Parameters

<Name>

Sets the character string used to identify a region.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a character string that is no more than 32 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

3. Note on using this parameter:

   To configure the same MST region, the values for this parameter and the `revision` parameter, as well as those of the MST instance ID and the VLAN ID set by the `vlans` parameter, must match within the MST region.

Default behavior

`Null` is set for `name`.

Impact on communication

When `mst` is set for the `spanning-tree mode` command, recalculation of the topology interrupts communication until the topology is formed.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

spanning-tree mst configuration

revision

Sets revision numbers to identify Multiple Spanning Tree regions.

Syntax

To set or change information:

```
revision <Version>
```

To delete information:

```
no revision
```

Input mode

```
(config-mst)
```

Parameters

<Version>

Sets the revision number to identify a region.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 65535

3. Note on using this parameter:

   To configure the same MST region, the values for this parameter and the `name` parameter, as well as those of the MST instance ID and the VLAN ID set by the `vlans` parameter, must match within the MST region.

Default behavior

`revision` is set to 0.

Impact on communication

When `mst` is set for the `spanning-tree mode` command, recalculation of the topology interrupts communication until the topology is formed.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

spanning-tree mst configuration

spanning-tree bpdufilter

Sets the BPDU filter functionality for the applicable ports. This command is applied to the applicable ports of PVST+, Single Spanning Tree, and Multiple Spanning Tree.

Syntax

To set information:

```
spanning-tree bpdufilter enable
```

To delete information:

```
no spanning-tree bpdufilter
```

Input mode

```
(config-if)
```

Parameters

None

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. When this command is set, the BPDU guard functionality is not valid.

Related commands

None

spanning-tree bpduguard

Sets the BPDU guard functionality for the applicable ports. This command is applied to the applicable ports of PVST+, Single Spanning Tree, and Multiple Spanning Tree, and operates on ports on which the PortFast functionality has been set.

Syntax

To set or change information:

```
spanning-tree bpduguard { enable | disable }
```

To delete information:

```
no spanning-tree bpduguard
```

Input mode

```
(config-if)
```

Parameters

`{ enable | disable }`

Setting `enable` causes the BPDU guard functionality to take effect. Setting `disable` stops operation of the BPDU guard functionality.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   `enable` or `disable`

Default behavior

The setting of the `spanning-tree portfast bpduguard default` command is used.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

spanning-tree portfast default

spanning-tree portfast

spanning-tree portfast bpduguard default

spanning-tree cost

Sets the path cost of the applicable port. This command is applied to PVST+, Single Spanning Tree, and Multiple Spanning Tree.

Syntax

To set or change information:

```
spanning-tree cost <Cost>
```

To delete information:

```
no spanning-tree cost
```

Input mode

```
(config-if)
```

Parameters

<Cost>

Specifies the path cost value. The lower the *<cost>* value, the higher the possibility that the port will be used for forwarding the applicable frames.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   When `short` is set by the `spanning-tree pathcost method` command:

   1 to 65535

   When `long` is set by the `spanning-tree pathcost method` command:

   1 to 200000000

3. Note on using this parameter:

   Changing the path cost value might change the topology.

Default behavior

The method of applying the path cost is set by the `spanning-tree pathcost method` command.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. The value of this command is not applied if the `spanning-tree vlan cost` command, the `spanning-tree single cost` command, or the `spanning-tree mst cost` command is set.
2. The value of this command is not applied if the `spanning-tree vlan pathcost method` command or the `spanning-tree single pathcost method` command is set.

Related commands

spanning-tree pathcost method

spanning-tree vlan pathcost method

spanning-tree vlan cost

spanning-tree single pathcost method

spanning-tree single cost

spanning-tree mst cost

spanning-tree disable

Stops operation of the Spanning Tree functionality for PVST+, Single Spanning Tree, and Multiple Spanning Tree.

Syntax

To set information:

```
spanning-tree disable
```

To delete information:

```
no spanning-tree disable
```

Input mode

```
(config)
```

Parameters

None

Default behavior

The Spanning Tree Protocols are enabled.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

spanning-tree guard

Sets the guard functionality for the applicable ports. This command is applied to the applicable PVST+, Single Spanning Tree, and Multiple Spanning Tree.

Syntax

To set or change information:

```
spanning-tree guard { loop | none | root }
```

To delete information:

```
no spanning-tree guard
```

Input mode

```
(config-if)
```

Parameters

`{ loop | none | root }`

`loop`: The loop guard functionality is applied to the applicable ports. The loop guard functionality does not operate for Multiple Spanning Tree.

`none`: Stop operation of the loop guard functionality and root guard functionality for the applicable ports.

`root`:The root guard functionality is applied to the applicable ports.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   `loop`, `none`, or `root`

Default behavior

For the loop guard functionality: The setting of the `spanning-tree loopguard default` command is used.

For the root guard functionality: The command does not operate.

Impact on communication

None

When the change is applied

Loop guard setting:

- When the `spanning-tree portfast default` command or the `spanning-tree portfast` command is set, the loop guard setting is not applied.
- If the `spanning-tree portfast default` command and `spanning-tree portfast` command settings have been deleted, loop guard operation starts immediately.

Root guard setting:

- The change takes effect immediately after it is made.

Notes

1. When the `spanning-tree portfast default` command or the `spanning-tree portfast` command is set, the loop guard setting is not applied. Instead, the root

guard setting is applied.

Related commands

spanning-tree loopguard default

spanning-tree link-type

Sets the link type of the applicable port. This command is applied to the applicable ports of PVST+, Single Spanning Tree, and multiple-spanning-tree ports. If you want to change the high-speed topology when `rapid-pvst` or `mst` is set by the `spanning-tree mode` command, and `rapid-pvst` is set by the `spanning-tree vlan mode` command, the connection between bridges must be a point-to-point connection. If you want to change the high-speed topology when `rapid-stp` is set by the `spanning-tree single mode` command, the connection between bridges must be a point-to-point connection.

Syntax

To set or change information:

```
spanning-tree link-type { point-to-point | shared }
```

To delete information:

```
no spanning-tree link-type
```

Input mode

```
(config-if)
```

Parameters

```
{ point-to-point | shared }
```

If `point-to-point` is set, point-to-point connection is used for the link type. If `shared` is set, a shared connection is used for the link type.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   `point-to-point` or `shared`

Default behavior

`point-to-point` is used for a full-duplex port and `shared` is used for a half-duplex port.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. The automatic restoration functionality is enabled if `point-to-point` is set in STP compatibility mode. The automatic restoration functionality does not operate if `shared` is set in STP compatibility mode.

Related commands

spanning-tree mode

spanning-tree vlan mode

spanning-tree single mode

spanning-tree loopguard default

Sets the loop guard functionality that is used by default. This command is valid for PVST+ and Single Spanning Tree ports.

Syntax

To set information:

```
spanning-tree loopguard default
```

To delete information:

```
no spanning-tree loopguard default
```

Input mode

```
(config)
```

Parameters

None

Default behavior

If the `spanning-tree guard` command has been set, that setting is used.

If the `spanning-tree guard` command has not been set, the `spanning tree loopguard default` command does not operate.

Impact on communication

None

When the change is applied

- When the `spanning-tree portfast default` command or the `spanning-tree portfast` command is set, the loop guard setting is not applied.
- If the `spanning-tree portfast default` command and `spanning-tree portfast` command settings have been deleted, loop guard operation starts immediately.

Notes

1. When the `spanning-tree portfast default` command or the `spanning-tree portfast` command is set, the loop guard setting is not applied.

Related commands

spanning-tree guard

spanning-tree mode

The following explains settings for the Spanning Tree operating mode. This command is applied to PVST+ other than Single Spanning Tree, and to Multiple Spanning Tree. If the `spanning-tree vlan mode` command is set in a PVST+ operating mode, the settings for that command are used.

Syntax

To set or change information:

```
spanning-tree mode { pvst | rapid-pvst | mst }
```

To delete information:

```
no spanning-tree mode
```

Input mode

```
(config)
```

Parameters

`{ pvst | rapid-pvst | mst }`

Sets the protocol to be used. If the protocol is changed during Spanning Tree operation, the Spanning Tree Protocol is re-initialized. If `pvst` is set, PVST+ is applied to all Spanning Tree Protocols. If `rapid-pvst` is set, rapid PVST+ is applied to all Spanning Tree Protocols. If `mst` is set, Multiple Spanning Tree is applied to all Spanning Tree Protocols. For Single Spanning Tree, `pvst` or `rapid-pvst` must be set.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   `pvst`, `rapid-pvst`, or `mst`

Default behavior

The configuration is explicitly set to `spanning-tree mode pvst`.

Impact on communication

Communication stops until recalculation of the topology is complete.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

spanning-tree link-type

spanning-tree mst configuration

Switches to config-mst mode in which you can set the information necessary for defining Multiple Spanning Tree regions. If this setting is deleted, all previously-set information for defining regions is deleted.

Syntax

To set information:

```
spanning-tree mst configuration
```

To delete information:

```
no spanning-tree mst configuration
```

Input mode

```
(config)
```

Parameters

None

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

instance

name

revision

spanning-tree mst cost

Sets the path cost for the applicable Multiple Spanning Tree ports.

Syntax

To set or change information:

`spanning-tree mst` *<MSTI ID list>* `cost` *<Cost>*

To delete information:

`no spanning-tree mst` *<MSTI ID list>* `cost`

Input mode

`(config-if)`

Parameters

<MSTI ID list>

Sets an MST instance ID. One MST instance ID can be set. You can use a hyphen (`-`) or a comma (`,`) to set multiple MST instance IDs at one time.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 4095

<Cost>

Specifies the path cost value. The lower the *<Cost>* value, the higher the possibility that the port will be used for forwarding the applicable frames.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 200000000

3. Note on using this parameter:

   Changing the path cost value might change the topology.

Default behavior

The setting of the `spanning-tree cost` command is used.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

spanning-tree cost

spanning-tree mst forward-time

Sets the time required for Multiple Spanning Tree state transitions.

Syntax

To set or change information:

```
spanning-tree mst forward-time <Seconds>
```

To delete information:

```
no spanning-tree mst forward-time
```

Input mode

```
(config)
```

Parameters

<Seconds>

Specifies the time in seconds required for the state of a port to change.

For ports in stp-compatible mode, listening and learning states can be maintained for the specified period of time. If a port is not in stp-compatible mode, discarding and learning states are maintained for the specified period of time (note that this applies only when a timer causes a state transition).

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   4 to 30 (seconds)

Default behavior

The time required for the state of a port to change is set to 15 seconds.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

spanning-tree mst hello-time

Sets the interval for sending BPDUs in Multiple Spanning Tree.

Syntax

To set or change information:

```
spanning-tree mst hello-time <Hello time>
```

To delete information:

```
no spanning-tree mst hello-time
```

Input mode

```
(config)
```

Parameters

<Hello time>

Specifies the interval in seconds for sending BPDUs that are sent regularly from the Switch.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 10 (seconds)

3. Note on using this parameter:

   If you set 1 then this might result in a changeable topology.

Default behavior

2 seconds is set as the interval for sending BPDUs.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

spanning-tree mst max-age

Sets the maximum valid time of BPDUs that are sent via Multiple Spanning Tree.

Syntax

To set or change information:

```
spanning-tree mst max-age <Seconds>
```

To delete information:

```
no spanning-tree mst max-age
```

Input mode

```
(config)
```

Parameters

<Seconds>

Sets the maximum valid time in seconds for BPDUs that are sent from the Switch.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   6 to 40 (seconds)

3. Note on using this parameter:

   If you set a value less than 20, then this might result in a changeable topology.

Default behavior

The maximum valid time of BPDUs that can be sent from a Switch is set to 20 seconds.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

spanning-tree mst max-hops

Sets the maximum-number-of-hops count for BPDUs in Multiple Spanning Tree.

Syntax

To set or change information:

```
spanning-tree mst max-hops <Hop number>
spanning-tree mst <MSTI ID list> max-hops <Hop number>
```

To delete information:

```
no spanning-tree mst max-hops
no spanning-tree mst <MSTI ID list> max-hops
```

Input mode

```
(config)
```

Parameters

<MSTI ID list>

Sets an MST instance ID. One MST instance ID can be set. You can use a hyphen (-) or a comma (,) to set multiple MST instance IDs at one time.

1. Default value when this parameter is omitted:

   All MST instances are selected.

2. Range of values:

   0 to 4095

<Hop number>

Specifies the maximum-number-of-hops count for BPDUs forwarded by the Switch.

1. Default value when this parameter is omitted:

   20

2. Range of values:

   2 to 40

Default behavior

The maximum-number-of-hops count for BPDUs is set to 20.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

spanning-tree mst port-priority

Sets the priority of the applicable Multiple Spanning Tree ports for each MST instance.

Syntax

To set or change information:

`spanning-tree mst` *<MSTI ID list>* `port-priority` *<Priority>*

To delete information:

`no spanning-tree mst` *<MSTI ID list>* `port-priority`

Input mode

`(config-if)`

Parameters

<MSTI ID list>

Sets an MST instance ID. One MST instance ID can be set. You can use a hyphen (`-`) or a comma (`,`) to set multiple MST instance IDs at one time.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 4095

<Priority>

Sets the port priority. Use a multiple of 16 as the port priority. The lower the value, the higher the priority.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 240

3. Note on using this parameter:

   Changing the port priority might change the topology.

Default behavior

The setting of the `spanning-tree port-priority` command is used. If the `spanning-tree port-priority` command has not been set, the port priority is set to 128.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

spanning-tree port-priority

spanning-tree mst root priority

Sets the bridge priority for each MST instance in Multiple Spanning Tree.

Syntax

To set or change information:

```
spanning-tree mst <MSTI ID list> root priority <Priority>
```

To delete information:

```
no spanning-tree mst <MSTI ID list> root priority
```

Input mode

```
(config)
```

Parameters

<MSTI ID list>

Sets an MST instance ID. One MST instance ID can be set. You can use a hyphen (-) or a comma (,) to set multiple MST instance IDs at one time.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 4095

<Priority>

Sets the bridge priority. The lower the value, the higher the priority. Use a multiple of 4096 as the bridge priority.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 61440

3. Note on using this parameter:

   Changing the bridge priority might change the topology.

Default behavior

The bridge priority is set to 32768.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

spanning-tree mst transmission-limit

Sets the maximum number of BPDUs that can be sent during each hello-time interval for Multiple Spanning Tree.

Syntax

To set or change information:

```
spanning-tree mst transmission-limit <Counts>
```

To delete information:

```
no spanning-tree mst transmission-limit
```

Input mode

```
(config)
```

Parameters

<Counts>

Sets the maximum number of BPDUs that can be sent per `hello-time` interval.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 10

Default behavior

The maximum number of BPDUs that can be sent is set to 3.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

spanning-tree pathcost method

Sets whether to use 16-bit values or 32-bit values as the path cost of ports. This command is applied to PVST+ and Single Spanning Tree, but not to Multiple Spanning Tree.

When the `spanning-tree vlan pathcost method` command or the `spanning-tree single pathcost method` command is set, the value of the `spanning-tree pathcost method` command is not applied.

If setting of the `spanning-tree cost`, `spanning-tree vlan cost`, or `spanning-tree single cost` command is omitted, the following value is applied to the path cost according to the interface speed and the `spanning-tree pathcost method` command settings:

- When `short` is set by the `spanning-tree pathcost method` command:

  10Mbit/s: 100

  100 Mbit/s: 19

  1 Gbit/s: 4

- When `long` is set by the `spanning-tree pathcost method` command:

  10 Mbit/s: 2000000

  100 Mbit/s: 200000

  1 Gbit/s: 20000

Syntax

To set or change information:

```
spanning-tree pathcost method { long | short }
```

To delete information:

```
no spanning-tree pathcost method
```

Input mode

```
(config)
```

Parameters

`{ long | short }`

If `long` is set, a 32-bit value is used. If `short` is set, a 16-bit value is used.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   `long` or `short`

3. Note on using this parameter:

   - The default value of the path cost changes.

   - Changing the path cost value might change the topology.

   - If the path cost value is set to 65536 or larger, you cannot change the parameter to `short`.

Default behavior

`short` is set by path cost mode.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. When `mst` is set by the `spanning-tree mode` command, Multiple Spanning Tree operates using a 32-bit value. To set a value of 65536 or larger for the path cost using the `spanning-tree cost` command, you must set `long` for this command.

   You do not need to set this command before setting a path cost value using the `spanning-tree mst cost` command.

Related commands

spanning-tree cost

spanning-tree vlan pathcost method

spanning-tree vlan cost

spanning-tree single pathcost method

spanning-tree single cost

spanning-tree port-priority

Sets the port priority of the applicable ports. This command is applied to PVST+, Single Spanning Tree, and Multiple Spanning Tree.

Syntax

To set or change information:

```
spanning-tree port-priority <Priority>
```

To delete information:

```
no spanning-tree port-priority
```

Input mode

```
(config-if)
```

Parameters

<Priority>

Sets the port priority. Use a multiple of 16 as the port priority. The lower the value, the higher the priority.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 240

3. Note on using this parameter:

   Changing the port priority might change the topology.

Default behavior

The settings of the `spanning-tree vlan port-priority`, `spanning-tree single port-priority`, or `spanning-tree mst port-priority` command are used. If the command described here has not been set, the port priority is set to 128.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

spanning-tree vlan port-priority

spanning-tree single port-priority

spanning-tree mst port-priority

spanning-tree portfast

Sets the PortFast functionality for the applicable ports. This command is applied to the applicable ports of PVST+, Single Spanning Tree, and Multiple Spanning Tree.

Syntax

To set or change information:

```
spanning-tree portfast [{ trunk | disable }]
```

To delete information:

```
no spanning-tree portfast
```

Input mode

```
(config-if)
```

Parameters

`{ trunk | disable }`

If `trunk` is set, the PortFast functionality is applied to access, trunk, protocol, and MAC ports.

If `disable` is set, the PortFast functionality stops.

1. Default value when this parameter is omitted:

   The PortFast functionality, which is enabled on access, protocol, and MAC ports, is applied.

2. Range of values:

   `trunk` or `disable`

Default behavior

The setting of the `spanning-tree portfast default` command is used.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

spanning-tree portfast default

spanning-tree portfast bpduguard default

Sets the BPDU guard functionality to be used by default. This command is valid for all ports on which the PortFast functionality of PVST+, Single Spanning Tree, and Multiple Spanning Tree is set.

Syntax

To set information:

```
spanning-tree portfast bpduguard default
```

To delete information:

```
no spanning-tree portfast bpduguard default
```

Input mode

```
(config)
```

Parameters

None

Default behavior

If the `spanning-tree bpduguard` command is set, that setting is used. If the `spanning-tree bpduguard` command is not set, this command does not operate.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

spanning-tree portfast default

spanning-tree portfast

spanning-tree bpduguard

spanning-tree portfast default

Sets the PortFast functionality to be used by default. This command is valid on the access, protocol, and MAC ports of PVST+, Single Spanning Tree, and Multiple Spanning Tree.

Syntax

To set information:

```
spanning-tree portfast default
```

To delete information:

```
no spanning-tree portfast default
```

Input mode

```
(config)
```

Parameters

None

Default behavior

If the `spanning-tree portfast` command has been set, that setting is used. If the `spanning-tree portfast` command has not been set, the `spanning-tree portfast default` command does not operate.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

spanning-tree portfast

spanning-tree single

Starts calculation of the topology for Single Spanning Tree. If the Spanning Tree operating mode is PVST+, VLAN 1 is treated as Single Spanning Tree after this command is executed.

Syntax

To set information:

```
spanning-tree single
```

To delete information:

```
no spanning-tree single
```

Input mode

```
(config)
```

Parameters

None

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If VLAN 1 was subject to PVST+ before this command was executed, executing this command stops PVST+ for VLAN 1. Removing Single Spanning Tree causes PVST+ to be applied to VLAN 1. If the operating mode is Multiple Spanning Tree, Single Spanning Tree does not operate.

Related commands

spanning-tree mode

spanning-tree single cost

Sets the path cost for the applicable Single Spanning Tree ports.

Syntax

To set or change information:

```
spanning-tree single cost <Cost>
```

To delete information:

```
no spanning-tree single cost
```

Input mode

```
(config-if)
```

Parameters

<Cost>

Specifies the path cost value. The lower the *<Cost>* value, the higher the possibility that the port will be used for forwarding the applicable frames.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   When `short` is set by the `spanning-tree pathcost method` or the `spanning-tree single pathcost method` command:

   1 to 65535

   When `long` is set by the `spanning-tree pathcost method` or the `spanning-tree single pathcost method` command:

   1 to 200000000

3. Note on using this parameter:

   Changing the path cost value might change the topology.

Default behavior

The path cost is applied according to the setting of the `spanning-tree single pathcost method` command.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

spanning-tree cost

spanning-tree pathcost method

spanning-tree single pathcost method

spanning-tree single forward-time

Sets the time required for the state of Single Spanning Tree to change.

Syntax

To set or change information:

```
spanning-tree single forward-time <Seconds>
```

To delete information:

```
no spanning-tree single forward-time
```

Input mode

```
(config)
```

Parameters

<Seconds>

Specifies the time in seconds required for the state of a port to change.

If `stp` (802.1D) is set by the `spanning-tree single mode` command, the listening state and the learning state are maintained for the specified period of time. If `rapid-stp` (802.1w) is set by the `spanning-tree single mode` command, the discarding state and the learning state are maintained for the set period of time (note that this applies only when a timer causes the transition).

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   4 to 30 (seconds)

Default behavior

The time required for the state of a port to change is set to 15 seconds.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

spanning-tree single mode

spanning-tree single hello-time

Sets the interval for sending Single Spanning Tree BPDUs.

Syntax

To set or change information:

```
spanning-tree single hello-time <Hello time>
```

To delete information:

```
no spanning-tree single hello-time
```

Input mode

```
(config)
```

Parameters

<Hello time>

Specifies the interval in seconds for sending BPDUs that are sent regularly from the Switch.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 10 (seconds)

3. Note on using this parameter:

   If you set 1 then this might result in a changeable topology.

Default behavior

2 seconds is set as the interval for sending BPDUs.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

spanning-tree single max-age

Sets the maximum valid time of BPDUs that are sent via Single Spanning Tree.

Syntax

To set or change information:

```
spanning-tree single max-age <Seconds>
```

To delete information:

```
no spanning-tree single max-age
```

Input mode

```
(config)
```

Parameters

<Seconds>

Sets the maximum valid time in seconds for BPDUs that are sent from the Switch.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   6 to 40 (seconds)

3. Note on using this parameter:

   If you set a value less than 20, then this might result in a changeable topology.

Default behavior

The maximum valid time of BPDUs that can be sent from a Switch is set to 20 seconds.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

spanning-tree single mode

Sets the operating mode of Single Spanning Tree.

Syntax

To set or change information:

```
spanning-tree single mode { stp | rapid-stp }
```

To delete information:

```
no spanning-tree single mode
```

Input mode

```
(config)
```

Parameters

`{ stp | rapid-stp }`

Sets the protocol to be used. If the protocol is changed during Spanning Tree operation, the Spanning Tree Protocol is re-initialized. If `stp` is set, Spanning Tree mode is used. If `rapid-stp` is set, rapid Spanning Tree mode is used.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   `stp` or `rapid-stp`

Default behavior

`stp` is set for the Single Spanning Tree operating mode.

Impact on communication

If the `spanning-tree single` command is set, communications are interrupted until recalculation of the topology is complete.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

spanning-tree single pathcost method

Sets whether to use a 16-bit value or a 32-bit value as the path cost for Single Spanning Tree ports.

If the `spanning-tree single cost` command setting is omitted, the following values are applied to the path cost according to the interface speed and the setting of the `spanning-tree single pathcost method` command.

- If `short` is set by the `spanning-tree single pathcost method` command:

  10Mbit/s: 100

  100 Mbit/s: 19

  1 Gbit/s: 4

- If `long` is set by the `spanning-tree single pathcost method` command:

  10 Mbit/s: 2000000

  100 Mbit/s: 200000

  1 Gbit/s: 20000

Syntax

To set or change information:

```
spanning-tree single pathcost method { long | short }
```

To delete information:

```
no spanning-tree single pathcost method
```

Input mode

```
(config)
```

Parameters

```
{ long | short }
```

If `long` is set, a 32-bit value is used. If `short` is set, a 16-bit value is used.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   `long` or `short`

3. Note on using this parameter:

   - The default value of the path cost changes.

   - Changing the path cost value might change the topology.

   - When 65536 or a larger value is set for the path cost, you cannot change the parameter to `short`.

Default behavior

The setting of the `spanning-tree pathcost method` command is used.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

spanning-tree single port-priority

Sets the priority for applicable Single Spanning Tree ports.

Syntax

To set or change information:

```
spanning-tree single port-priority <Priority>
```

To delete information:

```
no spanning-tree single port-priority
```

Input mode

```
(config-if)
```

Parameters

<Priority>

Sets the port priority. Use a multiple of 16 as the port priority. The lower the value, the higher the priority.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 240

3. Note on using this parameter:

   Changing the port priority might change the topology.

Default behavior

The setting of the `spanning-tree port-priority` command is used. If the `spanning-tree port-priority` command has not been set, the port priority is set to 128.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

spanning-tree single priority

Sets the bridge priority for Single Spanning Tree.

Syntax

To set or change information:

```
spanning-tree single priority <Priority>
```

To delete information:

```
no spanning-tree single priority
```

Input mode

```
(config)
```

Parameters

<Priority>

Sets the bridge priority. The lower the value, the higher the priority. Use a multiple of 4096 as the bridge priority.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 61440

3. Note on using this parameter:

   Changing the bridge priority might change the topology.

Default behavior

The bridge priority is set to 32768.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

spanning-tree single transmission-limit

Sets the maximum number of BPDUs that can be sent during the hello-time interval for Single Spanning Tree.

Syntax

To set or change information:

```
spanning-tree single transmission-limit <Counts>
```

To delete information:

```
no spanning-tree single transmission-limit
```

Input mode

```
(config)
```

Parameters

<Counts>

Sets the maximum number of BPDUs that can be sent per `hello-time` interval.

This parameter is valid only when `rapid-stp` (802.1w) is set by the `spanning-tree single mode` command. If `stp` (802.1D) is set by the `spanning-tree single mode` command, the maximum number of BPDUs that can be sent per second is 3 (fixed) and the setting value of this command is ignored.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 10

Default behavior

The maximum number of BPDUs that can be sent is set to 3.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

spanning-tree single mode

spanning-tree single hello-time

spanning-tree vlan

Configures PVST+. If the `no spanning-tree vlan` command is set after the `spanning-tree single` command has been set, the applicable VLAN operates with Single Spanning Tree.

Syntax

To set or change information:

```
no spanning-tree vlan <VLAN ID list>
```

To delete information:

```
spanning-tree vlan <VLAN ID list>
```

Input mode

```
(config)
```

Parameters

<VLAN ID list>

Starts configuration of PVST+ for the set VLAN.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to set *<VLAN ID list>* and the specifiable values, see *Specifiable values for parameters*.

3. Note on using this command:

   If the `spanning-tree single` command has been set, VLAN1 does not operate in PVST+ mode.

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

vlan

spanning-tree vlan cost

Sets the path cost for the applicable PVST+ ports.

Syntax

To set or change information:

```
spanning-tree vlan <VLAN ID list> cost <Cost>
```

To delete information:

```
no spanning-tree vlan <VLAN ID list> cost
```

Input mode

```
(config-if)
```

Parameters

<VLAN ID list>

Starts configuration of PVST+ for the set VLAN.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to set *<VLAN ID list>* and the specifiable values, see *Specifiable values for parameters*.

<Cost>

Specifies the path cost value. The lower the *<Cost>* value, the higher the possibility that the port will be used for forwarding the applicable frames.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   If `short` is set for the `spanning-tree pathcost method` or the `spanning-tree vlan <VLAN ID list> pathcost method` command:

   1 to 65535

   If `long` is set for the `spanning-tree pathcost method` or the `spanning-tree vlan <VLAN ID list> pathcost method` command:

   1 to 200000000

3. Note on using this parameter:

   Changing the port priority might change the topology.

Default behavior

The method of applying the path cost is determined by the setting of the `spanning-tree vlan pathcost method` command.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

spanning-tree cost

spanning-tree pathcost method

spanning-tree vlan pathcost method

spanning-tree vlan forward-time

Sets the time required for PVST+ state transition.

Syntax

To set or change information:

```
spanning-tree vlan <VLAN ID list> forward-time <Seconds>
```

To delete information:

```
no spanning-tree vlan <VLAN ID list> forward-time
```

Input mode

```
(config)
```

Parameters

<VLAN ID list>

Starts configuration of PVST+ for the set VLAN.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to set *<VLAN ID list>* and the specifiable values, see *Specifiable values for parameters*.

<Seconds>

Specifies the time in seconds required for the state of a port to change.

If `pvst` (802.1D) is set for the `spanning-tree mode` command or the `spanning-tree vlan` *<VLAN ID list>* `mode` command, the listening state and the learning state are maintained for the set period of time.

If `rapid-pvst` (802.1w) is set for the `spanning-tree mode` command or the `spanning-tree vlan` *<VLAN ID list>* `mode` command, the discarding state and the learning state are maintained for the set period of time (note that this applies only when the timer causes the transition).

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   4 to 30 (seconds)

Default behavior

The time required for the state of a port to change is set to 15 seconds.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

spanning-tree mode

spanning-tree vlan mode

spanning-tree vlan hello-time

Sets the interval for sending PVST+ BPDUs.

Syntax

To set or change information:

```
spanning-tree vlan <VLAN ID list> hello-time <Hello time>
```

To delete information:

```
no spanning-tree vlan <VLAN ID list> hello-time
```

Input mode

```
(config)
```

Parameters

<VLAN ID list>

Starts configuration of PVST+ for the set VLAN.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to set *<VLAN ID list>* and the specifiable values, see *Specifiable values for parameters*.

<Hello time>

Specifies the interval in seconds for sending BPDUs that are sent regularly from the Switch.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 10 (seconds)

3. Note on using this parameter:

   If you set 1 then this might result in a changeable topology.

Default behavior

2 seconds is set as the interval for sending BPDUs.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

spanning-tree vlan max-age

Sets the maximum valid time of BPDUs that are sent via PVST+.

Syntax

To set or change information:

```
spanning-tree vlan <VLAN ID list> max-age <Seconds>
```

To delete information:

```
no spanning-tree vlan <VLAN ID list> max-age
```

Input mode

```
(config)
```

Parameters

<VLAN ID list>

Starts configuration of PVST+ for the set VLAN.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to set *<VLAN ID list>* and the specifiable values, see *Specifiable values for parameters*.

<Seconds>

Sets the maximum valid time in seconds for BPDUs that are sent from the Switch.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   6 to 40 (seconds)

3. Note on using this parameter:

   If you set a value less than 20, then this might result in a changeable topology.

Default behavior

The maximum valid time of BPDUs that can be sent from a Switch is set to 20 seconds.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

spanning-tree vlan mode

Sets the PVST+ operating mode.

Syntax

To set or change information:

```
spanning-tree vlan <VLAN ID list> mode { pvst | rapid-pvst }
```

To delete information:

```
no spanning-tree vlan <VLAN ID list> mode
```

Input mode

```
(config)
```

Parameters

<VLAN ID list>

Starts configuration of PVST+ for the set VLAN.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to set *<VLAN ID list>* and the specifiable values, see *Specifiable values for parameters*.

`{ pvst | rapid-pvst }`

Sets the protocol to be used. If the protocol is changed during Spanning Tree operation, the Spanning Tree Protocol is re-initialized. If `pvst` is set, PVST+ mode is used. If `rapid-pvst` is set, rapid PVST+ mode is used.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   `pvst` or `rapid-pvst`

Default behavior

The PVST+ operating mode is set by the `spanning-tree mode` command.

Impact on communication

If `pvst` or `rapid-pvst` has been set for the `spanning-tree mode` command, recalculation of the topology interrupts communication until the topology is formed.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

spanning-tree mode

spanning-tree vlan pathcost method

Sets whether to use a 16-bit value or a 32-bit value as the path cost for a PVST+ port.

If the `spanning-tree vlan cost` command setting is omitted, the following values are applied to the path cost according to the interface speed and the `spanning-tree vlan pathcost method` command settings:

- When `short` is set by the `spanning-tree vlan pathcost method` command:

  10Mbit/s: 100

  100 Mbit/s: 19

  1 Gbit/s: 4

- When `long` is set by the `spanning-tree vlan pathcost method` command:

  10 Mbit/s: 2000000

  100 Mbit/s: 200000

  1 Gbit/s: 20000

Syntax

To set or change information:

```
spanning-tree vlan <VLAN ID list> pathcost method { long | short }
```

To delete information:

```
no spanning-tree vlan <VLAN ID list> pathcost method
```

Input mode

```
(config)
```

Parameters

<VLAN ID list>

Starts configuration of PVST+ for the set VLAN.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to set *<VLAN ID list>* and the specifiable values, see *Specifiable values for parameters*.

`{ long | short }`

If `long` is set, a 32-bit value is used. If `short` is set, a 16-bit value is used.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   `long` or `short`

3. Note on using this parameter:

   - The default value of the path cost changes.

   - Changing the path cost value might change the topology.

   - When 65536 or a larger value is set for the path cost, you cannot change the parameter to `short`.

Default behavior

The setting of the `spanning-tree pathcost method` command is used.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

spanning-tree pathcost method

spanning-tree cost

spanning-tree vlan cost

spanning-tree vlan port-priority

Sets the priority for the applicable PVST+ ports.

Syntax

To set or change information:

```
spanning-tree vlan <VLAN ID list> port-priority <Priority>
```

To delete information:

```
no spanning-tree vlan <VLAN ID list> port-priority
```

Input mode

```
(config-if)
```

Parameters

<VLAN ID list>

Starts configuration of PVST+ for the set VLAN.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to set *<VLAN ID list>* and the specifiable values, see *Specifiable values for parameters*.

<Priority>

Sets the port priority. Use a multiple of 16 as the port priority. The lower the value, the higher the priority.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 240

3. Note on using this parameter:

   Changing the port priority might change the topology.

Default behavior

The setting of the `spanning-tree port-priority` command is used. If the `spanning-tree port-priority` command has not been set, the port priority is set to 128.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

spanning-tree port-priority

spanning-tree vlan priority

Sets the PVST+ bridge priority.

Syntax

To set or change information:

```
spanning-tree vlan <VLAN ID list> priority <Priority>
```

To delete information:

```
no spanning-tree vlan <VLAN ID list> priority
```

Input mode

```
(config)
```

Parameters

<VLAN ID list>

Starts configuration of PVST+ for the set VLAN.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to set *<VLAN ID list>* and the specifiable values, see *Specifiable values for parameters*.

<Priority>

Sets the bridge priority. The lower the value, the higher the priority.

Use a multiple of 4096 as the bridge priority.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 61440

3. Note on using this parameter:

   Changing the bridge priority might change the topology.

Default behavior

The bridge priority is set to 32768.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

spanning-tree vlan transmission-limit

Sets the maximum number of BPDUs that can be sent within the PVST+ hello-time interval.

Syntax

To set or change information:

```
spanning-tree vlan <VLAN ID list> transmission-limit <Counts>
```

To delete information:

```
no spanning-tree vlan <VLAN ID list> transmission-limit
```

Input mode

```
(config)
```

Parameters

<VLAN ID list>

Starts configuration of PVST+ for the set VLAN.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to set *<VLAN ID list>* and the specifiable values, see *Specifiable values for parameters*.

<Counts>

Sets the maximum number of BPDUs that can be sent per `hello-time` interval.

This parameter is effective only when `rapid-pvst` (802.1w) is set for the `spanning-tree mode` command or the `spanning-tree vlan` *<VLAN ID list>* `mode` command. When `pvst` (802.1D) is set for the `spanning-tree mode` command or the `spanning-tree vlan` *<VLAN ID list>* `mode` command, the maximum number of BPDUs that can be sent per second is 3 (fixed) and the setting value of this command is not referenced.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 10

Default behavior

The maximum number of BPDUs that can be sent is set to 3.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

spanning-tree mode

spanning-tree vlan mode

spanning-tree vlan hello-time

13. Ring Protocol

axrp
axrp vlan-mapping
axrp-ring-port
control-vlan
disable
forwarding-shift-time
mode
multi-fault-detection mode
multi-fault-detection vlan
name
vlan-group

axrp

Sets the ring ID. In addition, to set information necessary for the Ring Protocol functionality, switches to config-axrp mode. A maximum of 4 ring IDs can be set for a Switch.

If this setting is removed, the ring information that is already set for ring IDs is deleted.

Syntax

To set information:

```
axrp <Ring ID>
```

To delete information:

```
no axrp <Ring ID>
```

Input mode

```
(config)
```

Parameters

<Ring ID>

Sets the ring ID.

The same ring ID must be specified for all switches belonging to the same ring. Specify a unique ring ID for each different ring in a network.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 65535

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

axrp vlan-mapping

Sets the VLAN mapping to be applied to a VLAN group and also the VLANs that participate in VLAN mapping.

Syntax

To set information:

```
axrp vlan-mapping <Mapping ID> vlan <VLAN ID list>
```

To change information:

```
axrp vlan-mapping <Mapping ID> {vlan <VLAN ID list> | vlan add <VLAN ID list> | vlan remove <VLAN ID list>}
```

To delete information:

```
no axrp vlan-mapping <Mapping ID>
```

Input mode

```
(config)
```

Parameters

<Mapping ID>

Specifies the VLAN mapping ID.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 128

`vlan` *<VLAN-ID-list>*

Sets the VLANs that participate in VLAN mapping. When specifying multiple VLANs, you can specify a range.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to specify *<VLAN ID List>* and the specifiable range of values, see *Specifiable values for parameters*.

`vlan add` *<VLAN ID list>*

Specifies the VLANs to be added to the VLAN list you have configured.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to specify *<VLAN ID List>* and the specifiable range of values, see *Specifiable values for parameters*.

3. Handling of *<VLAN ID list>* after a change:

   If the VLAN list is too long after the addition of VLANs, the VLAN list might be divided into multiple lines and the configuration might be displayed as an `axrp vlan-mapping` command that consists of multiple lines. If the VLAN list is shorter after the addition of VLANs, an `axrp vlan-mapping` command that consisted of multiple lines might be consolidated and displayed as the configuration.

`vlan remove` *<VLAN ID list>*

Specifies the VLANs to be removed from the VLAN list you have configured.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to specify *<VLAN ID List>* and the specifiable range of values, see *Specifiable values for parameters*.

3. Handling of *<VLAN ID list>* after a change:

   If the VLAN list is too long after the removal of VLANs, the VLAN list might be divided into multiple lines and the configuration might be displayed as an `axrp vlan-mapping` command that consisted of multiple lines. If the VLAN list is shorter after the removal of VLANs, an `axrp vlan-mapping` command that consisted of multiple lines might be consolidated and displayed as the configuration.

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. You cannot specify multiple VLAN mappings for one VLAN.
2. You cannot specify a VLAN mapping for a VLAN that is used as the control VLAN.
3. You cannot specify a VLAN mapping for the multi-fault monitoring VLAN.

Related commands

vlan

axrp-ring-port

Sets an interface that operates as the ring port for the Ring Protocol. The interfaces that can be set are Ethernet interfaces and port channel interfaces.

Syntax

To set information:

```
axrp-ring-port <Ring ID> [shared]
```

To delete information:

```
no axrp-ring-port <Ring ID>
```

Input mode

```
(config-if)
```

Parameters

<Ring ID>

Sets the ring ID.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 65535

`shared`

When a Switch operates as a transit node on a shared link, this parameter specifies the ring port that will be the shared link.

Two ports must be specified to correspond with the ring ID.

1. Default value when this parameter is omitted:

   The interface operates as a standard ring port.

2. Range of values:

   None

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. Two ring ports can be specified as corresponding to one ring ID.
2. You cannot specify an Ethernet interface that is part of a channel group as a ring port. Conversely, an Ethernet interface that is specified as a ring port cannot be part of a channel group. Set the ring port as the port channel interface to which the applicable Ethernet interface belongs.

Related commands

axrp

control-vlan

Sets the VLAN to be used as a control VLAN. You can use the VLANs set by using this command to send and receive control frames that monitor the ring status.

Specifying the `forwarding-delay-time` parameter allows you to set the time required to change the status of the control VLAN to `Forwarding` during initial operation. You can therefore adjust the time required before starting to monitor the status of received flush control frames on the transit node, to ensure that flush control frames sent by the master node are received.

Syntax

To set information:

```
control-vlan <VLAN ID> [forwarding-delay-time <Seconds>]
```

To delete information:

```
no control-vlan
```

Input mode

```
(config-axrp)
```

Parameters

<VLAN ID>

Specifies the VLAN to be used as the control VLAN.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   See *Specifiable values for parameters*.

   Note that the default VLAN (VLAN ID = 1) cannot be specified for this command.

`forwarding-delay-time` *<Seconds>*

Sets the time (in seconds) required before the control VLAN switches to `Forwarding` when a Switch is started in transit node.

1. Default value when this parameter is omitted:

   The control VLAN transitions to `Forwarding` immediately after the ring port comes up.

2. Range of values:

   1 to 65535 (seconds)

3. Note on using this parameter:

   To delete only this parameter, set `control-vlan` again with this parameter omitted. This operation is used to delete parameters.

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. You cannot specify a VLAN that is used as a control VLAN by another ring ID.
2. You cannot specify a VLAN that is used in a VLAN group.
3. For the control VLAN, you cannot specify a VLAN that is being used by the multi-fault monitoring VLAN.
4. While the Ring Protocol is operating, if you change or delete the control VLAN, this functionality is temporarily disabled. As a result, a loop might occur depending on the network configuration (ring configuration) to which the functionality is applied. To avoid a loop, before entering this command, place the interface that is the ring port in the shutdown state.
5. `forwarding-delay-time` operates when the following occurs:
   - The Switch is started (includes execution of the `reload` or `ppupdate` operation command).

Related commands

vlan

disable

Disables the Ring Protocol functionality.

Syntax

To set information:

```
disable
```

To delete information:

```
no disable
```

Input mode

```
(config-axrp)
```

Parameters

None

Default behavior

The Ring Protocol functionality is enabled.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If this command is entered while the Ring Protocol is operating, the Ring Protocol functionality is disabled. In this case, a loop might occur depending on a network configuration (ring configuration) to which the Ring Protocol functionality is applied. To avoid a loop, before entering this command, place the interface that is the ring port in the shutdown state.

Related commands

None

forwarding-shift-time

Sets the reception hold time for flush control frames in transit node.

When the reception hold time passes, if no flush control frames are received, the status of a ring port changes from `Blocking` to `Forwarding`.

Syntax

To set information:

```
forwarding-shift-time {<Seconds> | infinity}
```

To delete information:

```
no forwarding-shift-time
```

Input mode

```
(config-axrp)
```

Parameters

`{<Seconds> | infinity}`

Specifies the hold time in seconds until a flush control frame is received.

If you set `infinity`, there is no limit on the hold time, and the status of the ring port on the transit node does not switch to `Forwarding` until a flush control frame is received.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 65535 (seconds) or `infinity`

Default behavior

10 seconds is used as the reception hold time for flush control frames.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If the sending interval for health check frames on the master node is longer than the reception hold time for flush control frames on the transit node, the status of the ring port on the transit node switches to `Forwarding` before the master node detects normal status. This could produce a temporary loop.

   Set the hold time value based on the interval at which health check frames are sent from the master node.

Related commands

None

mode

Sets the operating mode of the Switch used for the ring.

Syntax

To set information:

```
mode transit
```

To delete information:

```
no mode
```

Input mode

```
(config-axrp)
```

Parameters

`transit`

Operates as a transit node.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If you delete the mode while Ring Protocol is operating, the functionality is disabled. As a result, a loop might occur depending on the network configuration (ring configuration) to which the functionality is applied. To avoid a loop, before entering this command, place the interface that is the ring port in the shutdown state.

Related commands

None

multi-fault-detection mode

Sets the multi-fault monitoring mode for shared link monitoring rings.

Syntax

To set information:

```
multi-fault-detection mode transport-only
```

To delete information:

```
no multi-fault-detection mode
```

Input mode

```
(config-axrp)
```

Parameters

`transport-only`

Transfers multi-fault monitoring frames. Multi-fault monitoring is not performed.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

Default behavior

None

Impact on communication

None

When the change is applied:

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

multi-fault-detection vlan

Sets the VLAN for multi-fault monitoring. The VLAN specified by this command forwards control frames used for monitoring multiple faults.

Set this command for shared link monitoring rings in a multi-ring configuration with shared links.

Syntax

To set information:

```
multi-fault-detection vlan <vlan id>
```

To delete information:

```
no multi-fault-detection vlan
```

Input mode

```
(config-axrp)
```

Parameters

<vlan id>

Transfers multi-fault monitoring frames. Multi-fault monitoring is not performed.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   See *Specifiable values for parameters*. Note that the default VLAN (VLAN ID = 1) cannot be specified for this parameter.

Default behavior

None

Impact on communication

None

When the change is applied:

The change is applied immediately after setting values are changed.

Notes

1. You cannot specify a VLAN that is used as a multi-fault control VLAN by another ring ID.
2. For the multi-fault control VLAN, you cannot specify a VLAN that is used as a control VLAN.
3. You cannot specify a VLAN that is used in a VLAN mapping.

Related commands

None

name

Sets the name for identifying a ring.

Syntax

To set information:

```
name <Name>
```

To delete information:

```
no name
```

Input mode

```
(config-axrp)
```

Parameters

<Name>

Sets the name for identifying a ring.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a character string that has no more than 32 characters. For details about the characters that can be specified, see *Any character string* in *Specifiable values for parameters*.

Default behavior

`NULL` is set.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

vlan-group

Sets the VLAN group that will be used for the Ring Protocol and the mapping IDs of the VLANs participating in the VLAN group.

A maximum of two VLAN groups can be set for the ring.

Syntax

To set or change information:

```
vlan-group <Group ID> vlan-mapping <Mapping ID list>
```

To delete information:

```
no vlan-group <Group ID>
```

Input mode

```
(config-axrp)
```

Parameters

<Group ID>

Specifies the VLAN group ID that will be used for the Ring Protocol.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 2

`vlan-mapping` *<Mapping ID list>*

Specifies the mapping IDs of the VLANs participating in a VLAN group. One VLAN mapping ID can be set. Use hyphens (`-`) or commas (`,`) to specify multiple VLAN mapping IDs at the same time.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 128

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If the same VLAN mapping is assigned to VLAN groups in different rings, these rings cannot share the same port as a ring port. Note, however, that it is possible to specify the same ring port if the port is a shared link (ring port for which `shared` is set).

Related commands

axrp vlan-mapping

14. DHCP Snooping

ip arp inspection limit rate
ip arp inspection trust
ip arp inspection validate
ip arp inspection vlan
ip dhcp snooping
ip dhcp snooping database url
ip dhcp snooping database write-delay
ip dhcp snooping information option allow-untrusted
ip dhcp snooping limit rate
ip dhcp snooping trust
ip dhcp snooping verify mac-address
ip dhcp snooping vlan
ip source binding
ip verify source

ip arp inspection limit rate

Sets the ARP packet reception rate (the number of ARP packets that can be received per second) on the applicable port when the DHCP snooping functionality is enabled on a Switch. ARP packets in excess of this reception rate are discarded.

Syntax

To set or change information:

```
ip arp inspection limit rate <Packet/s>
```

To delete information:

```
no ip arp inspection limit rate
```

Input mode

```
(config-if)
```

Parameters

<Packet/s>

Specify the number of ARP packets that can be received per second.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 300 (packets/s)

Default behavior

The reception rate has no limit.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. When the `ip arp inspection trust` command is set on the port where the `ip arp inspection limit rate` command is set, the settings of the `ip arp inspection limit rate` command become invalid. As a result, there is no limit on the reception rate for ARP packets.
2. Values specified by using this command set the upper limit for the number of received packets, but do not guarantee operation with the specified value.

Related commands

ip dhcp snooping

ip arp inspection trust

Sets the applicable interface as a trusted port where no dynamic ARP inspection is performed when the DHCP snooping functionality is enabled on a Switch.

Syntax

To set information:

```
ip arp inspection trust
```

To delete information:

```
no ip arp inspection trust
```

Input mode

```
(config-if)
```

Parameters

None

Default behavior

Dynamic ARP inspection is performed.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. On an interface on which this command is set, even if the interface is accommodated in the VLAN where the dynamic ARP inspection functionality is enabled, the inspection is not performed.
2. The ARP packet reception rate of the interface on which this command is set has no limit.

Related commands

ip dhcp snooping

ip dhcp snooping vlan

ip arp inspection validate

Sets inspection items to be added to improve the accuracy of the dynamic ARP inspection when the dynamic ARP inspection functionality is enabled on a Switch.

Syntax

To set or change information:

```
ip arp inspection validate [src-mac] [dst-mac] [ip]
```

To delete information:

```
no ip arp inspection validate
```

Input mode

```
(config)
```

Parameters

`src-mac`

This inspection item checks if the source MAC address and the sender MAC address of received ARP packets are the same. This inspection is performed on both an ARP request and an ARP reply.

1. Default value when this parameter is omitted:

   The inspection that checks if the source MAC address and the sender MAC address of the received ARP packet are the same is not performed.

2. Range of values:

   None

`dst-mac`

This inspection item checks if the destination MAC address and the target MAC address of the received ARP packets are the same. This inspection is performed on an ARP reply.

1. Default value when this parameter is omitted:

   The inspection for checking if the destination MAC address and the target MAC address of the received ARP packet are the same is not performed.

2. Range of values:

   None

`ip`

This inspection item checks if the target IP address of the received ARP packet is within the following ranges.

- 1.0.0.0 to 126.255.255.255
- 128.0.0.0 to 223.255.255.255

This inspection is performed on an ARP reply.

1. Default value when this parameter is omitted:

   The target IP address of the received ARP packet is not checked.

2. Range of values:

   None

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. You cannot omit all of the parameters in this command. You must set at least one.

Related commands

ip dhcp snooping

ip dhcp snooping vlan

ip arp inspection vlan

ip arp inspection vlan

Sets the VLAN used for dynamic ARP inspection when the DHCP snooping functionality is enabled on a Switch.

Syntax

To set or change information:

```
ip arp inspection vlan { <VLAN ID list> | add <VLAN ID list> | remove <VLAN ID list > }
```

To delete information:

```
no ip arp inspection vlan
```

Input mode

```
(config)
```

Parameters

<VLAN ID list>

Sets the IDs of the VLANs used for dynamic ARP inspection.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to set *<VLAN ID list>* and the specifiable values, see *Specifiable values for parameters*.

`add` *<VLAN ID list>*

Adds the IDs of VLANs that will be used for the dynamic ARP inspection to the VLAN list.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to set *<VLAN ID list>* and the specifiable values, see *Specifiable values for parameters*.

`remove` *<VLAN ID list>*

Removes the IDs of the VLANs used for dynamic ARP inspection from the VLAN list.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to set *<VLAN ID list>* and the specifiable values, see *Specifiable values for parameters*.

Default behavior

The dynamic ARP inspection functionality is not used.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. Set a VLAN ID set by using the `ip dhcp snooping vlan` command.
2. If this command is set, the binding database entries registered by using the `ip source binding` command are also subject to dynamic ARP inspection.
3. If a VLAN set by this command is accommodated on a port set by using the `ip arp inspection trust` command, dynamic ARP inspection is not performed.

Related commands

ip dhcp snooping

ip dhcp snooping vlan

ip dhcp snooping

Enables the DHCP snooping functionality on a Switch.

Syntax

To set information:

```
ip dhcp snooping
```

To delete information:

```
no ip dhcp snooping
```

Input mode

```
(config)
```

Parameters

None

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

This command cannot be set if `dhcp-snooping` was not set when the `system function` command was set. (This command can be set if the `system function` command has not been set.) [AX1250S] [AX1240S]

Related commands

None

ip dhcp snooping database url

Specifies where a binding database is to be saved.

Syntax

To set or change information:

```
ip dhcp snooping database url { flash | mc <File name> }
```

To delete information:

```
no ip dhcp snooping database url
```

Input mode

```
(config)
```

Parameters

`flash`

The database is saved to internal flash memory.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   flash

`mc` *<File name>*

The database is saved to a memory card.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   <File name>: A maximum of 64 characters can be set.

   If directories are created on a memory card by using an operation command, a maximum of 64 characters, including the directory name, can be set.

   For details about the characters that can be specified, see *Specifiable values for parameters*.

Default behavior

The binding database is not saved.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. For the wait-to-write time set by using the `ip dhcp snooping database write-delay` command, any of the save events below causes the timer to start. When the timer expires, the binding database is saved.
   - A dynamic binding database is registered, updated, or deleted.
   - The `ip dhcp snooping database url` command is set (this includes changes

to the save destination).

- The `clear ip dhcp snooping binding` operation command is executed

If the Switch power is turned off before the timer expires, the binding database cannot be saved.

2. If the `no ip dhcp snooping database url` command is entered after the timer set by using the `ip dhcp snooping database write-delay` command has started, the binding database is not saved.

Related commands

ip dhcp snooping

ip dhcp snooping vlan

ip dhcp snooping database write-delay

Sets the wait-to-write time used when a binding database is saved.

Syntax

To set or change information:

```
ip dhcp snooping database write-delay <Seconds>
```

To delete information:

```
no ip dhcp snooping database write-delay
```

Input mode

```
(config)
```

Parameters

<Seconds>

Sets the wait-to-write time used when a binding database is saved.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1800 to 86400 (seconds)

Default behavior

When `ip dhcp snooping database url` is set, 1800 (seconds) is used.

Impact on communication

None

When the change is applied

The setting takes effect at the next save event after the setting value has been changed.

Notes

1. For the wait-to-write time set by using this command, any of the save events below causes the timer to start. When the timer expires, the binding database is saved.
   - A dynamic binding database is registered, updated, or deleted.
   - The `ip dhcp snooping database url` command is set (this includes changes to the save destination).
   - The `clear ip dhcp snooping binding` operation command is executed

   If the Switch power is turned off before the timer expires, the binding database cannot be saved.
2. If the `no ip dhcp snooping database url` command is entered after the timer set by using the `ip dhcp snooping database write-delay` command has started, the binding database is not saved.

Related commands

ip dhcp snooping

ip dhcp snooping database url

ip dhcp snooping database write-delay

ip dhcp snooping vlan

ip dhcp snooping information option allow-untrusted

Set this command to allow DHCP packets that have option [82] information to be received on an untrusted port. If this setting is omitted, DHCP packets that have option [82] information are discarded.

Syntax

To set information:

```
ip dhcp snooping information option allow-untrusted
```

To delete information:

```
no ip dhcp snooping information option allow-untrusted
```

Input mode

```
(config)
```

Parameters

None

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

ip dhcp snooping

ip dhcp snooping limit rate

Sets the DHCP packet reception rate (the number of DHCP packets that can be received per second) on the applicable port. DHCP packets exceeding the reception rate are discarded.

Syntax

To set or change information:

```
ip dhcp snooping limit rate <Packet/s>
```

To delete information:

```
no ip dhcp snooping limit rate
```

Input mode

```
(config-if)
```

Parameters

<Packet/s>

Specify the number of DHCP packets that can be received per second.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 300 (packets/s)

Default behavior

The reception rate has no limit.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. When the `ip dhcp snooping limit rate` command is set on the port where the `ip dhcp snooping trust` command is set, the settings of the `ip dhcp snooping limit rate` command become invalid. As a result, there is no limit on the reception rate for DHCP packets.
2. Values specified by using this command set the upper limit for the number of received packets, but do not guarantee operation with the specified value.

Related commands

ip dhcp snooping

ip dhcp snooping trust

Sets whether the interface is a trusted port or an untrusted port.

Syntax

To set information:

```
ip dhcp snooping trust
```

To delete information:

```
no ip dhcp snooping trust
```

Input mode

```
(config-if)
```

Parameters

None

Default behavior

The applicable interface operates as an untrusted port.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

On an interface on which this command is set, even if the interface is accommodated in the VLAN where DHCP snooping is enabled, the inspection of DHCP packets is not performed.

Related commands

ip dhcp snooping

ip dhcp snooping verify mac-address

Sets whether to check if the source MAC address of DHCP packets received from an untrusted port matches the client hardware addresses in the DHCP packet.

Syntax

To set information:

```
no ip dhcp snooping verify mac-address
```

To delete information:

```
ip dhcp snooping verify mac-address
```

Input mode

```
(config)
```

Parameters

None

Default behavior

The source MAC address and the client hardware address are checked to see if they match.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

If this command is not set, the DHCP relay agent cannot be connected to an untrusted port because the MAC address is checked. (If packets are received via a DHCP relay agent, the sender MAC address is changed.)

Related commands

ip dhcp snooping

ip dhcp snooping vlan

Enables DHCP snooping in a VLAN. DHCP snooping is disabled if it is not set by using this command. A maximum of 32 VLANs can be set with this command.

Syntax

To set or change information:

```
ip dhcp snooping vlan <VLAN ID list>
```

To delete information:

```
no ip dhcp snooping vlan <VLAN ID list>
```

Input mode

```
(config)
```

Parameters

<VLAN ID list>

Specify the IDs of VLANs on which DHCP snooping is to be enabled.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   See *Specifiable values for parameters*.

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

DHCP snooping is not valid in a VLAN in which this command has not been set.

Related commands

ip dhcp snooping

ip source binding

Sets static for the binding database.

Syntax

To set information:

`ip source binding` *<MAC>* `vlan` *<VLAN ID>* *<IP address>* `interface { gigabitethernet` *<IF#>* `| port-channel` *<Channel group#>* `}` [AX2200S]

`ip source binding` *<MAC>* `vlan` *<VLAN ID>* *<IP address>* `interface { fastethernet` *<IF#>* `| gigabitethernet` *<IF#>* `| port-channel` *<Channel group#>* `}` [AX1250S] [AX1240S]

To delete information:

`no ip source binding` *<MAC>* `vlan` *<VLAN ID>* *<IP address>* `interface {gigabitethernet` *<IF#>* `| port-channel` *<Channel group#>* `}` [AX2200S]

`no ip source binding` *<MAC>* `vlan` *<VLAN ID>* *<IP address>* `interface { fastethernet` *<IF#>* `| gigabitethernet` *<IF#>* `| port-channel` *<Channel group#>* `}` [AX1250S] [AX1240S]

Input mode

`(config)`

Parameters

<MAC>

Sets the MAC address of a terminal.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0000.0000.0000 to ffff.ffff.ffff

<VLAN ID>

Sets the ID of a VLAN to which the terminal is connected.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   See *Specifiable values for parameters*.

<IP address>

Sets the IP address of the terminal.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1.0.0.0 to 126.255.255.255, 128.0.0.0 to 223.255.255.255

`interface { gigabitethernet` *<IF#>* `| port-channel` *<Channel group#>* `}` [AX2200S]

`interface { fastethernet` *<IF#>* `| gigabitethernet` *<IF#>* `| port-channel` *<Channel group#>* `}` [AX1250S] [AX1240S]

Sets the number of the interface to which the terminal is connected.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

   See *Specifiable values for parameters*.

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

A maximum of 64 entries can be set. Note, however, that no entries can be set if, when entries are set, the number of binding database entries, including dynamic entries, exceeds the maximum number of entries.

Related commands

ip dhcp snooping

ip dhcp snooping vlan

ip verify source

Set this command to use the terminal filter based on the DHCP snooping binding database. (The terminal filter is functionality used to filter the packets of unregistered source IP and MAC addresses.)

Syntax

To set or change information:

```
ip verify source [{port-security | mac-only}]
```

To delete information:

```
no ip verify source
```

Input mode

```
(config-if)
```

Parameters

`{port-security | mac-only}`

Sets a terminal filter condition.

`port-security`

Applies the terminal filter to both the source IP and the source MAC addresses.

`mac-only`

Applies the terminal filter only to source MAC addresses.

1. Default value when this parameter is omitted:

   The terminal filter is applied only to source IP addresses.

2. Range of values:

   None

Default behavior

None

Impact on communication

If the terminal filter is applied, packets from the terminals that are not registered in the binding database are discarded regardless of the VLAN.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. The terminal filter functionality is disabled on trusted ports even if this command is set.
2. If this command is set when DHCP snooping is enabled, the terminal filter functionality is enabled even in a VLAN for which DHCP snooping is not valid.

Related commands

ip dhcp snooping

ip dhcp snooping vlan

ip dhcp snooping trust

ip source binding

15. IGMP Snooping

ip igmp snooping (global)
ip igmp snooping (interface)
ip igmp snooping mrouter
ip igmp snooping querier

ip igmp snooping (global)

When `no ip igmp snooping` is set, the Switch suppresses the IGMP snooping functionality.

Syntax

To set information:

```
no ip igmp snooping
```

To delete information:

```
ip igmp snooping
```

Input mode

```
(config)
```

Parameters

None

Default behavior

The IGMP snooping functionality is enabled on a Switch.

Impact on communication

The IGMP snooping functionality stops.

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

None

Related commands

None

ip igmp snooping (interface)

Enables the IGMP snooping functionality on a VLAN interface.

Syntax

To set information:

```
ip igmp snooping
```

To delete information:

```
no ip igmp snooping
```

Input mode

```
(config-if)
```

Parameters

None

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

This command cannot be set if `igmp-snooping` is not set when the `system function` command has been set. (This command can be set if the `system function` command has not been set.) [AX1250S] [AX1240S]

Related commands

None

ip igmp snooping mrouter

Sets a multicast router port for the VLAN interface.

Syntax

To set or change information:

`ip igmp snooping mrouter interface {gigabitethernet` *<IF#>* `| port-channel` *<Channel group#>*`}` [AX2200S]

`ip igmp snooping mrouter interface {fastethernet` *<IF#>* `| gigabitethernet` *<IF#>* `| port-channel` *<Channel group#>*`}` [AX1250S] [AX1240S]

To delete information:

`no ip igmp snooping mrouter interface {gigabitethernet` *<IF#>* `| port-channel` *<Channel group#>*`}` [AX2200S]

`no ip igmp snooping mrouter interface {fastethernet` *<IF#>* `| gigabitethernet` *<IF#>* `| port-channel` *<Channel group#>*`}` [AX1250S] [AX1240S]

Input mode

`(config-if)`

Parameters

`{gigabitethernet` *<IF#>* `| port-channel` *<Channel group#>*`}` [AX2200S]

`{fastethernet` *<IF#>* `| gigabitethernet` *<IF#>* `| port-channel` *<Channel group#>*`}` [AX1250S] [AX1240S]

Sets an interface for a multicast router port that has been set.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   <IF#>: Specify an interface port number belonging to the VLAN.

   <Channel group#>: Specify a channel group number belonging to the VLAN. For details about the specifiable values, see *Specifiable values for parameters*.

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

1. If `ip igmp snooping` is not set for the applicable interface, this functionality does not operate.
2. To connect a Switch to a multicast router port, enable the IGMP snooping functionality on the destination Switch.
3. If you specify a port number belonging to a port channel for a multicast router port, no

operation is performed.

Related commands

ip igmp snooping

ip igmp snooping querier

Enables the IGMP querier functionality on a VLAN interface.

Syntax

To set information:

```
ip igmp snooping querier
```

To delete information:

```
no ip igmp snooping querier
```

Input mode

```
(config-if)
```

Parameters

None

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

1. If `ip igmp snooping` is not set for the applicable interface or the IP address is not set, the querier functionality does not operate.

Related commands

ip igmp snooping

ip address

16. MLD Snooping

ipv6 mld snooping (global)
ipv6 mld snooping (interface)
ipv6 mld snooping source
ipv6 mld snooping mrouter
ipv6 mld snooping querier

ipv6 mld snooping (global)

When `no ipv6 mld snooping` is set, the Switch suppresses the MLD snooping functionality.

Syntax

To set information:

```
no ipv6 mld snooping
```

To delete information:

```
ipv6 mld snooping
```

Input mode

```
(config)
```

Parameters

None

Default behavior

Enables the MLD snooping functionality on a Switch.

Impact on communication

The MLD snooping functionality stops.

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

None

Related commands

None

ipv6 mld snooping (interface)

Enables the MLD snooping functionality on a VLAN interface.

Syntax

To set information:

```
ipv6 mld snooping
```

To delete information:

```
no ipv6 mld snooping
```

Input mode

```
(config-if)
```

Parameters

None

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

This command cannot be set iff `mld-snooping` was not set when the `system function` command was set. (This command can be set if the `system function` command has not been set.) [AX1250S] [AX1240S]

Related commands

None

ipv6 mld snooping source

Sets the source IPv6 address of the MLD snooping functionality to be used on a VLAN interface.

Syntax

To set or change information:

```
ipv6 mld snooping source <IPv6 address>
```

To delete information:

```
no ipv6 mld snooping source
```

Input mode

```
(config-if)
```

Parameters

<IPv6 address>

Sets the source IPv6 address for the MLD snooping functionality.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   The IPv6 link-local address is set in colon notation.

Default behavior

The MLD querier functionality does not operate.

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

1. If `ipv6 mld snooping` or the `ipv6 mld snooping source` command is not set for the applicable interface, the MLD querier functionality does not operate.
2. This command cannot be set iff multiple interfaces (interface range) are set.
3. Specify the IPv6 link-local address. If the IPv6 global address is specified, a Switch might not operate as a system.

Related commands

ipv6 mld snooping

ipv6 mld snooping querier

ipv6 mld snooping mrouter

Sets a multicast router port for the VLAN interface.

Syntax

To set or change information:

`ipv6 mld snooping mrouter interface {gigabitethernet <IF#> | port-channel <Channel group#>}` [AX2200S]

`ipv6 mld snooping mrouter interface {fastethernet <IF#> | gigabitethernet <IF#> | port-channel <Channel group#>}` [AX1250S] [AX1240S]

To delete information:

`no ipv6 mld snooping mrouter interface {gigabitethernet <IF#> | port-channel <Channel group#>}` [AX2200S]

`no ipv6 mld snooping mrouter interface {fastethernet <IF#> | gigabitethernet <IF#> | port-channel <Channel group#>}` [AX1250S] [AX1240S]

Input mode

`(config-if)`

Parameters

`{gigabitethernet <IF#> | port-channel <Channel group#>}` [AX2200S]

`{fastethernet <IF#> | gigabitethernet <IF#> | port-channel <Channel group#>}` [AX1250S] [AX1240S]

Sets an interface for a multicast router port that has been set.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   <IF#>: Specify an interface port number belonging to the VLAN.

   <Channel group#>: Specify a channel group number belonging to the VLAN. For details about the specifiable values, see *Specifiable values for parameters*.

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

1. If `ipv6 mld snooping` is not set for the applicable interface, this functionality does not operate.
2. To connect a Switch to a multicast router port, enable the MLD snooping functionality on the destination Switch.

3. If you specify a port number belonging to a port channel for a multicast router port, no operation is performed.

Related commands

ipv6 mld snooping

ipv6 mld snooping querier

Enables the MLD querier functionality on a VLAN interface.

Syntax

To set information:

```
ipv6 mld snooping querier
```

To delete information:

```
no ipv6 mld snooping querier
```

Input mode

```
(config-if)
```

Parameters

None

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

1. If `ipv6 mld snooping` is not set for the applicable interface or the source IPv6 address of the MLD Query message is not set, the MLD querier functionality does not operate.

Related commands

ipv6 mld snooping

ipv6 mld snooping source

17. IPv4, ARP, and ICMP

ip address
ip route
ip mtu

ip address

Sets the local IPv4 address.

Syntax

To set or change information:

```
ip address <IP address> <Subnet-Mask>
```

To delete information:

```
no ip address <IP address>
```

Input mode

```
(config-if)
```

Parameters

<IP address>

Sets the local IPv4 address.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1.0.0.0 to 126.255.255.255, 128.0.0.0 to 223.255.255.255

<Subnet-Mask>

Sets the subnet mask.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Subnet mask: 128.0.0.0 to 255.255.255.252 (bits must be contiguous)

Default behavior

None

Impact on communication

If an interface that is up is changed by using this command, it first goes down and then comes up again.

Accordingly, the following might occur:

- If communication is in progress on the applicable interface, it stops.
- Dynamic ARP entries generated for the applicable interface are deleted.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. `127.*.*.*` cannot be set as an IPv4 address.

Related commands

interface vlan

ip route

Sets a static route IPv4 address.

Syntax

To set or change information:

```
ip route <IP address> <Mask> <Next hop>
```

To delete information:

```
no ip route <IP address> <Mask> <Next hop>
```

Input mode

```
(config)
```

Parameters

<IP address>

Sets the destination IPv4 address for a static route.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0.0.0.0 to 255.255.255.255

<Mask>

Sets the network mask for the destination IPv4 address for the static route.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Subnet mask: 0.0.0.0 to 255.255.255.255 (bits must be contiguous)

<Next hop>

Sets the next hop address on the static route.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1.0.0.0 to 126.255.255.255, 128.0.0.0 to 223.255.255.255

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

ip mtu

Sets the send IP MTU length for an interface.

Syntax

To set or change information:

```
ip mtu <Length>
```

To delete information:

```
no ip mtu
```

Input mode

```
(config-if)
```

Parameters

<Length>

Sets the send IP MTU length for an interface. In actuality, the frame length set in port MTU information and this parameter value are compared, and the smaller value is used as the IP MTU length of the interface.

For the frame length set in the port MTU information, see *mtu* .

To check the IP MTU length that is being used, use the `show ip interface` operation command.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   128 to 9216 (bytes)

Default behavior

The frame length (bytes) set in the port MTU information is used as the IP MTU length.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. The IP MTU length for Ethernet is set by comparing the frame length set in the port MTU information with the IP MTU value. Therefore, to set a value larger than 1500 for the IP MTU length, check the `ip mtu` settings as well as the `mtu` settings in the port MTU information.

Related commands

interface vlan

mtu

18. Flow Detection Mode

flow detection mode

flow detection mode

Sets the flow detection mode for the filtering and QoS functionality.

This command changes the allocation pattern for the maximum number of entries in a hardware table.

By changing the allocation pattern according to the operating mode, you can concentrate hardware resources on the necessary tables for use.

This command is used to set the basic operating conditions for hardware. If you want to change the allocation pattern, you must delete the `ip access-group`, `mac access-group`, `ip qos-flow-group`, and `mac qos-flow-group` commands if they have been set.

Accordingly, you must set this command during the first step of actual operation. We recommend that you do not make any changes during operation.

If you do not set this command or if the information has been deleted, `layer2-2` returns to its default state.

Syntax

To set or change information:

```
flow detection mode {layer2-1 | layer2-2}
```

To delete information:

```
no flow detection mode
```

Input mode

```
(config)
```

Parameters

`{layer2-1 | layer2-2}`

Sets the flow detection mode.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

The following table describes the commands applicable to the flow detection modes.

Table 18-1 Commands applicable to flow detection mode

Flow detection mode	**Applicable command**	
	mac	**ip**
	access-group	**access-group**
	qos-flow-group	**qos-flow-group**
Layer 2-1	Y	N
Layer 2-2	N	Y

Legend Y: Can be set; N: Cannot be set

For details about the flow detection modes, see *1.1.3 Flow detection modes* in the *Configuration Guide Vol.2* and *3.1.1 Flow detection modes* in the *Configuration Guide Vol.2*.

Default behavior

Flow detection operates as Layer 2-2 flow detection.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

ip access-group

mac access-group

ip qos-flow-group

mac qos-flow-group

flow detection mode

19. Access Lists

Names that can be specified
deny (ip access-list extended)
deny (ip access-list standard)
deny (mac access-list extended)
ip access-group
ip access-list extended
ip access-list resequence
ip access-list standard
mac access-group
mac access-list extended
mac access-list resequence
permit (ip access-list extended)
permit (ip access-list standard)
permit (mac access-list extended)
remark

Names that can be specified

Protocol names (IPv4)

The following table lists the names that can be specified as IPv4 protocol names.

Table 19-1 Protocol names that can be specified (IPv4)

Protocol name	Applicable protocol number
ah	51
esp	50
gre	47
icmp	1
igmp	2
ip	All IP protocols
ipinip	4
ospf	89
pcp	108
pim	103
sctp	132
tcp	6
tunnel	41
udp	17
vrrp	112

Port names (TCP)

The following table lists the port names that can be specified for TCP.

Table 19-2 Port names that can be specified for TCP

Port name	Applicable port name and number
bgp	Border Gateway Protocol version 4 (179)
chargen	Character generator (19)
daytime	Daytime (13)
discard	Discard (9)
domain	Domain Name System (53)

Port name	Applicable port name and number
echo	Echo (7)
exec	Remote process execution (512)
finger	Finger (79)
ftp	File Transfer Protocol (21)
ftp-data	FTP data connections (20)
gopher	Gopher (70)
hostname	NIC Host Name Server (101)
http	HyperText Transfer Protocol (80)
https	HTTP over TLS/SSL (443)
ident	Ident Protocol (113)
imap3	Interactive Mail Access Protocol version 3 (220)
irc	Internet Relay Chat (194)
klogin	Kerberos login (543)
kshell	Kerberos shell (544)
ldap	Lightweight Directory Access Protocol (389)
login	Remote login (513)
lpd	Printer service (515)
nntp	Network News Transfer Protocol (119)
pop2	Post Office Protocol v2 (109)
pop3	Post Office Protocol v3 (110)
pop3s	POP3 over TLS/SSL (995)
raw	Printer PDL Data Stream (9100)
shell	Remote commands (514)
smtp	Simple Mail Transfer Protocol (25)
smtps	SMTP over TLS/SSL (465)
ssh	Secure Shell Remote Login Protocol (22)
sunrpc	Sun Remote Procedure Call (111)
tacacs+	Terminal Access Controller Access Control System Plus (49)

Port name	Applicable port name and number
tacacs-ds	TACACS-Database Service (65)
talk	like tenex link (517)
telnet	Telnet (23)
time	Time (37)
uucp	Unix-to-Unix Copy Program (540)
whois	Nicname (43)

Port names (UDP)

The following table lists the port names that can be specified for UDP.

Table 19-3 Port names that can be specified for UDP (IPv4)

Port name	Applicable port name and number
biff	Biff (512)
bootpc	Bootstrap Protocol (BOOTP) client (68)
bootps	Bootstrap Protocol (BOOTP) server (67)
discard	Discard (9)
domain	Domain Name System (53)
echo	Echo (7)
isakmp	Internet Security Association and Key Management Protocol (500)
mobile-ip	Mobile IP registration (434)
nameserver	Host Name Server (42)
ntp	Network Time Protocol (123)
radius	Remote Authentication Dial In User Service (1812)
radius-acct	RADIUS Accounting (1813)
rip	Routing Information Protocol (520)
snmp	Simple Network Management Protocol (161)
snmptrap	SNMP Traps (162)
sunrpc	Sun Remote Procedure Call (111)
syslog	System Logger (514)
tacacs+	Terminal Access Controller Access Control System Plus (49)

Port name	Applicable port name and number
tacacs-ds	TACACS-Database Service (65)
talk	like tenex link (517)
tftp	Trivial File Transfer Protocol (69)
time	Time server protocol (37)
who	Who service (513)
xdmcp	X Display Manager Control Protocol (177)

TOS name

The following table lists the TOS names that can be specified.

Table 19-4 TOS names that can be specified

TOS name	TOS value
max-reliability	2
max-throughput	4
min-delay	8
min-monetary-cost	1
normal	0

Precedence name

The following table lists the precedence names that can be specified.

Table 19-5 Precedence names that can be specified

Precedence name	Precedence value
critical	5
flash	3
flash-override	4
immediate	2
internet	6
network	7
priority	1
routine	0

DSCP name

The following table lists the DSCP names that can be specified.

Table 19-6 DSCP names that can be specified

DSCP name	DSCP value
af11	10
af12	12
af13	14
af21	18
af22	20
af23	22
af31	26
af32	28
af33	30
af41	34
af42	36
af43	38
cs1	8
cs2	16
cs3	24
cs4	32
cs5	40
cs6	48
cs7	56
default	0
ef	46

Ethernet type name

The following table lists the Ethernet type names that can be specified.

Table 19-7 Ethernet type names that can be specified

Ethernet type name	Ethernet value	Remarks
appletalk	0x809b	
arp	0x0806	
eapol	0x888e	
gsrp	--#	Filters GSRP control packets.
ipv4	0x0800	
ipv6	0x86dd	
ipx	0x8137	
xns	0x0600	

#: The value is not made public.

Destination MAC address names

The following table lists the destination MAC address names that can be specified.

Table 19-8 Destination MAC address names that can be specified

Destination address specification	Destination address	Destination address mask
bpdu	0180.C200.0000	0000.0000.0000
cdp	0100.0CCC.CCCC	0000.0000.0000
lacp	0180.C200.0002	0000.0000.0000
lldp	0100.8758.1310	0000.0000.0000
oadp	0100.4C79.FD1B	0000.0000.0000
pvst-plus-bpdu	0100.0CCC.CCCD	0000.0000.0000

deny (ip access-list extended)

Specifies the conditions by which the IPv4 packet filter denies access.

Syntax

To set or change information:

- When upper-layer protocols are other than TCP and UDP

  `[<Seq>] deny {ip | <Protocol> | icmp | igmp } {<Src IPv4> <Src IPv4 wildcard> | host <Src IPv4> | any} {<Dst IPv4> <Dst IPv4 wildcard> | host <Dst IPv4> | any} [{[tos <TOS>] [precedence <Precedence>] | dscp <DSCP>}] [vlan <VLAN ID>] [user-priority <Priority>]`

- When the upper-layer protocol is TCP

  `[<Seq>] deny tcp {<Src IPv4> <Src IPv4 wildcard> | host <Src IPv4> | any}[eq <Src port>] {<Dst IPv4> <Dst IPv4 wildcard> | host <Dst IPv4> | any} [eq <Dst port> ] [ack] [fin] [psh] [rst] [syn] [urg] [{[tos <TOS>] [precedence <Precedence>] | dscp <DSCP>}] [vlan <VLAN ID>] [user-priority <Priority>]`

- When the upper-layer protocol is UDP

  `[<Seq>] deny udp {<Src IPv4> <Src IPv4 wildcard> | host <Src IPv4> | any}[eq <Src port>] {<Dst IPv4> <Dst IPv4 wildcard> | host <Dst IPv4> | any} [eq <Dst port>] [{[tos <TOS>] [precedence <Precedence>] | dscp <DSCP>}] [vlan <VLAN ID>] [user-priority <Priority>]`

To delete information:

`no <Seq>`

Input mode

`(config-ext-nacl)`

Parameters

<Seq>

Specifies the sequence in which filter conditions are applied.

1. Default value when this parameter is omitted:

   10 is set as the initial value if there are no conditions in the access list.

   If conditions have been set, the initial value is the maximum value for the application sequence that has been set plus 10.

   Note, however, that if the maximum value for the application sequence is greater than 4294967285, the value cannot be omitted.

2. Range of values:

   Specify 1 to 4294967295 in decimal.

`{ip | <Protocol> | icmp | igmp | tcp | udp}`

Specifies the upper-layer protocol condition for IPv4 packets.

Note that if all protocols are applicable, specify `ip`.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   - *<Protocol>*:

Set 0 to 255 (in decimal) or a protocol name.

See *Table 19-1 Protocol names that can be specified (IPv4)*.

`{`*<Src IPv4>* *<Src IPv4 wildcard>* `|` `host` *<Src IPv4>* `|` `any}`

Specifies the source IPv4 address.

To specify all source IPv4 addresses, specify `any`.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify *<Src IPv4>* *<Src IPv4 wildcard>*, `host` *<Src IPv4>*, or `any`.

   - *<Src IPv4>* *<Src IPv4 wildcard>* specification:

     Specify the source IPv4 address for *<Src IPv4>*.

     For *<Src IPv4 wildcard>*, specify a wildcard in IPv4 address format that sets bits that permit an arbitrary value in an IPv4 address.

   - `host` *<Src IPv4>* specification:

     The filter condition is a perfect match of *<Src IPv4>*.

   - `any` specification:

     The source IPv4 address is not included as a filter condition.

   IPv4 address (*nnn*.*nnn*.*nnn*.*nnn*): 0.0.0.0 to 255.255.255.255

`eq` *<Src Port>*

Specifies a source port number.

This parameter option is available only when the protocol is TCP or UDP.

1. Default value when this parameter is omitted:

   None. (The parameter is not set as a detection condition.)

2. Range of values:

   Specify 0 to 65535 (in decimal) or a port name.

   For details about the port names that can be specified, see *Table 19-2 Port names that can be specified for TCP* and *Table 19-3 Port names that can be specified for UDP (IPv4)*.

`{`*<Dst IPv4>* *<Dst IPv4 wildcard>* `|` `host` *<Dst IPv4>* `|` `any}`

Specifies the destination IPv4 address.

To specify all destination IPv4 addresses, specify `any`.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify *<Dst IPv4>* *<Dst IPv4 wildcard>*, `host` *<Dst IPv4>*, or `any`.

   - *<Dst IPv4>* *<Dst IPv4 wildcard>* specification:

     Specify the destination IPv4 address for *<Dst IPv4>*.

     For *<Dst IPv4 wildcard>*, specify a wildcard in IPv4 address format that sets bits that permit an arbitrary value in an IPv4 address.

   - `host` *<Dst IPv4>* specification:

     The filter condition is a perfect match of *<Dst IPv4>*.

   - `any` specification:

The destination IPv4 address is not included as a filter condition.

IPv4 address (*nnn*.*nnn*.*nnn*.*nnn*): 0.0.0.0 to 255.255.255.255

`eq` *<Dst Port>*

Specifies the destination port number.

This parameter option is available only when the protocol is TCP or UDP.

1. Default value when this parameter is omitted:

   None. (The parameter is not set as a detection condition.)

2. Range of values:

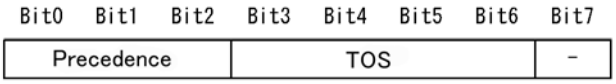
   Specify 0 to 65535 (in decimal) or a port name.

   For details about the port names that can be specified, see *Table 19-2 Port names that can be specified for TCP* and *Table 19-3 Port names that can be specified for UDP (IPv4)*.

`tos` *<TOS>*

Specifies 4 bits (bits 3 to 6) in the TOS field as the TOS value.

The TOS value is compared with 4 bits (bits 3 to 6) in the TOS field of the received packet.



1. Default value when this parameter is omitted:

   None. (The parameter is not set as a detection condition.)

2. Range of values:

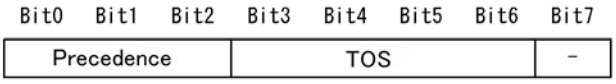
   Specify 0 to 15 (in decimal) or a TOS name.

   For details about the TOS names that can be specified, see *Table 19-4 TOS names that can be specified*.

`precedence` *<Precedence>*

Specifies the Precedence value, which is the first 3 bits in the TOS field.

The value is compared with the first three bits in the TOS field of the received packet.



1. Default value when this parameter is omitted:

   None. (The parameter is not set as a detection condition.)

2. Range of values:

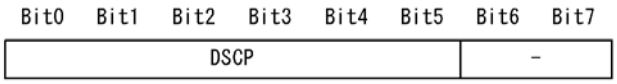
   Specify 0 to 7 (in decimal) or the Precedence name.

   For details about the Precedence names that can be specified, see *Table 19-5 Precedence names that can be specified*.

`dscp` *<DSCP>*

Specifies the DSCP value, which is the first six bits in the TOS field.

The value is compared with the first six bits in the TOS field of the received packet.



1. Default value when this parameter is omitted:

   None. (The parameter is not set as a detection condition.)

2. Range of values:

   Specify 0 to 63 (in decimal) or the DSCP name.

   For details about the DSCP names that can be specified, see *Table 19-6 DSCP names that can be specified*.

`ack`

Specifies the detection of packets whose ACK flag in the TCP header is 1.

This parameter option is available only when the protocol is TCP.

1. Default value when this parameter is omitted:

   None. (The parameter is not set as a detection condition.)

2. Range of values:

   None

`fin`

Specifies the detection of packets whose FIN flag in the TCP header is 1.

This parameter option is available only when the protocol is TCP.

1. Default value when this parameter is omitted:

   None. (The parameter is not set as a detection condition.)

2. Range of values:

   None

`psh`

Specifies the detection of packets whose PSH flag in the TCP header is 1.

This parameter option is available only when the protocol is TCP.

1. Default value when this parameter is omitted:

   None. (The parameter is not set as a detection condition.)

2. Range of values:

   None

`rst`

Specifies the detection of packets whose RST flag in the TCP header is 1.

This parameter option is available only when the protocol is TCP.

1. Default value when this parameter is omitted:

   None. (The parameter is not set as a detection condition.)

2. Range of values:

   None

`syn`

Specifies the detection of packets whose SYN flag in the TCP header is 1.

This parameter option is available only when the protocol is TCP.

1. Default value when this parameter is omitted:

None. (The parameter is not set as a detection condition.)

2. Range of values:

None

`urg`

Specifies the detection of packets whose URG flag in the TCP header is 1.

This parameter option is available only when the protocol is TCP.

1. Default value when this parameter is omitted:

None. (The parameter is not set as a detection condition.)

2. Range of values:

None

`vlan` *<VLAN ID>*

Specifies a VLAN ID.

This parameter has an effect only when it is applied to an Ethernet interface.

1. Default value when this parameter is omitted:

None. (The parameter is not set as a detection condition.)

2. Range of values:

See *Specifiable values for parameters*.

`user-priority` *<Priority>*

Specifies the user priority.

1. Default value when this parameter is omitted:

None. (The parameter is not set as a detection condition.)

2. Range of values:

Specify 0 to 7 in decimal.

Default behavior

None

Impact on communication

If any entry is added when an access list with no entries set is being applied to an interface, the IP packets received on the applicable interface are discarded temporarily until the entry is applied to the interface.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. When `255.255.255.255` is entered for the source address wildcard and the destination address wildcard, `any` is displayed.
2. If *nnn.nnn.nnn.nnn* `0.0.0.0` is entered as the source address and the destination address, `host` *nnn.nnn.nnn.nnn* is displayed.
3. `tos`, `precedence`, and `dscp` cannot be set at the same time.

Related commands

ip access-group

ip access-list resequence

permit (ip access-list extended)

remark

deny (ip access-list standard)

Specifies the conditions by which the IPv4 address filter denies access.

Syntax

To set or change information:

`[<Seq>] deny {<Src IPv4> [<Src IPv4 wildcard>] | host <Src IPv4> | any}`

To delete information:

`no <Seq>`

Input mode

`(config-std-nacl)`

Parameters

<Seq>

Specifies the sequence in which filter conditions are applied.

1. Default value when this parameter is omitted:

   10 is set as the initial value if there are no conditions in the access list.

   If conditions have been set, the initial value is the maximum value for the application sequence that has been set plus 10.

   Note, however, that if the maximum value for the application sequence is greater than 4294967285, the value cannot be omitted.

2. Range of values:

   Specify 1 to 4294967295 in decimal.

`{<Src IPv4> [<Src IPv4 wildcard>] | host <Src IPv4> | any}`

Specify an IPv4 address.

To specify all IPv4 addresses, specify `any`.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify *<Src IPv4>* [*<Src IPv4 wildcard>*], `host` *<Src IPv4>*, or `any`.

   - *<Src IPv4>* [*<Src IPv4 wildcard>*] specification:

     Specify the IPv4 address for *<Src IPv4>*.

   - For [*<Src IPv4 wildcard>*], specify a wildcard in IPv4 address format that sets bits that permit an arbitrary value in an IPv4 address. If omitted, the filter condition is a perfect match of *<Src IPv4>*. `host` *<Src IPv4>* specification:

     The filter condition is a perfect match of *<Src IPv4>*.

   - `any` specification:

     The IPv4 address is not included as a filter condition.

   IPv4 address (*nnn.nnn.nnn.nnn*): 0.0.0.0 to 255.255.255.255

Default behavior

None

Impact on communication

If any entry is added when an access list with no entries set is being applied to an interface, the IP packets received on the applicable interface are discarded temporarily until the entry is applied to the interface.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. When `255.255.255.255` is entered as the address wildcard, `any` is displayed.
2. When *nnn.nnn.nnn.nnn* `0.0.0.0` is entered as the address, `host` *nnn.nnn.nnn.nnn* is displayed.

Related commands

ip access-group

ip access-list resequence

permit (ip access-list standard)

remark

deny (mac access-list extended)

Specifies the conditions by which the MAC filter denies access.

Syntax

To set or change information:

`[<Seq>] deny {<Src MAC> <Src MAC mask> | host <Src MAC> | any} {<Dst MAC> <Dst MAC mask> | host <Dst MAC> | any | bpdu | cdp | lacp | lldp | oadp | pvst-plus-bpdu } [<Ethernet type>] [vlan <VLAN ID>] [user-priority <Priority>]`

To delete information:

`no <Seq>`

Input mode

`(config-ext-macl)`

Parameters

<Seq>

Specifies the sequence in which filter conditions are applied.

1. Default value when this parameter is omitted:

   10 is set as the initial value if there are no conditions in the access list.

   If conditions have been set, the initial value is the maximum value for the application sequence that has been set plus 10.

   Note, however, that if the maximum value for the application sequence is greater than 4294967285, the value cannot be omitted.

2. Range of values:

   Specify 1 to 4294967295 in decimal.

`{<Src MAC> <Src MAC mask> | host <Src MAC> | any}`

Specifies the source MAC address.

To specify all source MAC addresses, specify `any`.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify *<Src MAC> <Src MAC mask>*, `host` *<Src MAC>*, or `any`.

   - *<Src MAC> <Src MAC mask>* specification:

     Specify the source MAC address for *<Src MAC>*.

   - For *<Src MAC mask>*, specify a mask in MAC address format that sets bits that permit an arbitrary value in the MAC address. `host` *<Src MAC>* specification:

     The filter condition is a perfect match of *<Src MAC>*.

   - `any` specification:

     The source MAC address is not included as a filter condition.

   MAC address (*nnnn.nnnn.nnnn*): 0000.0000.0000 to ffff.ffff.ffff (hexadecimal)

`{`*<Dst MAC>* *<Dst MAC mask>* `|` `host` *<Dst MAC>* `|` `any` `|` `bpdu` `|` `cdp` `|` `lacp` `|` `lldp` `|` `oadp` `|` `pvst-plus-bpdu}`

Specifies the destination MAC address.

To specify all destination MAC addresses, specify `any`.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify *<Dst MAC>* *<Dst MAC mask>*, `host` *<Dst MAC>*, `any`, `bpdu, cdp, lacp, lldp, oadp,` or `pvst-plus-bpdu`.

   - *<Dst MAC>* *<Dst MAC mask>* specification:

     Specify the destination MAC address for *<Dst MAC>*.

   - For *<Dst MAC mask>*, specify a mask in MAC address format that sets bits that permit an arbitrary value in the MAC address.

   - `host` *<Dst MAC>* specification:

     The filter condition is a perfect match with *<Dst MAC>*.

   - `any` specification:

     The destination MAC address is not included as a filter condition.

   - bpdu specification:

     Sets BPDU control packets as a filter condition.

   - cdp specification:

     Sets CDP control packets as a filter condition.

   - lacp specification:

     Sets LACP control packets as a filter condition.

   - lldp specification:

     Sets LLDP control packets as a filter condition.

   - oadp specification:

     Sets OADP control packets as a filter condition.

     pvst-plus-bpdu specification:

     Sets PVST+ control packets as a filter condition.

   MAC address (*nnnn.nnnn.nnnn*): 0000.0000.0000 to ffff.ffff.ffff (hexadecimal)

<Ethernet type>

Specifies the Ethernet type number or the Ethernet type name.

1. Default value when this parameter is omitted:

   None. (The parameter is not set as a detection condition.)

2. Range of values:

   Specify 0x0000 to 0xffff (hexadecimal) or the Ethernet type name.

   For details about the Ethernet type names that can be specified, see *Table 19-7 Ethernet type names that can be specified*.

`vlan` *<VLAN ID>*

Specifies a VLAN ID.

This parameter has an effect only when it is applied to an Ethernet interface.

1. Default value when this parameter is omitted:

None. (The parameter is not set as a detection condition.)

2. Range of values:

   See *Specifiable values for parameters*.

`user-priority` *<Priority>*

Specifies the user priority.

1. Default value when this parameter is omitted:

   None. (The parameter is not set as a detection condition.)

2. Range of values:

   Specify 0 to 7 in decimal.

Default behavior

None

Impact on communication

If any entry is added when an access list with no entries set is being applied to an interface, all packets received on the applicable interface are discarded temporarily until the entry is applied to the interface.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If *nnnn.nnnn.nnnn* `ffff.ffff.ffff` is entered as the source address and the destination address, `any` is displayed.
2. If a protocol name is set for the destination address or if the address of a protocol name that can be set is set, the protocol name is displayed. For details about the address of a protocol name that can be specified as the destination address, see *Table 19-8 Destination MAC address names that can be specified*. If *nnnn.nnnn.nnnn* `0000.0000.0000` is entered as the source address and the destination address in cases other than the above, `host` *nnnn.nnnn.nnnn* is displayed.

Related commands

mac access-group

mac access-list resequence

permit (mac access-list extended)

remark

ip access-group

Applies an IPv4 access list to an Ethernet interface or a VLAN interface, and enables the IPv4 filtering functionality.

Syntax

To set information:

```
ip access-group <ACL ID> in
```

To delete information:

```
no ip access-group <ACL ID> in
```

Input mode

```
(config-if)
```

Parameters

<ACL ID>

Specifies the identifier of the IPv4 address filter or the IPv4 packet filter that is to be set.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify an access list name that is 3 to 31 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

`in`

Specifies `Inbound`.

`in`: Inbound (Specifies the receiving side)

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

Default behavior

None

Impact on communication

When an access list with at least one entry is applied to an interface, IP packets received at the interface are discarded temporarily until the entry is applied to the interface.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. This command cannot be set if `filter` is not set when the `system function` command has been set. (This command can be set if the `system function` command has not been set.) [AX1250S] [AX1240S]
2. One IPv4 filter can be set for one interface. A maximum of 128 filters can be applied to an Ethernet interface or a VLAN interface. If a filter has already been set, first

remove it and then set it again.

3. If you specify a non-existent IPv4 filter, this will be ignored. The identifier of the IPv4 filter is registered.

4. The following table shows receiving-side flow detection mode that can be set for each interface.

Table 19-9 Specifiable interfaces for each receiving-side flow detection mode (IPv4)

Flow detection mode	**Whether the mode can be set**	
	Ethernet	**VLAN**
Layer 2-1	N	N
Layer 2-2	Y	Y

Legend Y: Can be set; N: Cannot be set

5. When IPv4 packet filtering is applied to an Ethernet interface, the flow detection mode can be set if a VLAN parameter exists as a flow detection condition and the VLAN ID is included in the Ethernet interface settings.

6. When IPv4 packet filtering is applied to a VLAN interface, the flow detection mode can be set if no VLAN parameters are included as a flow detection condition.

7. Some packets are not subject to filtering. For details, see *1. Filters* in the *Configuration Guide Vol. 2*.

Related commands

ip access-list standard

ip access-list extended

ip access-list extended

Configures an access list to serve as an IPv4 filter. There are two types of access lists that operate as IPv4 filters. One type is an IPv4 address filter and the other type is an IPv4 packet filter.

This command sets an IPv4 packet filter.

An IPv4 packet filter filters based on source IPv4 address, destination IPv4 address, VLAN ID, user priority, TOS field value, port number, and TCP flag.

Multiple filter conditions can be set by using a single access list ID. For Ethernet and VLAN interfaces, a maximum of 127 filter conditions can be set. For a Switch, a maximum of 512 access lists (for IPv4 and MAC) can be created. A maximum of 1024 filter condition entries can be created.

Syntax

To set or change information:

```
ip access-list extended <ACL ID>
```

To delete information:

```
no ip access-list extended <ACL ID>
```

Input mode

```
(config)
```

Parameters

<ACL ID>

Specifies the identifier of the IPv4 packet filter that is to be set.

The Switch enters config-ext-nacl mode.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify an access list name that is 3 to 31 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

You cannot specify IPv4 address filter names and MAC access list names that have already been created.

Related commands

ip access-group

ip access-list resequence

Re-sequences the sequence numbers that determine the order in which the IPv4 address filter and IPv4 packet filter apply filter conditions.

Syntax

To set or change information:

```
ip access-list resequence <ACL ID> [<Starting seq> [<Increment seq>]]
```

Input mode

```
(config)
```

Parameters

<ACL ID>

Specifies the identifier of the IPv4 address filter or the IPv4 packet filter that is to be set.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify an access list name that is 3 to 31 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

<Starting seq>

Specifies the starting sequence number.

1. Default value when this parameter is omitted:

   The initial value is 10.

2. Range of values:

   Specify 1 to 4294967295 in decimal.

<Increment seq>

Specifies the increment value for the sequence.

1. Default value when this parameter is omitted:

   The initial value is 10.

2. Range of values:

   Specify 1 to 100 in decimal.

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

ip access-list standard

ip access-list extended

ip access-list standard

Configures an access list to serve as an IPv4 filter. There are two types of access lists that operate as IPv4 filters. One type is an IPv4 address filter and the other type is an IPv4 packet filter.

This command sets an IPv4 address filter.

An IPv4 address filter filters packets based on IPv4 address.

Multiple filter conditions can be set by using a single access list ID. For Ethernet and VLAN interfaces, a maximum of 127 filter conditions can be set. For a Switch, a maximum of 512 access lists (for IPv4 and MAC) can be created. A maximum of 1024 filter condition entries can be created.

Syntax

To set or change information:

```
ip access-list standard <ACL ID>
```

To delete information:

```
no ip access-list standard <ACL ID>
```

Input mode

```
(config)
```

Parameters

<ACL ID>

Specifies the identifier of the IPv4 address filter that is to be set.

The Switch enters config-std-nacl mode.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify an access list name that is 3 to 31 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

You cannot specify IPv4 address filter names and MAC access list names that have already been created.

Related commands

ip access-group

ip access-list resequence

mac access-group

Applies a MAC access list to an Ethernet interface or a VLAN interface and enables the MAC filtering functionality.

Syntax

To set information:

```
mac access-group <ACL ID> in
```

To delete information:

```
no mac access-group <ACL ID> in
```

Input mode

```
(config-if)
```

Parameters

<ACL ID>

Specifies the identifier of the MAC filter that is to be set.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify an access list name that is 3 to 31 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

`in`

Specifies `Inbound`.

`in`: Inbound (Specifies the receiving side)

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

Default behavior

None

Impact on communication

When an access list with at least one entry is applied to an interface, all packets received at the interface are discarded temporarily until the entry is applied to the interface.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. This command cannot be set if `filter` is not set when the `system function` command has been set. (This command can be set if the `system function` command has not been set.) [AX1250S] [AX1240S]
2. One MAC filter can be set for one interface. A maximum of 128 filters can be applied to an Ethernet interface or a VLAN interface. If a filter has already been set, first remove it and then set it again.

3. If you specify a non-existent MAC filter, this will be ignored. The identifier of a MAC access list is registered.
4. The following table shows the flow detection mode that can be set for each interface.

Table 19-10 Specifiable interfaces for each flow detection mode (MAC)

Flow detection mode	**Whether the mode can be set**	
	Ethernet	**VLAN**
Layer 2-1	Y	Y
Layer 2-2	N	N

Legend Y: Can be set; N: Cannot be set

5. When a MAC filter is applied to an Ethernet interface, the flow detection mode can be set if a VLAN parameter exists as a flow detection condition and the VLAN ID is included in the Ethernet interface settings.
6. When a MAC filter is applied to a VLAN interface, the flow detection mode can be set if no VLAN parameters are included as a flow detection condition.
7. Some packets are not subject to filtering. For details, see *1. Filters* in the *Configuration Guide Vol. 2*.

Related commands

mac access-list extended

mac access-list extended

Sets an access list to be used in a MAC filter. An access list used for a MAC filter filters packets based on source MAC address, destination MAC address, Ethernet type number, VLAN ID, and user priority.

Multiple filter conditions can be set by using a single access list ID. For Ethernet and VLAN interfaces, a maximum of 127 filter conditions can be set. For a Switch, a maximum of 512 access lists (for IPv4 and MAC) can be created. A maximum of 1024 filter condition entries can be created.

Syntax

To set or change information:

```
mac access-list extended <ACL ID>
```

To delete information:

```
no mac access-list extended <ACL ID>
```

Input mode

```
(config)
```

Parameters

<ACL ID>

Specifies the identifier of the MAC filter that is to be set. The Switch enters config-ext-macl mode.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify an access list name that is 3 to 31 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

You cannot specify IPv4 packet filter names and IPv4 address filter names that have already been created.

Related commands

mac access-group

mac access-list resequence

deny (mac access-list extended)

permit (mac access-list extended)

mac access-list extended

remark

mac access-list resequence

Re-sequences the sequence numbers that determine the order in which the MAC filter applies filter conditions.

Syntax

To set or change information:

```
mac access-list resequence <ACL ID> [<Starting Seq> [<Increment Seq>]]
```

Input mode

```
(config)
```

Parameters

<ACL ID>

Specifies the identifier of the MAC filter that is to be set.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify an access list name that is 3 to 31 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

<Starting-Seq>

Specifies the starting sequence number.

1. Default value when this parameter is omitted:

   The initial value is 10.

2. Range of values:

   Specify 1 to 4294967295 (in decimal).

<Increment-Seq>

Specifies the increment value for the sequence.

1. Default value when this parameter is omitted:

   The initial value is 10.

2. Range of values:

   Specify 1 to 100 in decimal.

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

mac access-list extended

permit (ip access-list extended)

Specifies the conditions by which the IPv4 packet filter permits access.

Syntax

To set or change information:

- When upper-layer protocols are other than TCP and UDP

  `[<Seq>] permit {ip | <Protocol> | icmp | igmp } {<Src IPv4> <Src IPv4 wildcard> | host <Src IPv4> | any} {<Dst IPv4> <Dst IPv4 wildcard> | host <Dst IPv4> | any} [{[tos <TOS>] [precedence <Precedence>] | dscp <DSCP>}] [vlan <VLAN ID>] [user-priority <Priority>]`

- When the upper-layer protocol is TCP

  `[<Seq>] permit tcp {<Src IPv4> <Src IPv4 wildcard> | host <Src IPv4> | any}[eq <Src port>] {<Dst IPv4> <Dst IPv4 wildcard> | host <Dst IPv4> | any} [eq <Dst port>] [ack] [fin] [psh] [rst] [syn] [urg] [{[tos <TOS>] [precedence <Precedence>] | dscp <DSCP>}] [vlan <VLAN ID>] [user-priority <Priority>]`

- When the upper-layer protocol is UDP

  `[<Seq>] permit udp {<Src IPv4> <Src IPv4 wildcard> | host <Src IPv4> | any}[eq <Src port>] {<Dst IPv4> <Dst IPv4 wildcard> | host <Dst IPv4> | any} [eq <Dst port>] [{[tos <TOS>] [precedence <Precedence>] | dscp <DSCP>}] [vlan <VLAN ID>] [user-priority <Priority>]`

To delete information:

`no <Seq>`

Input mode

`(config-ext-nacl)`

Parameters

<Seq>

Specifies the sequence in which filter conditions are applied.

1. Default value when this parameter is omitted:

   10 is set as the initial value if there are no conditions in the access list.

   If conditions have been set, the initial value is the maximum value for the application sequence that has been set plus 10.

   Note, however, that if the maximum value for the application sequence is greater than 4294967285, the value cannot be omitted.

2. Range of values:

   Specify 1 to 4294967295 in decimal.

`{ip | <Protocol> | icmp | igmp | tcp | udp}`

Specifies the upper-layer protocol condition for IPv4 packets.

Note that if all protocols are applicable, specify `ip`.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   - *<Protocol>*:

Set 0 to 255 (in decimal) or a protocol name.

See *Table 19-1 Protocol names that can be specified (IPv4)*.

`{<Src IPv4> <Src IPv4 wildcard> | host <Src IPv4> | any}`

Specifies the source IPv4 address.

To specify all source IPv4 addresses, specify `any`.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify *<Src IPv4> <Src IPv4 wildcard>*, `host` *<Src IPv4>*, or `any`.

   - *<Src IPv4> <Src IPv4 wildcard>* specification:

     Specify the source IPv4 address for *<Src IPv4>*.

     For *<Src IPv4 wildcard>*, specify a wildcard in IPv4 address format that sets bits that permit an arbitrary value in an IPv4 address.

   - `host` *<Src IPv4>* specification:

     The filter condition is a perfect match of *<Src IPv4>*.

   - `any` specification:

     The source IPv4 address is not included as a filter condition.

   IPv4 address (*nnn.nnn.nnn.nnn*): 0.0.0.0 to 255.255.255.255

`eq` *<Src Port>*

Specifies a source port number.

This parameter option is available only when the protocol is TCP or UDP.

1. Default value when this parameter is omitted:

   None. (The parameter is not set as a detection condition.)

2. Range of values:

   Specify 0 to 65535 (in decimal) or a port name.

   For details about the port names that can be specified, see *Table 19-2 Port names that can be specified for TCP* and *Table 19-3 Port names that can be specified for UDP (IPv4)*.

`{<Dst IPv4> <Dst IPv4 wildcard> | host <Dst IPv4> | any}`

Specifies the destination IPv4 address.

To specify all destination IPv4 addresses, specify `any`.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify *<Dst IPv4> <Dst IPv4 wildcard>*, `host` *<Dst IPv4>*, or `any`.

   - *<Dst IPv4> <Dst IPv4 wildcard>* specification:

     Specify the destination IPv4 address for *<Dst IPv4>*.

     For *<Dst IPv4 wildcard>*, specify a wildcard in IPv4 address format that sets bits that permit an arbitrary value in an IPv4 address.

   - `host` *<Dst IPv4>* specification:

     The filter condition is a perfect match of *<Dst IPv4>*.

   - `any` specification:

The destination IPv4 address is not included as a filter condition.

IPv4 address (*nnn*.*nnn*.*nnn*.*nnn*): 0.0.0.0 to 255.255.255.255

`eq` *<Dst Port>*

Specifies the destination port number.

This parameter option is available only when the protocol is TCP or UDP.

1. Default value when this parameter is omitted:

   None. (The parameter is not set as a detection condition.)

2. Range of values:

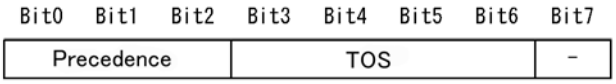
   Specify 0 to 65535 (in decimal) or a port name.

   For details about the port names that can be specified, see *Table 19-2 Port names that can be specified for TCP* and *Table 19-3 Port names that can be specified for UDP (IPv4)*.

`tos` *<TOS>*

Specifies 4 bits (bits 3 to 6) in the TOS field as the TOS value.

The TOS value is compared with 4 bits (bits 3 to 6) in the TOS field of the received packet.



1. Default value when this parameter is omitted:

   None. (The parameter is not set as a detection condition.)

2. Range of values:

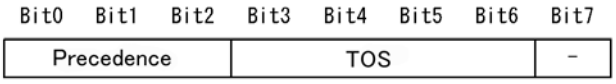
   Specify 0 to 15 (in decimal) or a TOS name.

   For details about the TOS names that can be specified, see *Table 19-4 TOS names that can be specified*.

`precedence` *<Precedence>*

Specifies the Precedence value, which is the first 3 bits in the TOS field.

The value is compared with the first three bits in the TOS field of the received packet.



1. Default value when this parameter is omitted:

   None. (The parameter is not set as a detection condition.)

2. Range of values:

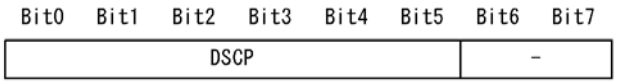
   Specify 0 to 7 (in decimal) or the Precedence name.

   For details about the Precedence names that can be specified, see *Table 19-5 Precedence names that can be specified*.

`dscp` *<DSCP>*

Specifies the DSCP value, which is the first six bits in the TOS field.

The value is compared with the first six bits in the TOS field of the received packet.



1. Default value when this parameter is omitted:

   None. (The parameter is not set as a detection condition.)

2. Range of values:

   Specify 0 to 63 (in decimal) or the DSCP name.

   For details about the DSCP names that can be specified, see *Table 19-6 DSCP names that can be specified*.

`ack`

Specifies the detection of packets whose ACK flag in the TCP header is 1.

This parameter option is available only when the protocol is TCP.

1. Default value when this parameter is omitted:

   None. (The parameter is not set as a detection condition.)

2. Range of values:

   None

`fin`

Specifies the detection of packets whose FIN flag in the TCP header is 1.

This parameter option is available only when the protocol is TCP.

1. Default value when this parameter is omitted:

   None. (The parameter is not set as a detection condition.)

2. Range of values:

   None

`psh`

Specifies the detection of packets whose PSH flag in the TCP header is 1.

This parameter option is available only when the protocol is TCP.

1. Default value when this parameter is omitted:

   None. (The parameter is not set as a detection condition.)

2. Range of values:

   None

`rst`

Specifies the detection of packets whose RST flag in the TCP header is 1.

This parameter option is available only when the protocol is TCP.

1. Default value when this parameter is omitted:

   None. (The parameter is not set as a detection condition.)

2. Range of values:

   None

`syn`

Specifies the detection of packets whose SYN flag in the TCP header is 1.

This parameter option is available only when the protocol is TCP.

1. Default value when this parameter is omitted:

None. (The parameter is not set as a detection condition.)

2. Range of values:

None

`urg`

Specifies the detection of packets whose URG flag in the TCP header is 1.

This parameter option is available only when the protocol is TCP.

1. Default value when this parameter is omitted:

None. (The parameter is not set as a detection condition.)

2. Range of values:

None

`vlan` *<VLAN ID>*

Specifies a VLAN ID.

This parameter has an effect only when it is applied to an Ethernet interface.

1. Default value when this parameter is omitted:

None. (The parameter is not set as a detection condition.)

2. Range of values:

See *Specifiable values for parameters*.

`user-priority` *<Priority>*

Specifies the user priority.

1. Default value when this parameter is omitted:

None. (The parameter is not set as a detection condition.)

2. Range of values:

Specify 0 to 7 in decimal.

Default behavior

None

Impact on communication

If any entry is added when an access list with no entries set is being applied to an interface, the IP packets received on the applicable interface are discarded temporarily until the entry is applied to the interface.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. When `255.255.255.255` is entered for the source address wildcard and the destination address wildcard, `any` is displayed.
2. If *nnn.nnn.nnn.nnn* `0.0.0.0` is entered as the source address and the destination address, `host` *nnn.nnn.nnn.nnn* is displayed.
3. `tos`, `precedence`, and `dscp` cannot be set at the same time.

Related commands

ip access-group

ip access-list resequence

permit (ip access-list standard)

Specifies the conditions by which the IPv4 address filter permits access.

Syntax

To set or change information:

`[<Seq>] permit {<Src IPv4> [<Src IPv4 wildcard>] | host <Src IPv4> | any}`

To delete information:

`no <Seq>`

Input mode

`(config-std-nacl)`

Parameters

<Seq>

Specifies the sequence in which filter conditions are applied.

1. Default value when this parameter is omitted:

   10 is set as the initial value if there are no conditions in the access list.

   If conditions have been set, the initial value is the maximum value for the application sequence that has been set plus 10.

   Note, however, that if the maximum value for the application sequence is greater than 4294967285, the value cannot be omitted.

2. Range of values:

   Specify 1 to 4294967295 in decimal.

`{<Src IPv4> [<Src IPv4 wildcard>] | host <Src IPv4> | any}`

Specify an IPv4 address.

To specify all IPv4 addresses, specify `any`.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify *<Src IPv4>* [*<Src IPv4 wildcard>*], `host` *<Src IPv4>*, or `any`.

   - *<Src IPv4>* [*<Src IPv4 wildcard>*] specification:

     Specify the IPv4 address for *<Src IPv4>*.

   - For [*<Src IPv4 wildcard>*], specify a wildcard in IPv4 address format that sets bits that permit an arbitrary value in an IPv4 address. If omitted, the filter condition is a perfect match of *<Src IPv4>*. `host` *<Src IPv4>* specification:

     The filter condition is a perfect match of *<Src IPv4>*.

   - `any` specification:

     The IPv4 address is not included as a filter condition.

   IPv4 address (*nnn.nnn.nnn.nnn*): 0.0.0.0 to 255.255.255.255

Default behavior

None

Impact on communication

If any entry is added when an access list with no entries set is being applied to an interface, the IP packets received on the applicable interface are discarded temporarily until the entry is applied to the interface.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. When `255.255.255.255` is entered as the address wildcard, `any` is displayed.
2. When *`nnn.nnn.nnn.nnn`* `0.0.0.0` is entered as the address, `host` *`nnn.nnn.nnn.nnn`* is displayed.

Related commands

ip access-group

ip access-list resequence

deny (ip access-list standard)

remark

permit (mac access-list extended)

Specifies the conditions by which the MAC filter permits access.

Syntax

To set or change information:

`[<Seq>] permit {<Src MAC> <Src MAC mask> | host <Src MAC> | any} {<Dst MAC> <Dst MAC mask> | host <Dst MAC> | any | bpdu | cdp | lacp | lldp | oadp | pvst-plus-bpdu } [<Ethernet type>] [vlan <VLAN ID>] [user-priority <Priority>]`

To delete information:

`no <Seq>`

Input mode

`(config-ext-macl)`

Parameters

<Seq>

Specifies the sequence in which filter conditions are applied.

1. Default value when this parameter is omitted:

   10 is set as the initial value if there are no conditions in the access list.

   If conditions have been set, the initial value is the maximum value for the application sequence that has been set plus 10.

   Note, however, that if the maximum value for the application sequence is greater than 4294967285, the value cannot be omitted.

2. Range of values:

   Specify 1 to 4294967295 in decimal.

`{<Src MAC> <Src MAC mask> | host <Src MAC> | any}`

Specifies the source MAC address.

To specify all source MAC addresses, specify `any`.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify *<Src MAC> <Src MAC mask>*, `host` *<Src MAC>*, or `any`.

   - *<Src MAC> <Src MAC mask>* specification:

     Specify the source MAC address for *<Src MAC>*.

   - For *<Src MAC mask>*, specify a mask in MAC address format that sets bits that permit an arbitrary value in the MAC address. `host` *<Src MAC>* specification:

     The filter condition is a perfect match of *<Src MAC>*.

   - `any` specification:

     The source MAC address is not included as a filter condition.

   MAC address (*nnnn.nnnn.nnnn*): 0000.0000.0000 to ffff.ffff.ffff (hexadecimal)

{*<Dst MAC>* *<Dst MAC mask>* | host *<Dst MAC>* | any | bpdu | cdp | lacp | lldp | oadp | pvst-plus-bpdu }

Specifies the destination MAC address.

To specify all destination MAC addresses, specify any.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify *<Dst MAC>* *<Dst MAC mask>*, host *<Dst MAC>*, any, bpdu, cdp, lacp, lldp, oadp, or pvst-plus-bpdu.

   - *<Dst MAC>* *<Dst MAC mask>* specification:

     Specify the destination MAC address for *<Dst MAC>*.

   - For *<Dst MAC mask>*, specify a mask in MAC address format that sets bits that permit an arbitrary value in the MAC address. host *<Dst MAC>* specification:

     The filter condition is a perfect match with *<Dst MAC>*.

   - any specification:

     The destination MAC address is not included as a filter condition.

   - bpdu specification:

     Sets BPDU control packets as a filter condition.

   - cdp specification:

     Sets CDP control packets as a filter condition.

   - lacp specification:

     Sets LACP control packets as a filter condition.

   - lldp specification:

     Sets LLDP control packets as a filter condition.

   - oadp specification:

     Sets OADP control packets as a filter condition.

     pvst-plus-bpdu specification:

     Sets PVST+ control packets as a filter condition.

   MAC address (*nnnn.nnnn.nnnn*): 0000.0000.0000 to ffff.ffff.ffff (hexadecimal)

<Ethernet type>

Specifies the Ethernet type number or the Ethernet type name.

1. Default value when this parameter is omitted:

   None. (The parameter is not set as a detection condition.)

2. Range of values:

   Specify 0x0000 to 0xffff (hexadecimal) or the Ethernet type name.

   For details about the Ethernet type names that can be specified, see *Table 19-7 Ethernet type names that can be specified*.

vlan *<VLAN ID>*

Specifies a VLAN ID.

This parameter has an effect only when it is applied to an Ethernet interface.

1. Default value when this parameter is omitted:

None. (The parameter is not set as a detection condition.)

2. Range of values:

   See *Specifiable values for parameters*.

`user-priority` *<Priority>*

Specifies the user priority.

1. Default value when this parameter is omitted:

   None. (The parameter is not set as a detection condition.)

2. Range of values:

   Specify 0 to 7 in decimal.

Default behavior

None

Impact on communication

If any entry is added when an access list with no entries set is being applied to an interface, all packets received on the applicable interface are discarded temporarily until the entry is applied to the interface.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If *nnnn.nnnn.nnnn* `ffff.ffff.ffff` is entered as the source address and the destination address, `any` is displayed.
2. If a protocol name is set for the destination address or if the address of a protocol name that can be set is set, the protocol name is displayed. For details about the address of a protocol name that can be set as the destination address, see *Table 19-8 Destination MAC address names that can be specified*. If *nnnn.nnnn.nnnn* `0000.0000.0000` is entered as the source address and the destination address in cases other than the above, `host` *nnnn.nnnn.nnnn* is displayed.

Related commands

mac access-group

mac access-list resequence

deny (mac access-list extended)

remark

remark

Sets supplementary information for an access list. Access lists are available for IPv4 address filtering, IPv4 packet filtering, and MAC filtering.

Syntax

To set or change information:

```
remark <Remark>
```

To delete information:

```
no remark
```

Input mode

```
(config-ext-nacl)
(config-std-nacl)
(config-ext-macl)
```

Parameters

<Remark>

Sets supplementary information according to input mode.

One line can be set for each access list. Entering new information overwrites the existing information.

1. Default value when this parameter is omitted:

   The initial value is null.

2. Range of values:

   Specify a character string that is no more than 64 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

ip access-list standard

ip access-list extended

mac access-list extended

20. QoS

Names and values that can be specified
ip qos-flow-group
ip qos-flow-list
ip qos-flow-list resequence
limit-queue-length
mac qos-flow-group
mac qos-flow-list
mac qos-flow-list resequence
qos (ip qos-flow-list)
qos (mac qos-flow-list)
qos-queue-group
qos-queue-list
remark
traffic-shape rate
control-packet user-priority

Names and values that can be specified

Protocol names (IPv4)

The following table lists the names that can be specified as IPv4 protocol names.

Table 20-1 Protocol names that can be specified (IPv4)

Protocol name	Applicable protocol number
ah	51
esp	50
gre	47
icmp	1
igmp	2
ip	All IP protocols
ipinip	4
ospf	89
pcp	108
pim	103
sctp	132
tcp	6
tunnel	41
udp	17
vrrp	112

Port names (TCP)

The following table lists the port names that can be specified for TCP.

Table 20-2 Port names that can be specified for TCP

Port name	Applicable port name and number
bgp	Border Gateway Protocol version 4 (179)
chargen	Character generator (19)
daytime	Daytime (13)
discard	Discard (9)
domain	Domain Name System (53)

Port name	Applicable port name and number
echo	Echo (7)
exec	Remote process execution (512)
finger	Finger (79)
ftp	File Transfer Protocol (21)
ftp-data	FTP data connections (20)
gopher	Gopher (70)
hostname	NIC Host Name Server (101)
http	HyperText Transfer Protocol (80)
https	HTTP over TLS/SSL (443)
ident	Ident Protocol (113)
imap3	Interactive Mail Access Protocol version 3 (220)
irc	Internet Relay Chat (194)
klogin	Kerberos login (543)
kshell	Kerberos shell (544)
ldap	Lightweight Directory Access Protocol (389)
login	Remote login (513)
lpd	Printer service (515)
nntp	Network News Transfer Protocol (119)
pop2	Post Office Protocol v2 (109)
pop3	Post Office Protocol v3 (110)
pop3s	POP3 over TLS/SSL (995)
raw	Printer PDL Data Stream (9100)
shell	Remote commands (514)
smtp	Simple Mail Transfer Protocol (25)
smtps	SMTP over TLS/SSL (465)
ssh	Secure Shell Remote Login Protocol (22)
sunrpc	Sun Remote Procedure Call (111)
tacacs+	Terminal Access Controller Access Control System Plus (49)

Port name	Applicable port name and number
tacacs-ds	TACACS-Database Service (65)
talk	like tenex link (517)
telnet	Telnet (23)
time	Time (37)
uucp	Unix-to-Unix Copy Program (540)
whois	Nicname (43)

Port names (UDP)

The following table lists the port names that can be specified for UDP.

Table 20-3 Port names that can be specified for UDP (IPv4)

Port name	Applicable port name and number
biff	Biff (512)
bootpc	Bootstrap Protocol (BOOTP) client (68)
bootps	Bootstrap Protocol (BOOTP) server (67)
discard	Discard (9)
domain	Domain Name System (53)
echo	Echo (7)
isakmp	Internet Security Association and Key Management Protocol (500)
mobile-ip	Mobile IP registration (434)
nameserver	Host Name Server (42)
ntp	Network Time Protocol (123)
radius	Remote Authentication Dial In User Service (1812)
radius-acct	RADIUS Accounting (1813)
rip	Routing Information Protocol (520)
snmp	Simple Network Management Protocol (161)
snmptrap	SNMP Traps (162)
sunrpc	Sun Remote Procedure Call (111)
syslog	System Logger (514)
tacacs+	Terminal Access Controller Access Control System Plus (49)

Port name	Applicable port name and number
tacacs-ds	TACACS-Database Service (65)
talk	like tenex link (517)
tftp	Trivial File Transfer Protocol (69)
time	Time server protocol (37)
who	Who service (513)
xdmcp	X Display Manager Control Protocol (177)

TOS name

The following table lists the TOS names that can be specified.

Table 20-4 TOS names that can be specified

TOS name	TOS value
max-reliability	2
max-throughput	4
min-delay	8
min-monetary-cost	1
normal	0

Precedence name

The following table lists the precedence names that can be specified.

Table 20-5 Precedence names that can be specified

Precedence name	Precedence value
critical	5
flash	3
flash-override	4
immediate	2
internet	6
network	7
priority	1
routine	0

DSCP name

The following table lists the DSCP names that can be specified.

Table 20-6 DSCP names that can be specified

DSCP name	DSCP value
af11	10
af12	12
af13	14
af21	18
af22	20
af23	22
af31	26
af32	28
af33	30
af41	34
af42	36
af43	38
cs1	8
cs2	16
cs3	24
cs4	32
cs5	40
cs6	48
cs7	56
default	0
ef	46

Ethernet type name

The following table lists the Ethernet type names that can be specified.

Table 20-7 Ethernet type names that can be specified

Ethernet type name	Ethernet value	Remarks
appletalk	0x809b	
arp	0x0806	
eapol	0x888e	
gsrp	--#	Performs flow detection for GSRP control packets.
ipv4	0x0800	
ipv6	0x86dd	
ipx	0x8137	
xns	0x0600	

#: The value is not made public.

Destination MAC address names

The following table lists the destination MAC address names that can be specified.

Table 20-8 Destination MAC address names that can be specified

Destination address specification	Destination address	Destination address mask
bpdu	0180.C200.0000	0000.0000.0000
cdp	0100.0CCC.CCCC	0000.0000.0000
lacp	0180.C200.0002	0000.0000.0000
lldp	0100.8758.1310	0000.0000.0000
oadp	0100.4C79.FD1B	0000.0000.0000
pvst-plus-bpdu	0100.0CCC.CCCD	0000.0000.0000

ip qos-flow-group

Enables the QoS functionality by applying an IPv4 QoS flow list to an Ethernet interface or a VLAN interface.

Syntax

To set information:

```
ip qos-flow-group <QoS flow list name> in
```

To delete information:

```
no ip qos-flow-group <QoS flow list name> in
```

Input mode

```
(config-if)
```

Parameters

<QoS flow list name>

Specifies the IPv4 QoS flow list name.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   This name can be 3 to 31 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

`in`

Specifies `Inbound`.

`in`: Inbound (Specifies the receiving side)

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. This command cannot be set if `qos` is not set when the `system function` command has been set. (This command can be set if the `system function` command has not been set.) [AX1250S] [AX1240S]
2. One IPv4 QoS flow list can be set for one interface. A maximum of 64 flow listscan be applied to an Ethernet interface or a VLAN interface.
3. If you specify a non-existent IPv4 QoS flow list name, this will be ignored. The IPv4

QoS flow list name is registered.

4. The following table shows flow detection mode that can be set for each interface.

Table 20-9 Specifiable interfaces for each flow detection mode (IPv4)

Flow detection mode	Whether the mode can be set	
	Ethernet	**VLAN**
Layer 2-1	N	N
Layer 2-2	Y	Y

Legend Y: Can be set; N: Cannot be set

5. If another list has been set for an interface by using this command, no more lists can be set. Remove the existing list first, and then set another list.
6. When a list is to be applied to an Ethernet interface and a VLAN parameter exists as a flow detection condition, the list can be set if the VLAN ID is included in settings of the Ethernet interface.
7. When an IPv4 QoS flow list is to be applied to a VLAN interface, the list can be set if no VLAN parameters exist as a flow detection condition.
8. Some packets are not subject to the QoS functionality. For details, see *3. Flow control* in the *Configuration Guide Vol. 2*.

Related commands

ip qos-flow-list

ip qos-flow-list

Creates an IPv4 QoS flow list to be used to set QoS flow detection and action specifications. A maximum of 512 IPv4 and MAC QoS flow lists can be created for a Switch. A maximum of 1024 flow detection and action specification entries can be created.

Syntax

To set or change information:

```
ip qos-flow-list <QoS flow list name>
```

To delete information:

```
no ip qos-flow-list <QoS flow list name>
```

Input mode

```
(config)
```

Parameters

<QoS flow list name>

Specifies the IPv4 QoS flow list name.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   This name can be 3 to 31 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

The names of existing QoS flow lists cannot be specified.

Related commands

ip qos-flow-group

ip qos-flow-list resequence

qos (ip qos-flow-list)

remark

ip qos-flow-list resequence

Resets the sequence numbers of the application sequence in the IPv4 QoS flow list.

Syntax

To set or change information:

```
ip qos-flow-list resequence <QoS flow list name> [<Starting seq> [<Increment seq>] ]
```

Input mode

```
(config-ip-qos)
```

Parameters

<QoS flow list name>

Specifies the name of the IPv4 QoS flow list to be changed.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   This name can be 3 to 31 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

<Starting seq>

Specifies the starting sequence number.

1. Default value when this parameter is omitted:

   The initial value is 10.

2. Range of values:

   Specify 1 to 4294967295 in decimal.

<Increment seq>

Specifies the increment value for the sequence.

1. Default value when this parameter is omitted:

   The initial value is 10.

2. Range of values:

   Specify 1 to 100 in decimal.

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

ip qos-flow-list

limit-queue-length

Sets for a Switch the maximum send queue length of a physical port.

If this command is omitted or if setting information is deleted, the send queue length is set to 32.

This command is used to set basic operating conditions for the hardware. You must restart the Switch after you change the settings.

Syntax

To set or change information:

```
limit-queue-length <Queue length>
```

To delete information:

```
no limit-queue-length
```

Input mode

```
(config)
```

Parameters

<Queue length>

Specifies the maximum queue length of a physical port.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   32, 128, or 728 can be specified.

Default behavior

32 is used as the send queue length for a port on a Switch.

Impact on communication

The Switch must be restarted. Communication via the Switch stops until the restart processing has been completed.

When the change is applied

If you have changed any values, save the configuration and restart the Switch. The new setting values take effect when the Switch is restarted.

Notes

1. When this command is entered, the message below is displayed. Before entering another configuration command, save the settings and restart the Switch.

   ```
   Please execute the reload command after save,
   because this command becomes effective after reboot.
   ```

2. Before setting this command, use the `qos-queue-list` command to set scheduling mode PQ. The PQ scheduling mode cannot be set from other scheduling modes.

   This also applies when 32 is set as the send queue length.

3. If information is deleted by using the `no` command, there will be no scheduling mode limitations.

4. When 32 has been set as the send queue length by using the `limit-queue-length`

command, the send queue length is as follows:

Queues 1 to 8: 32

5. When 128 has been set as the send queue length by using the `limit-queue-length` command, the send queue length is as follows:

   Queues 1 to 4: 128

   Queues 5 to 8: 0

6. When 728 has been set as the send queue length by using the `limit-queue-length` command, the send queue length is as follows:

   Queue 1: 728

   Queue 2: 32

   Queues 3 to 8: 0

   At this time, use the `flowcontrol` command to configure the sending of pause packets.

Related commands

qos-queue-list

flowcontrol

mac qos-flow-group

Enables the QoS functionality by applying a MAC QoS flow list to an Ethernet interface or a VLAN interface.

Syntax

To set information:

```
mac qos-flow-group <QoS flow list name> in
```

To delete information:

```
no mac qos-flow-group <QoS flow list name> in
```

Input mode

```
(config-if)
```

Parameters

<QoS flow list name>

Specifies the MAC QoS flow list name.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   This name can be 3 to 31 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

`in`

Specifies `Inbound`.

`in`: Inbound (Specifies the receiving side)

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. This command cannot be set if `qos` is not set when the `system function` command has been set. (This command can be set if the `system function` command has not been set.) [AX1250S] [AX1240S]
2. One MAC QoS flow list can be set for one interface. A maximum of 64 flow listscan be applied to an Ethernet interface or a VLAN interface.
3. If a non-existent MAC QoS flow list name is set, no operation is performed. The MAC

QoS flow list name is registered.

4. The following table shows flow detection mode that can be set for each interface.

Table 20-10 Specifiable interfaces for each flow detection mode (MAC)

Receiving-side flow detection mode	Whether the mode can be set	
	Ethernet	**VLAN**
Layer 2-1	Y	Y
Layer 2-2	N	N

Legend Y: Can be set; N: Cannot be set

5. If another list has been set for an interface by using this command, no more lists can be set. Remove the existing list first, and then set another list.
6. When a list is to be applied to an Ethernet interface and a VLAN parameter exists as a flow detection condition, the list can be set if the VLAN ID is included in settings of the Ethernet interface.
7. When an MAC QoS flow list is to be applied to a VLAN interface, the list can be set if no VLAN parameters exist as a flow detection condition.
8. Some packets are not subject to the QoS functionality. For details, see *3. Flow control* in the *Configuration Guide Vol. 2*.

Related commands

mac qos-flow-list

mac qos-flow-list

Creates a MAC QoS flow list used to set QoS flow detection and action specifications. A maximum of 512 IPv4 and MAC QoS flow lists can be created for a Switch. A maximum of 1024 flow detection and action specification entries can be created.

Syntax

To set or change information:

```
mac qos-flow-list <QoS flow list name>
```

To delete information:

```
no mac qos-flow-list <QoS flow list name>
```

Input mode

```
(config)
```

Parameters

<QoS flow list name>

Specifies the MAC QoS flow list name.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   This name can be 3 to 31 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. The names of existing IPv4 QoS flow lists cannot be specified.

Related commands

mac qos-flow-group

mac qos-flow-list resequence

qos (mac qos-flow-list)

remark

mac qos-flow-list resequence

Resets the sequence numbers of the application sequence in the MAC QoS flow list.

Syntax

To set or change information:

```
mac qos-flow-list resequence <QoS flow list name> [<Starting seq>
[<Increment seq>] ]
```

Input mode

```
(config-mac-qos)
```

Parameters

<QoS flow list name>

Specifies the MAC QoS flow list name to be changed.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   This name can be 3 to 31 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

<Starting seq>

Specifies the starting sequence number.

1. Default value when this parameter is omitted:

   The initial value is 10.

2. Range of values:

   Specify 1 to 4294967295 in decimal.

<Increment seq>

Specifies the increment value for the sequence.

1. Default value when this parameter is omitted:

   The initial value is 10.

2. Range of values:

   Specify 1 to 100 in decimal.

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

mac qos-flow-list

qos (ip qos-flow-list)

Specifies flow detection conditions and action specifications in the IPv4 QoS flow list.

Syntax

To set or change information:

`[<Seq>] qos {<flow detection condition>}[<action specification>]`

- Flow detection conditions

When upper-layer protocols are other than TCP and UDP

`{ip | <Protocol> | icmp | igmp } {<Src IPv4> <Src IPv4 wildcard> | host <Src IPv4> | any}{<Dst IPv4> <Dst IPv4 wildcard> | host <Dst IPv4> | any} [{ [tos <TOS>] [precedence <Precedence>] | dscp <DSCP>}] [vlan <VLAN ID>] [user-priority <Priority>]`

When the upper-layer protocol is TCP

`tcp {<Src IPv4> <Src IPv4 wildcard> | host <Src IPv4> | any} [eq <Src port>] {<Dst IPv4> <Dst IPv4 wildcard> | host <Dst IPv4> | any} [eq <Dst port>] [ack] [fin] [psh] [rst] [syn] [urg] [{ [tos <TOS>] [precedence <Precedence>] | dscp <DSCP>}] [vlan <VLAN ID>] [user-priority <Priority>]`

When the upper-layer protocol is UDP

`udp {<Src IPv4> <Src IPv4 wildcard> | host <Src IPv4> | any} [eq <Src port>] {<Dst IPv4> <Dst IPv4 wildcard> | host <Dst IPv4> | any} [eq <Dst port>] [{ [tos <TOS>] [precedence <Precedence>] | dscp <DSCP>}] [vlan <VLAN ID>] [user-priority <Priority>]`

- Action specification

`action [cos <COS>] [replace-user-priority <Priority>] [replace-dscp <DSCP>]`

To delete information:

`no <Seq>`

Input mode

`(config-ip-qos)`

Parameters

<Seq>

Specifies the application sequence in the QoS flow list to be created or changed.

1. Default value when this parameter is omitted:

   10 is set as the initial value if there are no conditions in the QoS flow list.

   If conditions have been set, the initial value is the maximum value for the application sequence that has been set plus 10.

   Note, however, that if the maximum value for the application sequence is greater than 4294967285, the value cannot be omitted.

2. Range of values:

   Specify 1 to 4294967295 in decimal.

`{ip | <Protocol> | icmp | igmp | tcp | udp }`

Specifies the upper-layer protocol condition for IPv4 packets.

Note that if all protocols are applicable, specify `ip`.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   - *<Protocol>*:

     Set 0 to 255 (in decimal) or a protocol name.

     See *Table 20-1 Protocol names that can be specified (IPv4)*.

`{`*<Src IPv4> <Src IPv4 wildcard>* `|` `host` *<Src IPv4>* `|` `any` `}`

Specifies the source IPv4 address.

To specify all source IPv4 addresses, specify `any`.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify *<Src IPv4> <Src IPv4 wildcard>*, `host` *<Src IPv4>*, or `any`.

   - *<Src IPv4> <Src IPv4 wildcard>* specification:

   Specify the source IPv4 address for *<Src IPv4>*.

   For *<Src IPv4 wildcard>*, specify a wildcard in IPv4 address format that sets bits that permit an arbitrary value in an IPv4 address.

   - `host` *<Src IPv4>* specification:

   The flow detection condition is a perfect match of *<Src IPv4>*.

   - `any` specification:

   The source IPv4 address is not included as a filter condition.

   IPv4 address (*nnn*.*nnn*.*nnn*.*nnn*): 0.0.0.0 to 255.255.255.255

`eq` *<Src Port>*

Specifies a source port number.

This parameter option is available only when the protocol is TCP or UDP.

1. Default value when this parameter is omitted:

   None. (The parameter is not set as a detection condition.)

2. Range of values:

   Specify 0 to 65535 (in decimal) or a port name.

   For details about the port names that can be specified, see *Table 20-2 Port names that can be specified for TCP* and *Table 20-3 Port names that can be specified for UDP (IPv4)*.

`{`*<Dst IPv4> <Dst IPv4 wildcard>* `|` `host` *<Dst IPv4>* `|` `any}`

Specifies the destination IPv4 address.

To specify all destination IPv4 addresses, specify `any`.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify *<Dst IPv4> <Dst IPv4 wildcard>*, `host` *<Dst IPv4>*, or `any`.

   - *<Dst IPv4> <Dst IPv4 wildcard>* specification:

   Specify the destination IPv4 address for *<Dst IPv4>*.

For *<Dst IPv4 wildcard>*, specify a wildcard in IPv4 address format that sets bits that permit an arbitrary value in an IPv4 address.

- `host` *<Dst IPv4>* specification:

The flow detection condition is a perfect match of *<Dst IPv4>*.

- `any` specification:

The destination IPv4 address is not included as a flow detection condition.

IPv4 address (*nnn.nnn.nnn.nnn*): 0.0.0.0 to 255.255.255.255

`eq` *<Dst Port>*

Specifies the destination port number.

This parameter option is available only when the protocol is TCP or UDP.

1. Default value when this parameter is omitted:

   None. (The parameter is not set as a detection condition.)

2. Range of values:

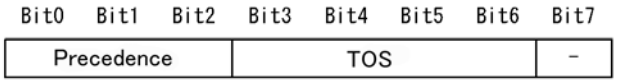
   Specify 0 to 65535 (in decimal) or a port name.

   For details about the port names that can be specified, see *Table 20-2 Port names that can be specified for TCP* and *Table 20-3 Port names that can be specified for UDP (IPv4)*.

`tos` *<TOS>*

Specifies four bits (bits 3 to 6) in the TOS field as the TOS value.

This value is compared with four bits (bits 3 to 6) in the TOS field of the sent or received packet.



1. Default value when this parameter is omitted:

   None. (The parameter is not set as a detection condition.)

2. Range of values:

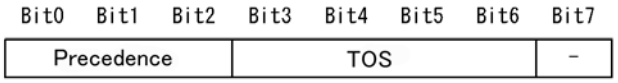
   Specify 0 to 15 (in decimal) or a TOS name.

   For details about the TOS names that can be set, see *Table 20-4 TOS names that can be specified*.

`precedence` *<Precedence>*

Specifies the Precedence value, which is the first three bits in the TOS field.

This value is compared with the first three bits in the TOS field of the sent or received packet.



1. Default value when this parameter is omitted:

   None. (The parameter is not set as a detection condition.)

2. Range of values:

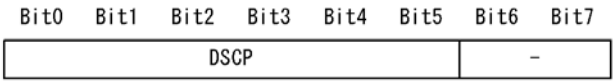
   Specify 0 to 7 (in decimal) or the Precedence name.

   For details about the Precedence names that can be set, see *Table 20-5 Precedence names that can be specified*.

`dscp` *<DSCP>*

Specifies the DSCP value, which is the first six bits in the TOS field.

The value is compared with the first six bits in the TOS field of the received packet.



1. Default value when this parameter is omitted:

   None. (The parameter is not set as a detection condition.)

2. Range of values:

   Specify 0 to 63 (in decimal) or the DSCP name.

   For details about the DSCP names that can be set, see *Table 20-6 DSCP names that can be specified*.

`ack`

Specifies the detection of packets whose ACK flag in the TCP header is 1.

This parameter option is available only when the protocol is TCP.

1. Default value when this parameter is omitted:

   None. (The parameter is not set as a detection condition.)

2. Range of values:

   None

`fin`

Specifies the detection of packets whose FIN flag in the TCP header is 1.

This parameter option is available only when the protocol is TCP.

1. Default value when this parameter is omitted:

   None. (The parameter is not set as a detection condition.)

2. Range of values:

   None

`psh`

Specifies the detection of packets whose PSH flag in the TCP header is 1.

This parameter option is available only when the protocol is TCP.

1. Default value when this parameter is omitted:

   None. (The parameter is not set as a detection condition.)

2. Range of values:

   None

`rst`

Specifies the detection of packets whose RST flag in the TCP header is 1.

This parameter option is available only when the protocol is TCP.

1. Default value when this parameter is omitted:

   None. (The parameter is not set as a detection condition.)

2. Range of values:

   None

`syn`

Specifies the detection of packets whose SYN flag in the TCP header is 1.

This parameter option is available only when the protocol is TCP.

1. Default value when this parameter is omitted:

   None. (The parameter is not set as a detection condition.)

2. Range of values:

   None

`urg`

Specifies the detection of packets whose URG flag in the TCP header is 1.

This parameter option is available only when the protocol is TCP.

1. Default value when this parameter is omitted:

   None. (The parameter is not set as a detection condition.)

2. Range of values:

   None

`vlan <VLAN ID>`

Specifies a VLAN ID.

This parameter has an effect only when it is applied to an Ethernet interface.

1. Default value when this parameter is omitted:

   None. (The parameter is not set as a detection condition.)

2. Range of values:

   See *Specifiable values for parameters*.

`user-priority <Priority>`

Specifies the user priority.

1. Default value when this parameter is omitted:

   None. (The parameter is not set as a detection condition.)

2. Range of values:

   Specify 0 to 7 in decimal.

Action parameters

`action`

To set or change an action parameter, you must set the `action` parameter keyword at the beginning of the action parameters.

1. Default value when this parameter is omitted:

   None. (This `action` parameter keyword cannot be omitted if an action is set.)

2. Range of values:

   None

`cos <COS>`

Specifies an index (CoS) indicating the priority on a Switch.

1. Default value when this parameter is omitted:

   The default COS values are set. For details about the default COS values, see *3.7.1 COS values* in the *Configuration Guide Vol. 2*.

2. Range of values:

Specify 0 to 7 in decimal.

`replace-user-priority <Priority>`

Specifies the value for rewriting the user priority.

The user priority of the received packet is replaced with the specified *<Priority>* value.

1. Default value when this parameter is omitted:

   None. (The user priority is not replaced.)

2. Range of values:

   Specify 0 to 7 in decimal.

`replace-dscp <DSCP>`

Specifies the value for rewriting DSCP.

The DSCP field of the received packet is replaced with the specified *<DSCP>* value.

1. Default value when this parameter is omitted:

   None. (The DSCP value is not replaced.)

2. Range of values:

   Specify 0 to 63 (in decimal) or the DSCP name.

   For details about the DSCP names that can be set, see *Table 20-6 DSCP names that can be specified*.

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. When `255.255.255.255` is entered for the source address wildcard and the destination address wildcard, `any` is displayed.
2. If `nnn.nnn.nnn.nnn 0.0.0.0` is entered as the source address and the destination address, `host nnn.nnn.nnn.nnn` is displayed.
3. `tos`, `precedence`, and `dscp` cannot be set at the same time.
4. When `cos` and `replace-user-priority` are set for the `action` parameter at the same time, the user priority is replaced with the value set for `cos`.

Related commands

ip qos-flow-list

ip qos-flow-group

ip qos-flow-list resequence

remark

qos (mac qos-flow-list)

Specifies flow detection conditions and action specifications in the MAC QoS flow list.

Syntax

To set or change information:

`[<Seq>] qos {<flow detection condition>}[<action specification>]`

- Flow detection conditions

  `{<Src MAC> <Src MAC mask> | host <Src MAC> | any}{<Dst MAC> <Dst MAC mask> | host <Dst MAC> | any | bpdu | cdp | lacp | lldp | oadp | pvst-plus-bpdu }[<Ethernet type>] [vlan <VLAN ID>] [user-priority <Priority>]`

- Action specification

  `action [cos <COS>] [replace-user-priority <Priority>]`

To delete information:

`no <Seq>`

Input mode

`(config-mac-qos)`

Parameters

<Seq>

Specify a sequence number in the QoS flow list to be created or changed.

1. Default value when this parameter is omitted:

   10 is set as the initial value if there are no conditions in the QoS flow list.

   If conditions have been set, the initial value is the maximum value for the application sequence that has been set plus 10.

   Note, however, that if the maximum value for the application sequence is greater than 4294967285, the value cannot be omitted.

2. Range of values:

   Specify 1 to 4294967295 in decimal.

`{<Src MAC> <Src MAC mask> | host <Src MAC> | any}`

Specifies the source MAC address. To specify all source MAC addresses, specify `any`.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify *<Src MAC> <Src MAC mask>*, `host` *<Src MAC>*, or `any`.

   - *<Src MAC> <Src MAC mask>* specification:

     Specify the source MAC address for *<Src MAC>*.

     For *<Src MAC mask>*, specify a mask in MAC address format that sets bits that permit an arbitrary value in the MAC address.

   - `host` *<Src MAC>* specification:

     The flow detection condition is a perfect match of *<Src MAC>*.

- `any` specification:

  The source MAC address is not included as a flow detection condition.

MAC address (*nnnn.nnnn.nnnn*): 0000.0000.0000 to ffff.ffff.ffff (hexadecimal)

`{`*<Dst MAC>* *<Dst MAC mask>* `| host` *<Dst MAC>* `| any | bpdu | cdp | lacp | lldp | oadp | pvst-plus-bpdu }`

Specifies the destination MAC address. To specify all destination MAC addresses, specify `any`.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify *<Dst MAC>* *<Dst MAC mask>*, `host` *<Dst MAC>*, `any`, `bpdu, cdp, lacp, lldp, oadp,` or `pvst-plus-bpdu`.

   - *<Dst MAC>* *<Dst MAC mask>* specification:

     Specify the destination MAC address for *<Dst MAC>*.

     For *<Dst MAC mask>*, specify a mask in MAC address format that sets bits that permit an arbitrary value in the MAC address.

   - `host` *<Dst MAC>* specification:

     The flow detection condition is a perfect match of *<Dst MAC>*.

   - `any` specification:

     The destination MAC address is not included as a flow detection condition.

   - `bpdu` specification:

     Sets BPDU control packets as a flow detection condition.

   - `cdp` specification:

     Sets CDP control packets as a flow detection condition.

   - `lacp` specification:

     Sets LACP control packets as a flow detection condition.

   - `lldp` specification:

     Sets LLDP control packets as a flow detection condition.

   - `oadp` specification:

     Sets OADP control packets as a flow detection condition.

   - `pvst-plus-bpdu` specification:

     Sets PVST+ control packets as a flow detection condition.

MAC address (*nnnn.nnnn.nnnn*): 0000.0000.0000 to ffff.ffff.ffff (hexadecimal)

<Ethernet type>

Specifies the Ethernet type number or the Ethernet type name.

1. Default value when this parameter is omitted:

   None. (The parameter is not set as a detection condition.)

2. Range of values:

   Specify 0x0000 to 0xffff (hexadecimal) or the Ethernet type name.

   For details about the Ethernet type names that can be specified, see *Table 20-7 Ethernet type names that can be specified*.

`vlan` *<VLAN ID>*

Specifies a VLAN ID.

This parameter has an effect only when it is applied to an Ethernet interface.

1. Default value when this parameter is omitted:

   None. (The parameter is not set as a detection condition.)

2. Range of values:

   See *Specifiable values for parameters*.

`user-priority` *<Priority>*

Specifies the user priority.

1. Default value when this parameter is omitted:

   None. (The parameter is not set as a detection condition.)

2. Range of values:

   Specify 0 to 7 in decimal.

Action parameters

`action`

To set or change an action parameter, you must set the `action` parameter keyword at the beginning of the action parameters.

1. Default value when this parameter is omitted:

   None. (This `action` parameter keyword cannot be omitted if an action is set.)

2. Range of values:

   None

`cos` *<COS>*

Specifies an index (CoS) indicating the priority on a Switch.

1. Default value when this parameter is omitted:

   The default COS values are set. For details about the default COS values, see *3.7.1 COS values* in the *Configuration Guide Vol. 2*.

2. Range of values:

   Specify 0 to 7 in decimal.

`replace-user-priority` *<Priority>*

Specifies the value for rewriting the user priority.

The user priority of the received packet is replaced with the specified *<Priority>* value.

1. Default value when this parameter is omitted:

   None. (The user priority is not replaced.)

2. Range of values:

   Specify 0 to 7 in decimal.

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If *nnnn.nnnn.nnnn* `ffff.ffff.ffff` is entered as the source address and the destination address, `any` is displayed.
2. If a protocol name is set for the destination address or if the address of a protocol name that can be set is set, the protocol name is displayed. For details about the address of a protocol name that can be set as the destination address, see *Table 20-8 Destination MAC address names that can be specified* . If *nnnn.nnnn.nnnn* `0000.0000.0000` is entered as the source address and the destination address in cases other than the above, `host` *nnnn.nnnn.nnnn* is displayed.
3. When `cos` and `replace-user-priority` are set for the `action` parameter at the same time, the user priority is replaced with the value set for `cos`.
4. The parameters set by using this command are valid only for relay packets. Therefore, the set parameters are not valid for incoming and outgoing packets.

Related commands

mac qos-flow-list

mac qos-flow-group

mac qos-flow-list resequence

remark

qos-queue-group

Sets QoS queue list information for an interface (physical port).

Syntax

To set information:

```
qos-queue-group <QoS queue list name>
```

To delete information:

```
no qos-queue-group
```

Input mode

```
(config-if)
```

Parameters

<QoS queue list name>

Specifies the QoS queue list name.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   This name can be 3 to 31 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

Default behavior

`PQ` is set as the scheduling mode.

Impact on communication

If the scheduling mode is changed by specifying a QoS queue list name and queued packets remain in the send queue of the applicable line, all packets are cleared.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If the scheduling mode is changed by specifying a QoS queue list name and queued packets remain in the send queue of the changed interface, all packets are cleared. While packets are being cleared, no new packets can be queued. You need to be careful if you logged in via a network.
2. If you did not set the scheduling mode by specifying the QoS queue list name, PQ is used as the scheduling mode.
3. If an invalid queue list name is specified by using the `qos-queue-group` command, PQ is used as the scheduling mode.

Related commands

qos-queue-list

interface fastethernet

interface gigabitethernet

qos-queue-list

Sets the scheduling mode in QoS queue list information. A maximum of 52 lists can be created for a Switch.

Syntax

To set or change information:

```
qos-queue-list <QoS queue list name> { pq | wrr [ <Packet1> <Packet2> <Packet3> <Packet4> <Packet5> <Packet6> <Packet7> <Packet8> ] | wfq [ min-rate1 <Min rate1> ] [ min-rate2 < Min rate2> ] [ min-rate3 < Min rate3> ] [ min-rate4 < Min rate4> ] [ min-rate5 < Min rate5> ] [ min-rate6 < Min rate6> ] [ min-rate7 < Min rate7> ] [ min-rate8 < Min rate8> ] | 2pq+6wrr < Packet1> < Packet2> < Packet3> < Packet4> < Packet5> < Packet6> }
```

To delete information:

```
no qos-queue-list <QoS queue list name>
```

Input mode

```
(config)
```

Parameters

<QoS queue list name>

Specifies the QoS queue list name.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   This name can be 3 to 31 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

```
{ pq | wrr [ <Packet1> <Packet2> <Packet3> <Packet4> <Packet5> <Packet6> <Packet7> <Packet8> ] | wfq [ min-rate1 <Min rate1> ] [ min-rate2 < Min rate2> ] [ min-rate3 < Min rate3> ] [ min-rate4 < Min rate4> ] [ min-rate5 < Min rate5> ] [ min-rate6 < Min rate6> ] [ min-rate7 < Min rate7> ] [ min-rate8 < Min rate8> ] | 2pq+6wrr < Packet1> < Packet2> < Packet3> < Packet4> < Packet5> < Packet6> }
```

Specifies the scheduling mode.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

`pq`

Sets priority queuing. The number of queues is fixed at eight queues for each physical port. If there are packets in multiple queues, the packets with the highest priority queue number are always sent first (for example, packets in queue 8 are sent first, followed the packets in queue 7, and so on, until queue 1 is reached).

`wrr [ <Packet1> <Packet2> <Packet3> <Packet4> <Packet5> <Packet6> <Packet7> <Packet8> ]`

Sets round robin or weighted (number of packets) round robin. The number of queues is fixed at eight queues for each physical port. If the *<Packet>* setting is omitted, round robin is used. Packets are sent by looking at the queue in order. Regardless of the queue length, the number of packets is controlled so that packets are distributed evenly. When *<Packet>* is set, weighted (number of packets) round robin is used. If there are packets in multiple queues, packets are sent according to the number of packets set for *<Packet>* as the

queues are looked at in order. A number from 1 to 8 suffixed to *<Packet>* indicates the queue number.

1. Default value when this parameter is omitted:

   <Packet>: This parameter cannot be omitted.

   Note, however, that all *<Packet>* values can be omitted. If they are omitted, round robin is used.

2. Range of values:

   <Packet>: 1 to 15

`wfq [ min-rate1` *<Min rate1>* `] [ min-rate2` *< Min rate2>* `] [ min-rate3` *< Min rate3>* `] [ min-rate4` *< Min rate4>* `] [ min-rate5` *< Min rate5>* `] [ min-rate6` *< Min rate6>* `] [ min-rate7` *< Min rate7>* `] [ min-rate8` *< Min rate8>* `]`

Weighted fair queuing. The number of queues is fixed at eight queues for each physical port. The minimum bandwidth, which is set for each queue as *<Min rate>*, is sent for packets. Note that a number from 1 to 8 suffixed to *<Min rate>* indicates a queue number.

1. Default value when this parameter is omitted:

   <Min rate>: None. (A minimum bandwidth is not set.)

2. Range of values:

   `min-rate` *<Min rate>*: See the table below.

   You can specify k (default), or M for the unit of the value.

   `{` *<Min rate>* `|` *<Min rate>*`M }`

   Set *<Min rate>* values so that their total value does not exceed the line bandwidth.

Table 20-11 Range of values for the minimum bandwidth

Setting unit[#1]	**Setting range**	**Increment**
Mbit/s	1 M to 1000 M	1 Mbit/s
kbit/s	1000 to 1000000	100 kbit/s[#2]
	64 to 960	64 kbit/s[#3]

#1: 1M is treated as 1000000, and 1k is treated as 1000.

#2: When setting a value of 1000 kbit/s or more, specify the value in 100 kbit/s increments (1000, 1100, 1200...10000000).

#3: When setting a value less than 1000 kbit/s, specify the value in 64 kbit/s increments (64, 128, 192...960).

`2pq+6wrr` *< Packet1> < Packet2> < Packet3> < Packet4> < Packet5> < Packet6>*

Top-priority queues and weighted (number of packets) round robin. The number of queues is fixed at eight queues for each physical port. If there are packets in top-priority queue 8, the applicable packets are sent at the highest priority. The applicable packets in queue 7 are sent at the next priority after queue 8. If there are no packets in queues 8 and 7, packets are sent according to the number of packets set for *<Packet>* in queues 6 to 1. A number from 1 to 6 suffixed to *<Packet>* indicates the queue number.

1. Default value when this parameter is omitted:

   <Packet>: This parameter cannot be omitted.

2. Range of values:

   <Packet>: 1 to 15

Default behavior

None

Impact on communication

If the scheduling mode is changed by specifying a QoS queue list name for the `qos-queue-group` command and queued packets remain in the send queue of the applicable line, all packets are cleared.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If the scheduling mode is changed by specifying a QoS queue list name for the `qos-queue-group` command and queued packets remain in the send queue of the changed interface, all packets are cleared. While packets are being cleared, no new packets can be queued. You need to be careful if you logged in via a network.
2. WFQ does not work correctly when the line status is half duplex mode. Change to full-duplex mode.
3. If WFQ is set, there might be a maximum error of 10% between the set minimum bandwidth and the actual value.
4. To use port bandwidth control and scheduling of QoS queue list information at the same time, set PQ as the scheduling mode.
5. If `wfq` is selected as the scheduling mode, *<Min rate>* must be set for the queues that will be used.
6. When the bandwidth is set in Mbit/s (*<Mbit/s>*`M`), the value is displayed in kbit/s for `show running-config` and `show startup-config`.

Related commands

qos-queue-group

remark

Sets supplementary information for a QoS flow list.

IPv4 QoS flow list and MAC QoS flow list are available as QoS flow list.

Syntax

To set or change information:

```
remark <Remark>
```

To delete information:

```
no remark
```

Input mode

```
(config-ip-qos)
(config-mac-qos)
```

Parameters

<Remark>

Sets supplementary information about the applicable QoS flow list depending on input mode.

Only one line can be set for one QoS flow list. Entering new information overwrites the existing information.

1. Default value when this parameter is omitted:

   The initial value is null.

2. Range of values:

   Specify a character string that is no more than 64 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

ip qos-flow-list

mac qos-flow-list

traffic-shape rate

Sets the bandwidth by setting port bandwidth control for an interface (physical port) to limit the send bandwidth.

Syntax

To set or change information:

```
traffic-shape rate { <kbit/s> | <Mbit/s>M }
```

To delete information:

```
no traffic-shape rate
```

Input mode

```
(config-if)
```

Parameters

```
rate { <kbit/s> | <Mbit/s>M }
```

Sets port bandwidth control. Using this functionality limits the total-line send bandwidth to the specified bandwidth.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   See the table below.

   You can specify k (default) or M for the unit of the value.

   Set the bandwidth so that it is equal to or smaller than the line speed.

Table 20-12 Setting range for port bandwidth control

Setting unit#1	Setting range	Increment
Mbit/s	1 M to 1000 M	1 Mbit/s
kbit/s	1000 to 1000000	100 kbit/s#2
	64 to 960	64 kbit/s#3

#1: 1M is treated as 1000000, and 1k is treated as 1000.

#2: When setting a value of 1000 kbit/s or more, specify the value in 100 kbit/s increments (1000, 1100, 1200...10000000).

#3: When setting a value less than 1000 kbit/s, specify the value in 64 kbit/s increments (64, 128, 192...960).

Default behavior

The send bandwidth is not limited.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. There might be a maximum error of 10% between the set port bandwidth value and the actual value.
2. When the line status is half duplex, port bandwidth control is not supported.
3. To use port bandwidth control and scheduling of QoS queue list information at the same time, set PQ as the scheduling mode.
4. When the bandwidth is set in Mbit/s (<*Mbit/s*>`M`), the value is displayed in kbit/s for `show running-config` and `show startup-config`.
5. When the set bandwidth for port bandwidth control exceeds the line speed, the port bandwidth is not controlled.

Related commands

interface fastethernet

interface gigabitethernet

control-packet user-priority

Specifies the user priority in the VLAN tags of frames spontaneously sent by a Switch. If this command is not set or if information is deleted, 7 is used as the user priority of frames spontaneously sent.

Syntax

To set or change information:

```
control-packet user-priority { layer-2 <User-priority> | layer-3 <User-priority> | layer-2 <User-priority> layer-3 <User-priority> }
```

To delete information:

```
no control-packet user-priority
```

Input mode

```
(config)
```

Parameters

```
{ layer-2 <User-priority> | layer-3 <User-priority> | layer-2 <User-priority> layer-3 <User-priority> }
```

Specifies the user priority of frames spontaneously sent by a Switch.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 0 to 7. 7 is set as the user priority for parameters that are not set.

Default behavior

7 is used as the user priority of frames spontaneously sent by a Switch.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

21. Common to Layer 2 Authentication

authentication arp-relay
authentication force-authorized enable
authentication force-authorized vlan
authentication ip access-group

authentication arp-relay

Relays ARP packets received from unauthenticated terminals to other ports.

When the Layer 2 authentication functionality is used, set this command to output ARP packets destined for another device sent from an unauthenticated terminal to a non-authenticating port.

This command can be used in the following authentication modes:

- IEEE 802.1X: Port-based authentication (static), port-based authentication (dynamic)
- Web authentication: Fixed VLAN mode, dynamic VLAN mode
- MAC-based authentication: Fixed VLAN mode or dynamic VLAN mode

Syntax

To set information:

```
authentication arp-relay
```

To delete information:

```
no authentication arp-relay
```

Input mode

```
(config-if)
```

Parameters

None

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. When setting this command, you must set one of the following commands for the applicable port in advance:
   - dot1x port-control
   - web-authentication port
   - mac-authentication port
2. When you use authentication IPv4 access list for IEEE 802.1X port-based authentication (static), note the following:
   - This command cannot be set if the `system function` command is set and `extended-authentication` has not been set. (This command can be set if the `system function` command has not been set.) [AX1250S] [AX1240S]
3. Interfaces that can be set for this command vary depending on the authentication functionality.
   - IEEE 802.1X port-based authentication (static) can be set for Ethernet

interfaces and port channel interfaces.

- IEEE 802.1X port-based authentication (dynamic), Web authentication, and MAC-based authentication can be set only for Ethernet interfaces.

Related commands

dot1x system-auth-control

dot1x port-control

web-authentication system-auth-control

web-authentication port

web-authentication redirect enable

mac-authentication system-auth-control

mac-authentication port

authentication force-authorized enable

When the following state exists for all Layer 2 authentications, a terminal subject to authentication that requested authentication is forcibly changed to the authenticated state.

- RADIUS authentication is specified but there is no response from the designated RADIUS server

Syntax

To set information:

```
authentication force-authorized enable
```

To delete information:

```
no authentication force-authorized enable
```

Input mode

```
(config)
```

Parameters

None

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. Be especially careful when using this functionality, as it can pose security problems.
2. In dynamic VLAN mode, the native VLAN of the applicable port is assigned as the post-authentication VLAN.

   If you want to assign a specific VLAN as the post-authentication VLAN, do so by using the `authentication force-authorized vlan` command.
3. This command cannot be set if at least one of the following commands is set for a Switch:
   - `dot1x force-authorized`
   - `dot1x force-authorized vlan`
   - `mac-authentication force-authorized vlan`
   - `mac-authentication static-vlan force-authorized`
   - `web-authentication force-authorized vlan`
   - `web-authentication static-vlan force-authorized`
4. This operates only when RADIUS authentication is set. If multiple authentication methods are set, the forced authentication functionality does not operate.
5. Register general-use RADIUS server information or authentication-specific RADIUS server information. For details, see *5. Overview of Layer 2 Authentication* in the *Configuration Guide Vol. 2*.

6. Private Trap with forced authentication is sent regardless of the `snmp-server traps` command setting.
7. This functionality is not subject to legacy mode.

Related commands

aaa authentication dot1x default

aaa authentication mac-authentication default

aaa authentication web-authentication default

dot1x port-control

dot1x system-auth-control

dot1x radius-server

radius-server

mac-authentication port

mac-authentication system-auth-control

mac-authentication radius-server

web-authentication port

web-authentication system-auth-control

web-authentication radius-server

authentication force-authorized vlan

In dynamic VLAN mode of Web authentication and MAC-based authentication, and port-based authentication (dynamic) for IEEE 802.1X authentication, set this command to allocate a post-authentication VLAN when forced authentication is performed on the applicable port.

Syntax

To set or change information:

```
authentication force-authorized vlan <VLAN ID>
```

To delete information:

```
no authentication force-authorized vlan
```

Input mode

```
(config-if)
```

Parameters

<VLAN ID>

Sets a MAC VLAN as the port-authentication VLAN that is assigned when forced authentication is performed.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   See *Specifiable values for parameters*.

   Note, however, that the default VLAN (`VLAN ID = 1`) cannot be set.

Default behavior

The native VLAN of the applicable port is assigned as the post-authentication VLAN.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. This command is valid only when the `authentication force-authorized enable` command is set.
2. When this command is set or deleted, a currently authenticated terminal or a user operates in the VLAN that was accommodated by the previous setting. The values set for this command take effect after re-authentication or the next authentication.
3. This functionality is not subject to legacy mode.

Related commands

authentication force-authorized enable

vlan mac-based

authentication ip access-group

Applies the IPv4 access list specified by using this command to IP packets received from unauthenticated terminals, and relays only the matched (permitted) packets to other ports. IP packets that match (permitted) the IPv4 access list specified by using this command are not subject to URL redirection.

This command can be used in the following authentication modes:

- IEEE 802.1X: Port-based authentication (static), port-based authentication (dynamic)
- Web authentication: Fixed VLAN mode, dynamic VLAN mode
- MAC-based authentication: Fixed VLAN mode or dynamic VLAN mode

Syntax

To set information:

```
authentication ip access-group <ACL ID>
```

To delete information:

```
no authentication ip access-group
```

Input mode

```
(config-if)
```

Parameters

<ACL ID>

Specifies the identifier of the IPv4 packet filter to be used to restrict output of packets to ports that are not subject to authentication. This parameter can specify one IPv4 packet filter identifier for a Switch.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify an access list name that is 3 to 31 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

Default behavior

IPv4 packets received from unauthenticated terminals are not relayed.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. One access list name can be set for a Switch by using this command.
2. When setting this command, you must set one of the following commands for the applicable port in advance:
   - `dot1x port-control`
   - `web-authentication port`

- `mac-authentication port`

3. When you use authentication IPv4 access list for IEEE 802.1X port-based authentication (static), note the following:
   - This command cannot be set if the `system function` command is set and `extended-authentication` has not been set. (This command can be set if the `system function` command has not been set.) [AX1250S] [AX1240S]
4. Interfaces that can be set for this command vary depending on the authentication functionality.
   - IEEE 802.1X port-based authentication (static) can be set for Ethernet interfaces and port channel interfaces.
   - IEEE 802.1X port-based authentication (dynamic), Web authentication, and MAC-based authentication can be set only for Ethernet interfaces.

Related commands

dot1x system-auth-control

dot1x port-control

web-authentication system-auth-control

web-authentication port

web-authentication redirect enable

mac-authentication system-auth-control

mac-authentication port

ip access-list extended

22. IEEE802.1X

Correspondence between configuration commands and authentication modes
aaa accounting dot1x
aaa authentication dot1x
aaa authorization network default
dot1x authentication
dot1x auto-logout
dot1x force-authorized
dot1x force-authorized eapol
dot1x force-authorized vlan
dot1x ignore-eapol-start
dot1x max-req
dot1x multiple-authentication
dot1x port-control
dot1x radius-server dead-interval
dot1x radius-server host
dot1x reauthentication
dot1x supplicant-detection
dot1x system-auth-control
dot1x timeout keep-unauth
dot1x timeout quiet-period
dot1x timeout reauth-period
dot1x timeout server-timeout
dot1x timeout supp-timeout
dot1x timeout tx-period
dot1x vlan dynamic enable
dot1x vlan dynamic ignore-eapol-start
dot1x vlan dynamic max-req
dot1x vlan dynamic radius-vlan
dot1x vlan dynamic reauthentication
dot1x vlan dynamic supplicant-detection
dot1x vlan dynamic timeout quiet-period
dot1x vlan dynamic timeout reauth-period
dot1x vlan dynamic timeout server-timeout
dot1x vlan dynamic timeout supp-timeout
dot1x vlan dynamic timeout tx-period

Correspondence between configuration commands and authentication modes

The following table describes IEEE 802.1X authentication modes in which IEEE 802.1X configuration commands can be set.

Table 22-1 Configuration commands and IEEE 802.1X authentication modes

	IEEE 802.1X authentication modes[#4]		
	Port-based authentication		**VLAN-based authentication**
Command name	**(static)**	**(dynamic)**	**(dynamic)**
aaa accounting dot1x	Y	Y	Y
aaa authentication dot1x	Y	Y	Y
aaa authorization network default	--	--	Y
authentication arp-relay[#1]	Y	Y	N
authentication ip access-group[#1]	Y	Y	N
dot1x authentication	Y	Y	N
dot1x auto-logout	Y	Y	Y
dot1x force-authorized	Y	N	N
dot1x force-authorized eapol	Y	Y	Y
dot1x force-authorized vlan	N	Y	Y
dot1x ignore-eapol-start	Y	Y	--
dot1x max-req	Y	Y	--
dot1x multiple-authentication	Y	Y	--
dot1x port-control[#2]	Y	Y	--
dot1x radius-server dead-interval	Y	Y	Y
dot1x radius-server host	Y	Y	Y
dot1x reauthentication	Y	Y	--
dot1x supplicant-detection	Y	Y	--
dot1x system-auth-control	Y	Y	Y
dot1x timeout keep-unauth[#3]	Y	Y	--

Command name	IEEE 802.1X authentication modes[#4]		
	Port-based authentication		VLAN-based authentication
	(static)	(dynamic)	(dynamic)
dot1x timeout quiet-period	Y	Y	--
dot1x timeout reauth-period	Y	Y	--
dot1x timeout server-timeout	Y	Y	--
dot1x timeout supp-timeout	Y	Y	--
dot1x timeout tx-period	Y	Y	--
dot1x vlan dynamic enable	--	--	Y
dot1x vlan dynamic ignore-eapol-start	--	--	Y
dot1x vlan dynamic max-req	--	--	Y
dot1x vlan dynamic radius-vlan	--	--	Y
dot1x vlan dynamic reauthentication	--	--	Y
dot1x vlan dynamic supplicant-detection	--	--	Y
dot1x vlan dynamic timeout quiet-period	--	--	Y
dot1x vlan dynamic timeout reauth-period	--	--	Y
dot1x vlan dynamic timeout server-timeout	--	--	Y
dot1x vlan dynamic timeout supp-timeout	--	--	Y
dot1x vlan dynamic timeout tx-period	--	--	Y

Legend

Y: The command operates according to the settings.

-: T he command can be entered, but it will have no effect.

N: The command cannot be entered.

#1

For details about command input formats, see *21. Common to Layer 2 Authentication*.

#2

The specification of this command affects the switching of authentication modes.

#3

The specification of this command applies only to single-terminal mode of port-based authentication (static) and port-based authentication (dynamic).

#4

For details such as a description of the authentication modes, see the *Configuration*

Guide Vol. 2.

aaa accounting dot1x

Sends IEEE 802.1X accounting information to the accounting server.

Syntax

To set information:

```
aaa accounting dot1x default start-stop group radius
```

To delete information:

```
no aaa accounting dot1x default
```

Input mode

```
(config)
```

Parameters

`default`

Sets the default accounting method of a Switch.

`start-stop`

If authentication is successful, the accounting start notification is sent to the accounting server. If authentication is canceled, the accounting stop notification is sent to the accounting server.

`group radius`

The RADIUS server is used as the accounting server.

Default behavior

A notification is not sent to the accounting server.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All IEEE 802.1X settings take effect when the `dot1x system-auth-control` command is set.
2. See *Table 22-1 Configuration commands and IEEE 802.1X authentication modes* for the authentication mode in which the command's settings are operable.

Related commands

aaa authentication dot1x

dot1x system-auth-control

radius-server host or dot1x radius-server host

aaa authentication dot1x

Sets an IEEE 802.1X authentication method group.

If `default` is set, one entry can be set. If an authentication method list name is specified, a maximum of four entries can be set.

Syntax

To set or change information:

```
aaa authentication dot1x default <Method>
aaa authentication dot1x <List name> group <Group name>
```

To delete information:

```
no aaa authentication dot1x {default | <List name>}
```

Input mode

```
(config)
```

Parameters

`default` *<Method>*

Sets the default authentication method of a Switch. For *<Method>*, specify `group radius`.

`group radius`

IEEE 802.1X authentication is performed by a RADIUS server. The RADIUS server that can be used is an IEEE 802.1X RADIUS server or a general-use RADIUS server.

<List name>

Sets the name of an authentication method list.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a character string that has no more than 32 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

   We recommend that you use an upper-case letter for the first character.

   However, you cannot use the following character strings:

   - At mark (`@`)

   - `default` or a character string beginning with `default`

`group` *<Group Name>*

IEEE 802.1X authentication is performed by a RADIUS server. The RADIUS server to use is a RADIUS server group. Specify the RADIUS server group name set by the `aaa group server radius` command.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a character string that has no more than 32 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

Default behavior

None

Impact on communication

If the setting of this command is changed, the Switch clears the authentication status of the affected terminals.

- When the Switch default is added, authentication is not canceled.
- When the Switch default is changed or deleted, authentication of the terminals authenticated by using the Switch default is canceled.
- When an authentication method list is added, authentication of terminals on ports specifying the corresponding authentication method list name is canceled. (If the authentication method list set for the port is not set by this command, the Switch is authenticated by the Switch default.)
- When the authentication method list is changed or deleted, authentication of terminals authenticated by the corresponding authentication method list is canceled.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All IEEE 802.1X settings take effect when the `dot1x system-auth-control` command is set.
2. See *Table 22-1 Configuration commands and IEEE 802.1X authentication modes* for the authentication mode in which the command's settings are operable.
3. If this command is not set, the RADIUS server cannot be used for IEEE 802.1X authentication.

Related commands

aaa authorization network

aaa group server radius

dot1x authentication

dot1x system-auth-control

radius-server host or dot1x radius-server host

aaa authorization network default

Set this command to perform VLAN-based authentication (dynamic) according to the VLAN information set by using an authentication method.

Syntax

To set information:

```
aaa authorization network default group radius
```

To delete information:

```
no aaa authorization network default
```

Input mode

```
(config)
```

Parameters

`group radius`

IEEE 802.1X authentication is performed by a RADIUS server.

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All IEEE 802.1X settings take effect when the `dot1x system-auth-control` command is set.
2. See *Table 22-1 Configuration commands and IEEE 802.1X authentication modes* for the authentication mode in which the command's settings are operable.
3. If this command is not set, VLAN-based authentication (dynamic) cannot be used.

Related commands

dot1x system-auth-control

dot1x vlan dynamic enable

aaa authentication dot1x

radius-server host or dot1x radius-server host

dot1x authentication

Sets the name of an authentication method list for the port-based authentication method.

Syntax

To set or change information:

```
dot1x authentication <List name>
```

To delete information:

```
no dot1x authentication
```

Input mode

```
(config-if)
```

Parameters

<List name>

Sets the authentication method list name set by using the `aaa authentication dot1x` command.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a character string that has no more than 32 characters. For details about the characters that can be specified, see *Specifiable values for parameters* (with the exception of the at mark (`@`)).

   We recommend that you use an upper-case letter for the first character.

Default behavior

IEEE 802.1X authentication is performed by using the default values of the Switch.

Impact on communication

Authentication of a terminal for a port whose authentication method list name has been changed is canceled.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All IEEE 802.1X settings take effect when the `dot1x system-auth-control` command is set.
2. See *Table 22-1 Configuration commands and IEEE 802.1X authentication modes* for the authentication mode in which the command's settings are operable.
3. If at least one of the following commands is set for a Switch, this command cannot be set:
   - `dot1x vlan dynamic enable`
   - `dot1x vlan dynamic radius-vlan`
   - `web-authentication user-group`
   - `web-authentication vlan`
   - `mac-authentication interface`

- `mac-authentication vlan`

4. If the authentication method list name set by using this command does not match the authentication method list name set by using the `aaa authentication dot1x` command, the default settings of the Switch are used.
5. This command can be set only for Ethernet interfaces.

Related commands

aaa authentication dot1x

dot1x port-control

dot1x system-auth-control

dot1x auto-logout

The `no dot1x auto-logout` command disables the setting to automatically cancel authentication when no frame is received from a terminal authenticated by IEEE 802.1X for a certain period of time.

Syntax

To set information:

```
no dot1x auto-logout
```

To delete information:

```
dot1x auto-logout
```

Input mode

```
(config)
```

Parameters

None

Default behavior

Authentication is automatically canceled if no frames are received from a terminal authenticated by IEEE 802.1X for a certain period of time.

Impact on communication

After the `no dot1x auto-logout` command is set, authentication is not automatically canceled if no frames are received from a terminal authenticated by IEEE 802.1X for a certain period of time.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All IEEE 802.1X settings take effect when the `dot1x system-auth-control` command is set.
2. See *Table 22-1 Configuration commands and IEEE 802.1X authentication modes* for the authentication mode in which the command's settings are operable.

Related commands

dot1x port-control

dot1x system-auth-control

mac-address-table aging-time

dot1x force-authorized

When the RADIUS authentication method is used, this command forcibly changes the status of a terminal that requests authentication on the applicable port to authentication authorized if the RADIUS server does not respond or a request to the RADIUS server fails because of a route failure or other problem.

Syntax

To set information:

```
dot1x force-authorized
```

To delete information:

```
no dot1x force-authorized
```

Input mode

```
(config-if)
```

Parameters

None

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All IEEE 802.1X settings take effect when the `dot1x system-auth-control` command is set.
2. See *Table 22-1 Configuration commands and IEEE 802.1X authentication modes* for the authentication mode in which the command's settings are operable.
3. Be especially careful when using this functionality, as it can pose a security problem.
4. This command takes effect when the following condition is met:
   - All the following configurations have been set:
     - dot1x system-auth-control
     - `radius-server host` or `dot1x radius-server host`
     - `dot1x force-authorized`#1
     - `dot1x port-control auto`#1
     - `switchport mode access`#1
     - `aaa authentication dot1x`#2
     - `dot1x authentication`#3

#1

Set for the same interface.

- The following accounting log data is collected when an authentication

request is sent to the RADIUS server:

No.=82

WARNING:SYSTEM: (*<Additional information>*) `Failed to connect to RADIUS server.`

<Additional information>:IP

You can use the `show dot1x logging` command to check the accounting log.

#2

When forced authentication is used as the Switch default, set `default group radius`.

#3

When forced authentication is used as the authentication method by port, set `aaa authentication dot1x` *<List name>*.

5. The forced authentication authorization state is canceled if authentication for the applicable terminal is canceled.
6. If either of the following commands has already been set, this command cannot be set:
   - authentication force-authorized enable
   - authentication force-authorized vlan

Related commands

aaa authentication dot1x

dot1x port-control

dot1x system-auth-control

switchport mode

radius-server host or dot1x radius-server host

dot1x force-authorized eapol

Sends according to the IEEE 802.1X forced authentication settings the EAPOL-Success response packet from the Switch to the terminal to be authenticated when its status has been forcibly changed to authentication authorized.

Syntax

To set information:

```
dot1x force-authorized eapol
```

To delete information:

```
no dot1x force-authorized eapol
```

Input mode

```
(config)
```

Parameters

None

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All IEEE 802.1X settings take effect when the `dot1x system-auth-control` command is set.
2. See *Table 22-1 Configuration commands and IEEE 802.1X authentication modes* for the authentication mode in which the command's settings are operable.
3. This command affects operation when forced authentication is authorized by setting of the following commands:
   - Port-based authentication (static): `dot1x force-authorized` or `authentication force-authorized enable`
   - Port-based authentication (dynamic), VLAN-based authentication (dynamic): `dot1x force-authorized vlan` or `authentication force-authorized enable`

Related commands

dot1x force-authorized

dot1x force-authorized vlan

authentication force-authorized enable

authentication force-authorized vlan

dot1x force-authorized vlan

When the RADIUS authentication method is used, if the RADIUS server does not respond or a request to a RADIUS server fails due to route failure, this command forcibly changes the status of a terminal, that requests authentication on the applicable port, to authentication authorized and assigns a post-authentication VLAN.

Syntax

To set or change information:

```
dot1x force-authorized vlan <VLAN ID>
```

To delete information:

```
no dot1x force-authorized
```

Input mode

```
(config-if)
```

Parameters

<VLAN ID>

Sets the post-authentication VLAN ID to be assigned when forced authentication is authorized.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   See *Specifiable values for parameters*. Note that the default VLAN (`VLAN ID = 1`) cannot be set.

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All IEEE 802.1X settings take effect when the `dot1x system-auth-control` command is set.
2. See *Table 22-1 Configuration commands and IEEE 802.1X authentication modes* for the authentication mode in which the command's settings are operable.
3. Set a VLAN ID for which `mac-based` (MAC VLAN) has been set in the `vlan` command.
4. Be especially careful when using this functionality, as it can pose a security problem.
5. This command takes effect when the following condition is met:
   - All the following configurations have been set:
     - dot1x system-auth-control
     - `radius-server host` or `dot1x radius-server host`

- `dot1x port-control auto`[#1, #4]
- `aaa authorized network default`[#2]
- `dot1x vlan dynamic enable`[#2]
- `dot1x vlan dynamic radius-vlan`[#2, #3]
- `vlan <VLAN ID> mac-based`[#3]
- `switchport mac vlan`[#2, #3, #4]
- `switchport mode mac-vlan`[#4]
- `dot1x force-authorized vlan`[#3, #4]
- `aaa authentication dot1x`[#5]
- `dot1x authentication`[#6]

#1

Set this command when using port-based authentication (dynamic).

#2

Set this command when using VLAN-based authentication (dynamic).

#3

Set the same VLAN ID for commands marked [#3].

#4

Set for the same interface.

- The following accounting log data is collected when an authentication request is sent to the RADIUS server:

  No.=82

  WARNING:SYSTEM: (*<Additional information>*) `Failed to connect to RADIUS server.`

  <Additional information>:IP

  You can use the `show dot1x logging` command to check the accounting log.

#5

When forced authentication is used as the Switch default, set `default group radius`.

#6

When forced authentication is used as the authentication method by port, set `aaa authentication dot1x` *<List name>*.

6. The forced authentication authorization state is canceled if authentication for the applicable terminal is canceled.
7. If either of the following commands has already been set, this command cannot be set:
   - `authentication force-authorized enable`
   - `authentication force-authorized vlan`

Related commands

aaa authentication dot1x

aaa authorized network default

dot1x port-control

dot1x system-auth-control

dot1x vlan dynamic enable

dot1x vlan dynamic radius-vlan

switchport mac

switchport mode

vlan

radius-server host or dot1x radius-server host

dot1x ignore-eapol-start

Sets the Switch not to issue EAP-Request/Identity packets in response to EAPOL-Start from a supplicant.

Syntax

To set information:

```
dot1x ignore-eapol-start
```

To delete information:

```
no dot1x ignore-eapol-start
```

Input mode

```
(config-if)
```

Parameters

None

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All IEEE 802.1X settings take effect when the `dot1x system-auth-control` command is set.
2. See *Table 22-1 Configuration commands and IEEE 802.1X authentication modes* for the authentication mode in which the command's settings are operable.
3. This command takes effect only if the `dot1x port-control` command has been set.
4. This command can be set only on an interface on which the `dot1x reauthentication` command has been set and the `dot1x supplicant-detection` command without the `disable` parameter set has been set.
5. This command cannot be set on an interface on which the `dot1x supplicant-detection` command with the `disable` parameter set has been set.
6. If this command has been set, you cannot use the `no dot1x reauthentication` command to set no re-authentication.

Related commands

dot1x reauthentication

dot1x supplicant-detection

dot1x system-auth-control

dot1x port-control

dot1x max-req

Specifies the maximum number of EAP-Request retransmissions if the supp-timeout value is exceeded. If the number of retransmissions exceeds this value, authentication is determined to have failed.

Syntax

To set or change information:

```
dot1x max-req <Counts>
```

To delete information:

```
no dot1x max-req
```

Input mode

```
(config-if)
```

Parameters

<Counts>

Specifies the maximum number of EAP-Request retransmissions.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 10 (times)

Default behavior

The maximum number of EAP-Request retransmissions is two.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All IEEE 802.1X settings take effect when the `dot1x system-auth-control` command is set.
2. See *Table 22-1 Configuration commands and IEEE 802.1X authentication modes* for the authentication mode in which the command's settings are operable.
3. This command takes effect only if the `dot1x port-control` command has been set.

Related commands

dot1x system-auth-control

dot1x timeout supp-timeout

dot1x port-control

dot1x multiple-authentication

Sets the IEEE 802.1X authentication submode to terminal authentication mode. The command performs authentication for each terminal and the authentication result determines whether communication is possible. Accordingly, multiple terminals can be connected.

If terminal authentication mode is not set as the authentication submode, single mode is used as the submode. Single mode authentication permits connection of only one terminal. When multiple terminals are connected, the status of the interface that has been set changes to no authentication.

Syntax

To set information:

```
dot1x multiple-authentication
```

To delete information:

```
no dot1x multiple-authentication
```

Input mode

```
(config-if)
```

Parameters

None

Default behavior

The authentication submode is single mode.

Impact on communication

If the authentication submode is changed, the authentication status of the interface that has been set is initialized. As a result, authenticated terminals must be re-authenticated. Until the terminals are re-authenticated, communication is impossible.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All IEEE 802.1X settings take effect when the `dot1x system-auth-control` command is set.
2. See *Table 22-1 Configuration commands and IEEE 802.1X authentication modes* for the authentication mode in which the command's settings are operable.
3. This command takes effect only when `auto` is set for the `dot1x port-control` command.
4. If the authentication submode is changed, the authentication status of the interface that has been set is initialized. As a result, authenticated terminals must be re-authenticated.
5. Behavior of a terminal configured by using the `mac-address-table static` command is as follows:
   - When this command has not been set (single mode)

     Communication is impossible as long as a terminal subject to authentication has not been authenticated successfully.

- When this command has been set (terminal authentication mode)

  Regardless of the authentication status, if `auto` is set for the `dot1x port-control` command, communication is always possible.

Related commands

dot1x system-auth-control

dot1x port-control

dot1x port-control

Sets the port-control status for an interface that has been set. Entering this command also enables the IEEE 802.1X port-based authentication functionality.

Syntax

To set or change information:

```
dot1x port-control {auto | force-authorized | force-unauthorized}
```

To delete information:

```
no dot1x port-control
```

Input mode

```
(config-if)
```

Parameters

`{auto | force-authorized | force-unauthorized}`

`auto`

IEEE 802.1X authentication processing is performed. The authentication result determines whether communication for the terminals connected to the interface is possible.

`force-authorized`

IEEE 802.1X authentication is not performed, and communication by the terminals connected to the interface that has been set is always possible. This parameter can be set only if the mode for port-based authentication (static) is single mode.

`force-unauthorized`

IEEE 802.1X authentication is not performed, and communication by the terminals connected to the interface that has been set is never possible. This parameter can be set only if the mode for port-based authentication (static) is single mode.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   `auto`, `force-authorized`, or `force-unauthorized`

Default behavior

The port-based authentication functionality is disabled.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All IEEE 802.1X settings take effect when the `dot1x system-auth-control` command is set.
2. See *Table 22-1 Configuration commands and IEEE 802.1X authentication modes* for

the authentication mode in which the command's settings are operable.

3. When port-based authentication (static) is used, set the following commands for the same interface (these commands can be set for Ethernet interfaces and port channel interfaces):
   - `dot1x port-control auto`
   - `switchport mode access`
   - `switchport access`
4. When port-based authentication (dynamic) is used, pay attention to the following:
   - This command cannot be set if the `system function` command is set and `extended-authentication` has not been set. (This command can be set if the `system function` command has not been set.) [AX1250S] [AX1240S]
   - Set the following commands for the same interface (these commands can be set only for Ethernet interfaces):

     - `dot1x port-control auto`

     - `switchport mode mac-vlan`
5. When the `authentication ip access-group` command or the `authentication arp-relay` command has been set for the applicable port, this command can be deleted if the following condition exists:

   `web-authentication port` or `mac-authentication port` has been set.
6. If the `dot1x multiple-authentication` command has not been set, the authentication submode is single mode.

Related commands

dot1x system-auth-control

dot1x multiple-authentication

switchport mode

switchport access

switchport mac

dot1x radius-server dead-interval

Configures the timer for monitoring automatic restoration to the primary IEEE 802.1X authentication RADIUS server from the IEEE 802.1X authentication RADIUS server.

The primary IEEE 802.1X authentication RADIUS server is restored when either of the following occurs: The current server (the destination for RADIUS authentication requests in operation) switches to a valid secondary IEEE 802.1X authentication RADIUS server, or when all servers are disabled, the monitoring timer starts and the period of time set by this command elapses (when the monitoring timer expires).

Syntax

To set or change information:

```
dot1x radius-server dead-interval <Minutes>
```

To delete information:

```
no dot1x radius-server dead-interval
```

Input mode

```
(config)
```

Parameters

<Minutes>

Configures the timer for monitoring automatic restoration to the primary IEEE 802.1X authentication RADIUS server from the secondary IEEE 802.1X authentication RADIUS server.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 1440 (minutes)

   If 0 is set, RADIUS authentication requests are always initiated from the primary IEEE 802.1X authentication RADIUS server.

Default behavior

The primary IEEE 802.1X authentication RADIUS server is automatically restored 10 minutes after the current server switches to the secondary IEEE 802.1X authentication RADIUS server.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

1. If the secondary IEEE 802.1 authentication RADIUS server is operating as the current server, and if the value of the monitoring timer is changed, the progress to that time is used as the judgment value and the result is applied.
2. If this command configuration is deleted after the monitoring timer starts, the monitoring timer counter continues without being reset and runs for 10 minutes (default value).

Notes

1. All IEEE 802.1X settings take effect when the `dot1x system-auth-control` command is set.
2. See *Table 22-1 Configuration commands and IEEE 802.1X authentication modes* for the authentication mode in which the command's settings are operable.
3. If three or more IEEE 802.1X authentication RADIUS servers are configured and the current server switches to another IEEE 802.1X authentication RADIUS server after the monitoring timer starts, the monitoring timer is not reset and continues to run.
4. In general, when the monitoring timer has started, it does not reset until it expires. However, as exceptions, it resets in the following cases:
   - When `dot1x radius-server dead-interval 0` is set by using this command
   - When information about the IEEE 802.1X authentication RADIUS server running as the current server is deleted by using the `dot1x radius-server host` command
   - When the `clear radius-server` operation command is executed
5. If the monitoring timer expires while the authentication sequence is being executed on a terminal subject to authentication, restoration of the primary IEEE 802.1X authentication RADIUS server is not performed until the executed authentication sequence is completed.

Related commands

aaa authentication dot1x

dot1x port-control

dot1x system-auth-control

dot1x radius-server host

dot1x radius-server host

Configures the general-use RADIUS server used for IEEE 802.1X.

Syntax

To set or change information:

```
dot1x radius-server host <IP address> [auth-port <Port>] [acct-port <Port>] [timeout <Seconds>] [retransmit <Retries>] [key <String>]
```

To delete information:

```
no dot1x radius-server host <IP address>
```

Input mode

```
(config)
```

Parameters

<IP address>

Specifies the IPv4 address of the RADIUS server.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify the IPv4 address (dot notation).

   1.0.0.0 to 126.255.255.255, 128.0.0.0 to 223.255.255.255

`auth-port` *<port>*

Specifies the RADIUS server port number.

1. Default value when this parameter is omitted:

   Port number 1812 is used.

2. Range of values:

   1 to 65535

`acct-port` *<Port>*

Specifies the port number for RADIUS server accounting.

1. Default value when this parameter is omitted:

   Port number 1813 is used.

2. Range of values:

   1 to 65535

`timeout` *<Seconds>*

Specifies the timeout period (in seconds) for a response from the RADIUS server.

1. Default value when this parameter is omitted:

   The period of time set by using the `radius-server timeout` command is used. If no period is set, the initial value is 5.

2. Range of values:

   1 to 30 (seconds)

`retransmit` *<Retries>*

Specifies the number of times an authentication request is resent to the RADIUS

server.

1. Default value when this parameter is omitted:

   The number of times set by using the `radius-server retransmit` command is used. If no value is set, the initial value is 3.

2. Range of values:

   0 to 15 (times)

`key` *<String>*

Specifies the RADIUS key used for encryption or for authentication of communication with the RADIUS server. The same RADIUS key must be set for the client and the RADIUS server.

1. Default value when this parameter is omitted:

   The RADIUS key set by using the `radius-server key` command is used. If no key is set, the RADIUS server is disabled.

2. Range of values:

   Specify a character string that has no more than 64 characters. For details about the characters that can be specified, see *Any character string* in *Specifiable values for parameters*.

Default behavior

The RADIUS server settings registered by using the `radius-server host` command are used.

If the `radius-server host` command is not registered, authentication cannot be performed.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All IEEE 802.1X settings take effect when the `dot1x system-auth-control` command is set.
2. See *Table 22-1 Configuration commands and IEEE 802.1X authentication modes* for the authentication mode in which the command's settings are operable.
3. When this command is set, the setting information of the RADIUS server referenced by IEEE 801.X authentication has precedence over the information set by the `radius-server host` command (the settings of the `radius-server host` command are not applied). For details about the settings of general-use RADIUS server information and the IEEE 802.1X authentication RADIUS server information, see *Configuration Guide Vol. 2*.
4. A maximum of 4 IEEE 802.1X authentication RADIUS servers can be specified for each Switch.
5. `127.*.*.*` cannot be set as an IPv4 address.
6. If the `key` parameter is omitted and the `radius-server key` command is not set, the RADIUS server is disabled.
7. If multiple IEEE 802.1X authentication RADIUS servers are configured, the address displayed first by using the `show radius-server` operation command is the address of the primary RADIUS server. The primary IEEE 802.1X authentication RADIUS

server is used as the initial current server (the destination for RADIUS authentication requests during operation).

If a failure occurs on the primary IEEE 802.1X authentication RADIUS server, the current server switches to the next effective IEEE 802.1X authentication RADIUS server (the secondary RADIUS server). For details about automatic restoration of the primary IEEE 802.1X authentication RADIUS server, see the description of the `dot1x radius-server dead-interval` command.

8. If a RADIUS server with an IP address that matches has already been registered in the general-use RADIUS server configuration, other authentication-specific RADIUS server configuration, or the RADIUS server group configuration, all these parameters are replaced by the new commands that were entered automatically.

Related commands

aaa authentication dot1x

dot1x port-control

dot1x system-auth-control

dot1x reauthentication

After successful IEEE 802.1X authentication, this command sets whether a supplicant is to be re-authenticated. When this command is in effect, `EAP-Request/Identity` packets for re-authentication are sent at the interval set by using the `dot1x timeout reauth-period` command to a supplicant as a prompt for supplicant re-authentication.

Syntax

To set information:

```
dot1x reauthentication
```

To delete information:

```
no dot1x reauthentication
```

Input mode

```
(config-if)
```

Parameters

None

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All IEEE 802.1X settings take effect when the `dot1x system-auth-control` command is set.
2. See *Table 22-1 Configuration commands and IEEE 802.1X authentication modes* for the authentication mode in which the command's settings are operable.
3. This command takes effect only if the `dot1x port-control` command has been set.
4. If the `dot1x ignore-eapol-start` command has been set, you cannot use the `no dot1x reauthentication` command to set no re-authentication.

Related commands

dot1x ignore-eapol-start

dot1x timeout reauth-period

dot1x system-auth-control

dot1x port-control

dot1x supplicant-detection

Sets the behavior when a new terminal is detected after the terminal authentication mode has been set to an authentication submode.

Syntax

To set or change information:

```
dot1x supplicant-detection {disable | shortcut | auto}
```

To delete information:

```
no dot1x supplicant-detection
```

Input mode

```
(config-if)
```

Parameters

`{disable | shortcut | auto}`

Specifies the behavior when a new terminal is detected after terminal authentication submode has been set for authentication.

`disable`

If there is a terminal that was detected on the applicable port, this parameter suppresses EAP-Request/Identity transmission processing for detecting a new terminal when the authentication submode is set to terminal authentication mode. Specify this parameter if a supplicant operates abnormally if the authentication sequence is omitted in order to decrease switch load.

If this parameter is specified, authentication processing for a supplicant for which authentication cannot be initiated from the terminal cannot be started.

`shortcut`

Sends EAP-Request/Identity packets regularly in multicast routing for detecting a new terminal when the authentication submode is set to terminal authentication mode. Also, to reduce the load, the authentication sequence of an authenticated terminal is omitted. Specify this parameter for a supplicant that is unable to initiate authentication from a terminal.

If this parameter is specified, some supplicants might not operate correctly and communication is temporarily stopped.

`auto`

Suppresses EAP-Request/Identity transmission processing for detecting a new terminal when the authentication submode is set to terminal authentication mode, and sends EAP-Request/Identity packets in unicast routing when an ARP/IP frame is received from a new terminal.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   `disable`, `shortcut`, and `auto`

Default behavior

`shortcut` is used as the operation when a new terminal is detected.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All IEEE 802.1X settings take effect when the `dot1x system-auth-control` command is set.
2. See *Table 22-1 Configuration commands and IEEE 802.1X authentication modes* for the authentication mode in which the command's settings are operable.
3. This command takes effect only if the `dot1x port-control` command has been set.
4. This command takes effect only if the `dot1x multiple-authentication` command has been set.
5. `disable` cannot be set for the `dot1x supplicant-detection` command on an interface on which the `dot1x ignore-eapol-start` command has been set.

Related commands

dot1x ignore-eapol-start

dot1x multiple-authentication

dot1x system-auth-control

dot1x port-control

dot1x system-auth-control

Enables IEEE 802.1X.

Syntax

To set information:

```
dot1x system-auth-control
```

To delete information:

```
no dot1x system-auth-control
```

Input mode

```
(config)
```

Parameters

None

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. See *Table 22-1 Configuration commands and IEEE 802.1X authentication modes* for the authentication mode in which the command's settings are operable.
2. If the EAPOL forwarding functionality has been set, this command fails and IEEE 802.1X is not enabled.
3. If the `aaa authentication dot1x` command has not been set, a RADIUS server cannot be used for IEEE 802.1X authentication.

Related commands

l2protocol-tunnel eap

aaa authentication dot1x

dot1x timeout keep-unauth

Sets the period of time (in seconds) for maintaining the communication-disabled state of the interface if two or more terminals are connected to an interface on which the single-mode authentication submode is set. After the time set by using this command elapses, an authenticated terminal must be re-authenticated.

Syntax

To set or change information:

```
dot1x timeout keep-unauth <Seconds>
```

To delete information:

```
no dot1x timeout keep-unauth
```

Input mode

```
(config-if)
```

Parameters

<Seconds>

Sets the period of time (in seconds) for maintaining the communication-disabled state when single mode is set as authentication submode.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 65535 (seconds)

Default behavior

3600 seconds is used as the period of time for maintaining the communication-disabled state.

Impact on communication

None

When the change is applied

When the communication becomes impossible.

Notes

1. All IEEE 802.1X settings take effect when the `dot1x system-auth-control` command is set.
2. See *Table 22-1 Configuration commands and IEEE 802.1X authentication modes* for the authentication mode in which the command's settings are operable.
3. This command takes effect only if the `dot1x port-control` command has been set.
4. The value set for this command is applied only to an interface in single-mode authentication submode.

Related commands

dot1x system-auth-control

dot1x port-control

dot1x timeout keep-unauth

dot1x multiple-authentication

dot1x timeout quiet-period

Specifies the time (in seconds) to maintain the unauthenticated state on the applicable interface after an IEEE 802.1X authentication failure. During this period, no EAPOL packets are sent and received EAPOL packets are ignored. Also, no authentication is performed.

Syntax

To set or change information:

```
dot1x timeout quiet-period <Seconds>
```

To delete information:

```
no dot1x timeout quiet-period
```

Input mode

```
(config-if)
```

Parameters

<Seconds>

Specifies the period of time (in seconds) for maintaining the unauthenticated state.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 65535 (seconds)

Default behavior

60 seconds is used as the period for maintaining the unauthenticated state.

Impact on communication

None

When the change is applied

When the Switch enters an unauthenticated state due to an authentication failure.

Notes

1. All IEEE 802.1X settings take effect when the `dot1x system-auth-control` command is set.
2. See *Table 22-1 Configuration commands and IEEE 802.1X authentication modes* for the authentication mode in which the command's settings are operable.
3. This command takes effect only if the `dot1x port-control` command has been set.

Related commands

dot1x system-auth-control

dot1x port-control

dot1x timeout reauth-period

Specifies the interval (in seconds) for re-authenticating a supplicant after a successful IEEE 802.1X authentication. EAP-Request/Identify packets for re-authentication are sent to the supplicant at the interval set by using this command as a prompt for supplicant re-authentication.

Syntax

To set or change information:

```
dot1x timeout reauth-period <Seconds>
```

To delete information:

```
no dot1x timeout reauth-period
```

Input mode

```
(config-if)
```

Parameters

<Seconds>

Specifies the interval (in seconds) for re-authenticating a supplicant.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 65535 (seconds)

Default behavior

3600 seconds is used as the interval for re-authenticating a supplicant.

Impact on communication

None

When the change is applied

- When the operating timer times out (the value of the timer becomes 0).
- When the `clear dot1x auth-state` operation command is executed to cancel authentication at the authentication level or the switch level.
- When a terminal is authenticated successfully at the authentication level when there are no authenticated terminals.

Notes

1. All IEEE 802.1X settings take effect when the `dot1x system-auth-control` command is set.
2. See *Table 22-1 Configuration commands and IEEE 802.1X authentication modes* for the authentication mode in which the command's settings are operable.
3. This command takes effect only if the `dot1x port-control` command has been set.
4. This command takes effect only if re-authentication has been set by using the `dot1x reauthentication` command.
5. For the parameter, set a value greater than the value set by using the `dot1x timeout tx-period` command.

Related commands

dot1x timeout tx-period

dot1x reauthentication

dot1x system-auth-control

dot1x port-control

dot1x timeout server-timeout

Specifies the time (in seconds) to wait for a response, including the time required for retransmitting a response to an authentication server.

Syntax

To set or change information:

```
dot1x timeout server-timeout <Seconds>
```

To delete information:

```
no dot1x timeout server-timeout
```

Input mode

```
(config-if)
```

Parameters

<Seconds>

Specifies the time (in seconds) to wait for a response.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 65535 (seconds)

Default behavior

30 seconds is used as the time to wait for a response.

Impact on communication

None

When the change is applied

- When the operating timer times out (the value of the timer becomes 0).
- When authentication starts

Notes

1. All IEEE 802.1X settings take effect when the `dot1x system-auth-control` command is set.
2. See *Table 22-1 Configuration commands and IEEE 802.1X authentication modes* for the authentication mode in which the command's settings are operable.
3. This command takes effect only if the `dot1x port-control` command has been set.

Related commands

dot1x system-auth-control

dot1x port-control

dot1x timeout supp-timeout

Specifies the time (in seconds) to wait for a response from a supplicant for an EAP-Request packet sent to a supplicant. If no response is received during the specified period, the EAP-Request packet is retransmitted.

Syntax

To set or change information:

```
dot1x timeout supp-timeout <Seconds>
```

To delete information:

```
no dot1x timeout supp-timeout
```

Input mode

```
(config-if)
```

Parameters

<Seconds>

Specifies the time (in seconds) to wait for a response from a supplicant.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 65535 (seconds)

Default behavior

30 seconds is used as the time to wait for a response from a supplicant.

Impact on communication

None

When the change is applied

- When the operating timer times out (the value of the timer becomes 0).
- When authentication starts

Notes

1. All IEEE 802.1X settings take effect when the `dot1x system-auth-control` command is set.
2. See *Table 22-1 Configuration commands and IEEE 802.1X authentication modes* for the authentication mode in which the command's settings are operable.
3. This command takes effect only if the `dot1x port-control` command has been set.

Related commands

dot1x system-auth-control

dot1x max-req

dot1x port-control

dot1x timeout tx-period

Specifies the interval (in seconds) for sending EAP-Request/Identity packets when IEEE 802.1X is valid.

Syntax

To set or change information:

```
dot1x timeout tx-period <Seconds>
```

To delete information:

```
no dot1x timeout tx-period
```

Input mode

```
(config-if)
```

Parameters

<Seconds>

Specifies the interval (in seconds) for sending EAP-Request/Identity packets.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 65535 (seconds)

Default behavior

30 seconds is used as the interval for sending EAP-Request/Identity packets.

Impact on communication

None

When the change is applied

- When the operating timer times out (the value of the timer becomes 0).
- When the `clear dot1x auth-state` operation command is executed to cancel authentication at the authentication level or the switch level.

Notes

1. All IEEE 802.1X settings take effect when the `dot1x system-auth-control` command is set.
2. See *Table 22-1 Configuration commands and IEEE 802.1X authentication modes* for the authentication mode in which the command's settings are operable.
3. This command takes effect only if the `dot1x port-control` command has been set.
4. Specify a value smaller than the one set by using the `dot1x timeout reauth-period` command as the parameter value.

Related commands

dot1x timeout reauth-period

dot1x system-auth-control

dot1x port-control

dot1x vlan dynamic enable

Enables IEEE 802.1X VLAN-based authentication (dynamic).

Syntax

To set information:

```
dot1x vlan dynamic enable
```

To delete information:

```
no dot1x vlan dynamic enable
```

Input mode

```
(config)
```

Parameters

None

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All IEEE 802.1X settings take effect when the `dot1x system-auth-control` command is set.
2. See *Table 22-1 Configuration commands and IEEE 802.1X authentication modes* for the authentication mode in which the command's settings are operable.
3. When you set the `dot1x vlan dynamic enable` command, it will take effect only if you also set the `aaa authorization network default group radius` command.
4. When this command has not been set, none of the VLAN-based authentication (dynamic) functionality is enabled.
5. If at least one of the following commands is set for a Switch, this command cannot be set:
   - `authentication multi-step`
   - `dot1x authentication`
   - `mac-authentication authentication`
   - `web-authentication authentication`
   - `web-authentication user-group`

Related commands

dot1x system-auth-control

aaa authorization network default

dot1x vlan dynamic ignore-eapol-start

Sets the Switch not to issue EAP-Request/Identity packets in response to EAPOL-Start from a supplicant.

Syntax

To set information:

```
dot1x vlan dynamic ignore-eapol-start
```

To delete information:

```
no dot1x vlan dynamic ignore-eapol-start
```

Input mode

```
(config)
```

Parameters

None

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All IEEE 802.1X settings take effect when the `dot1x system-auth-control` command is set.
2. See *Table 22-1 Configuration commands and IEEE 802.1X authentication modes* for the authentication mode in which the command's settings are operable.
3. This command takes effect only if the `dot1x vlan dynamic enable` command has been set.
4. This command can be set only on an interface on which the `dot1x vlan dynamic reauthentication` command set and `disable` is not set for the `dot1x vlan dynamic supplicant-detection` command.
5. This command cannot be set on an interface on which `disable` is set for the `dot1x vlan dynamic supplicant-detection` command.
6. If this command has been set, you cannot use the `no dot1x vlan dynamic reauthentication` command to set no re-authentication.

Related commands

dot1x vlan dynamic reauthentication

dot1x vlan dynamic supplicant-detection

dot1x system-auth-control

dot1x vlan dynamic enable

dot1x vlan dynamic max-req

Specifies the maximum number of EAP-Request retransmissions if the supp-timeout value is exceeded. If the number of retransmissions exceeds this value, authentication is determined to have failed.

Syntax

To set or change information:

```
dot1x vlan dynamic max-req <Counts>
```

To delete information:

```
no dot1x vlan dynamic max-req
```

Input mode

```
(config)
```

Parameters

<Counts>

Specifies the maximum number of EAP-Request retransmissions.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 10 (times)

Default behavior

The maximum number of EAP-Request retransmissions is two.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All IEEE 802.1X settings take effect when the `dot1x system-auth-control` command is set.
2. See *Table 22-1 Configuration commands and IEEE 802.1X authentication modes* for the authentication mode in which the command's settings are operable.
3. This command takes effect only if the `dot1x vlan dynamic enable` command has been set.

Related commands

dot1x system-auth-control

dot1x vlan dynamic timeout supp-timeout

dot1x vlan dynamic enable

dot1x vlan dynamic radius-vlan

Specifies VLANs to allow dynamic VLAN allocation according to VLAN information sent from the RADIUS server during IEEE 802.1X authentication.

Syntax

To set information:

```
dot1x vlan dynamic radius-vlan <VLAN ID list>
```

To change information:

```
dot1x vlan dynamic radius-vlan {<VLAN ID list> | add <VLAN ID list> | remove <VLAN ID list>}
```

To delete information:

```
no dot1x vlan dynamic radius-vlan
```

Input mode

```
(config)
```

Parameters

<VLAN ID list>

Specifies the IDs of VLANs to which the IEEE 802.1X authentication settings are applied. Changing the parameter replaces the existing VLANs with the VLANs that have been specified. VLANs that have not been set for the Switch cannot be specified.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to specify *<VLAN ID List>* and the specifiable range of values, see *Specifiable values for parameters*. Note that the default VLAN (VLAN ID = 1) cannot be specified for this command.

`add` *<VLAN ID list>*

Specifies VLANs to be added to the VLANs to which the IEEE 802.1X authentication settings are applied. VLANs that have not been set for the Switch cannot be specified.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to specify *<VLAN ID List>* and the specifiable range of values, see *Specifiable values for parameters*. Note that the default VLAN (VLAN ID = 1) cannot be specified for this command.

`remove` *<VLAN ID list>*

Specifies VLANs to be removed from the VLANs to which the IEEE 802.1X authentication settings are applied. VLANs that have not been set for the Switch cannot be specified.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to specify *<VLAN ID List>* and the specifiable range of

values, see *Specifiable values for parameters*. Note that the default VLAN (VLAN ID = 1) cannot be specified for this command.

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All IEEE 802.1X settings take effect when the `dot1x system-auth-control` command is set.
2. See *Table 22-1 Configuration commands and IEEE 802.1X authentication modes* for the authentication mode in which the command's settings are operable.
3. This command takes effect only if the `dot1x vlan dynamic enable` command has been set.
4. The <*VLAN ID list*> parameter can be set only for the VLAN ID of a MAC VLAN that has been set.
5. A maximum of 256 VLANs can be set for VLAN-based authentication (dynamic).
6. If one of the VLANs within the specified range cannot be set, an error occurs.
7. If at least one of the following commands is set for a Switch, this command cannot be set:
   - `authentication multi-step`
   - `dot1x authentication`
   - `mac-authentication authentication`
   - `web-authentication authentication`
   - `web-authentication user-group`

Related commands

vlan

dot1x system-auth-control

dot1x vlan dynamic enable

switchport mac

dot1x vlan dynamic reauthentication

Sets whether a supplicant is to be re-authenticated after successful IEEE 802.1X authentication. When this command is in effect, EAP-Request/Identity packets for re-authentication are sent to a supplicant at the interval set by using the `dot1x vlan dynamic timeout reauth-period` command as a prompt for supplicant re-authentication.

Syntax

To set information:

```
dot1x vlan dynamic reauthentication
```

To delete information:

```
no dot1x vlan dynamic reauthentication
```

Input mode

```
(config)
```

Parameters

None

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All IEEE 802.1X settings take effect when the `dot1x system-auth-control` command is set.
2. See *Table 22-1 Configuration commands and IEEE 802.1X authentication modes* for the authentication mode in which the command's settings are operable.
3. This command takes effect only if the `dot1x vlan dynamic enable` command has been set.
4. If the `dot1x vlan dynamic ignore-eapol-start` command has been set, you cannot use the `no dot1x vlan dynamic reauthentication` command to set no re-authentication.

Related commands

dot1x system-auth-control

dot1x vlan dynamic ignore-eapol-start

dot1x vlan dynamic timeout reauth-period

dot1x vlan dynamic enable

dot1x vlan dynamic supplicant-detection

Specifies the behavior when a new terminal is detected.

Syntax

To set or change information:

```
dot1x vlan dynamic supplicant-detection {disable | shortcut}
```

To delete information:

```
no dot1x vlan dynamic supplicant-detection
```

Input mode

```
(config)
```

Parameters

`{disable | shortcut}`

Specifies the behavior when a new terminal is detected.

`disable`

If there is a terminal that was detected on the applicable port, this parameter suppresses EAP-Request/Identity transmission processing for detecting a new terminal. Specify this parameter if a supplicant operates abnormally if the authentication sequence is omitted in order to decrease switch load.

If this parameter is specified, authentication processing for a supplicant for which authentication cannot be initiated from the terminal cannot be started.

`shortcut`

Omits the authentication sequence of an authenticated terminal during EAP-Request/Identity transmission for detecting a new terminal to reduce the load. Specify this parameter for a supplicant that is unable to initiate authentication from a terminal.

If this parameter is set, some supplicants do not operate correctly and communication temporarily stops.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

Default behavior

`shortcut` is used as the operation when a new terminal is detected.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All IEEE 802.1X settings take effect when the `dot1x system-auth-control` command is set.
2. See *Table 22-1 Configuration commands and IEEE 802.1X authentication modes* for

the authentication mode in which the command's settings are operable.

3. This command takes effect only if the `dot1x vlan dynamic enable` command has been set.
4. On the interface on which the `dot1x vlan dynamic ignore-eapol-start` command is set, `disable` cannot be set for the `dot1x vlan dynamic supplicant-detection` command.

Related commands

dot1x vlan dynamic ignore-eapol-start

dot1x vlan dynamic enable

dot1x system-auth-control

dot1x vlan dynamic timeout quiet-period

Specifies the period of time (in seconds) for maintaining the unauthenticated state on the applicable interface after an IEEE 802.1X authentication failure. During this period, no EAPOL packets are sent and received EAPOL packets are ignored. Also, no authentication is performed.

Syntax

To set or change information:

```
dot1x vlan dynamic timeout quiet-period <Seconds>
```

To delete information:

```
no dot1x vlan dynamic timeout quiet-period
```

Input mode

```
(config)
```

Parameters

<Seconds>

Specifies the period of time (in seconds) for maintaining the unauthenticated state.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 65535 (seconds)

Default behavior

60 seconds is used as the period for maintaining the unauthenticated state.

Impact on communication

None

When the change is applied

When the Switch enters the unauthenticated state due to an authentication failure.

Notes

1. All IEEE 802.1X settings take effect when the `dot1x system-auth-control` command is set.
2. See *Table 22-1 Configuration commands and IEEE 802.1X authentication modes* for the authentication mode in which the command's settings are operable.
3. This command takes effect only if the `dot1x vlan dynamic enable` command has been set.

Related commands

dot1x system-auth-control

dot1x vlan dynamic enable

dot1x vlan dynamic timeout reauth-period

Specifies the interval (in seconds) for re-authenticating a supplicant after a successful IEEE 802.1X authentication. EAP-Request/Identify packets for re-authentication are sent to the supplicant at the interval set by using this command as a prompt for supplicant re-authentication.

Syntax

To set or change information:

```
dot1x vlan dynamic timeout reauth-period <Seconds>
```

To delete information:

```
no dot1x vlan dynamic timeout reauth-period
```

Input mode

```
(config)
```

Parameters

<Seconds>

Sets the interval (in seconds) for re-authenticating a supplicant.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 65535 (seconds)

Default behavior

3600 seconds is used as the interval for re-authenticating a supplicant.

Impact on communication

None

When the change is applied

- When the operating timer times out (the value of the timer becomes 0).
- When the `clear dot1x auth-state` operation command is executed to cancel authentication at the authentication level or the switch level.
- When a terminal is authenticated successfully at the authentication level when there are no authenticated terminals.

Notes

1. All IEEE 802.1X settings take effect when the `dot1x system-auth-control` command is set.
2. See *Table 22-1 Configuration commands and IEEE 802.1X authentication modes* for the authentication mode in which the command's settings are operable.
3. This command takes effect only if the `dot1x vlan dynamic enable` command has been set.
4. This command takes effect only if re-authentication has been set by using the `dot1x vlan dynamic reauthentication` command.
5. For the parameter, a value greater than the value set by using the `dot1x vlan`

`dynamic timeout tx-period` command.

Related commands

dot1x vlan dynamic timeout tx-period

dot1x vlan dynamic reauthentication

dot1x system-auth-control

dot1x vlan dynamic enable

dot1x vlan dynamic timeout server-timeout

Specifies the time (in seconds) to wait for a response, including the time required for retransmitting a response to an authentication server.

Syntax

To set or change information:

```
dot1x vlan dynamic timeout server-timeout <Seconds>
```

To delete information:

```
no dot1x vlan dynamic timeout server-timeout
```

Input mode

```
(config)
```

Parameters

<Seconds>

Specifies the time (in seconds) to wait for a response.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 65535 (seconds)

Default behavior

30 seconds is used as the time to wait for a response.

Impact on communication

None

When the change is applied

- When the operating timer times out (the value of the timer becomes 0).
- When authentication starts

Notes

1. All IEEE 802.1X settings take effect when the `dot1x system-auth-control` command is set.
2. See *Table 22-1 Configuration commands and IEEE 802.1X authentication modes* for the authentication mode in which the command's settings are operable.
3. This command takes effect only if the `dot1x vlan dynamic enable` command has been set.

Related commands

dot1x system-auth-control

dot1x vlan dynamic enable

dot1x vlan dynamic timeout supp-timeout

Specifies the time (in seconds) to wait for a response from a supplicant for an EAP-Request packet sent to a supplicant. If no response is received during the specified period, the EAP-Request packet is retransmitted.

Syntax

To set or change information:

```
dot1x vlan dynamic timeout supp-timeout <Seconds>
```

To delete information:

```
no dot1x vlan dynamic timeout supp-timeout
```

Input mode

```
(config)
```

Parameters

<Seconds>

Specifies the time (in seconds) to wait for a response from a supplicant.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 65535 (seconds)

Default behavior

30 seconds is used as the time to wait for a response from a supplicant.

Impact on communication

None

When the change is applied

- When the operating timer times out (the value of the timer becomes 0).
- When authentication starts

Notes

1. All IEEE 802.1X settings take effect when the `dot1x system-auth-control` command is set.
2. See *Table 22-1 Configuration commands and IEEE 802.1X authentication modes* for the authentication mode in which the command's settings are operable.
3. This command takes effect only if the `dot1x vlan dynamic enable` command has been set.

Related commands

dot1x system-auth-control

dot1x vlan dynamic max-req

dot1x vlan dynamic enable

dot1x vlan dynamic timeout tx-period

Specifies the interval (in seconds) for sending EAP-Request/Identity packets when IEEE 802.1X authentication is valid.

Syntax

To set or change information:

```
dot1x vlan dynamic timeout tx-period <Seconds>
```

To delete information:

```
no dot1x vlan dynamic timeout tx-period
```

Input mode

```
(config)
```

Parameters

<Seconds>

Specifies the interval (in seconds) for sending EAP-Request/Identity packets.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 65535 (seconds)

Default behavior

30 seconds is used as the interval for sending EAP-Request/Identity packets.

Impact on communication

None

When the change is applied

- When the operating timer times out (the value of the timer becomes 0).
- When the `clear dot1x auth-state` operation command is executed to cancel authentication at the authentication level or the switch level.

Notes

1. All IEEE 802.1X settings take effect when the `dot1x system-auth-control` command is set.
2. See *Table 22-1 Configuration commands and IEEE 802.1X authentication modes* for the authentication mode in which the command's settings are operable.
3. This command takes effect only if the `dot1x vlan dynamic enable` command has been set.
4. For the parameter, set a value smaller than the value set by using the `dot1x vlan dynamic timeout reauth-period` command.

Related commands

dot1x system-auth-control

dot1x vlan dynamic timeout reauth-period

dot1x vlan dynamic enable

23. Web Authentication

Correspondence between configuration commands and authentication modes
aaa accounting web-authentication
aaa authentication web-authentication
aaa authentication web-authentication end-by-reject
web-authentication authentication
web-authentication auto-logout
web-authentication force-authorized vlan
web-authentication html-fileset
web-authentication ip address
web-authentication jump-url
web-authentication logout ping tos-windows
web-authentication logout ping ttl
web-authentication logout polling count
web-authentication logout polling enable
web-authentication logout polling interval
web-authentication logout polling retry-interval
web-authentication max-timer
web-authentication max-user
web-authentication max-user (interface)
web-authentication port
web-authentication radius-server dead-interval
web-authentication radius-server host
web-authentication redirect-mode
web-authentication redirect enable
web-authentication redirect tcp-port
web-authentication roaming
web-authentication static-vlan force-authorized
web-authentication static-vlan max-user
web-authentication static-vlan max-user (interface)
web-authentication static-vlan roaming
web-authentication system-auth-control
web-authentication user-group
web-authentication user replacement
web-authentication vlan
web-authentication web-port
web-authentication web-port
dns-server
ip dhcp excluded-address
ip dhcp pool
lease

max-lease
network
service dhcp

Correspondence between configuration commands and authentication modes

The following table describes Web authentication modes in which Web authentication configuration commands can be set.

Table 23-1 Configuration commands and Web authentication modes

Command name	Web authentication modes[#3]		
	F	**D**	**L**
aaa accounting web-authentication	Y	Y	Y
aaa authentication web-authentication	Y	Y	Y
aaa authentication web-authentication end-by-reject	Y	Y	--
authentication arp-relay[#1]	Y	Y	N
authentication ip access-group[#1]	Y	Y	N
web-authentication authentication	Y	Y	N
web-authentication auto-logout	Y	Y	Y
web-authentication force-authorized vlan	--	Y	Y
web-authentication html-fileset	Y	Y	N
web-authentication ip address	Y	Y	Y
web-authentication jump-url	Y	Y	Y
web-authentication logout ping tos-windows	Y	Y	Y
web-authentication logout ping ttl	Y	Y	Y
web-authentication logout polling count	Y	--	--
web-authentication logout polling enable	Y	--	--
web-authentication logout polling interval	Y	--	--
web-authentication logout polling retry-interval	Y	--	--
web-authentication max-timer	Y	Y	Y
web-authentication max-user	--	Y	Y
web-authentication max-user (interface)	--	Y	Y
web-authentication port[#2]	Y	Y	--

Correspondence between configuration commands and authentication modes

Command name	Web authentication modes[#3]		
	F	D	L
web-authentication radius-server dead-interval	Y	Y	Y
web-authentication radius-server host	Y	Y	Y
web-authentication redirect-mode	Y	Y	--
web-authentication redirect enable	Y	Y	--
web-authentication redirect tcp-port	Y	Y	--
web-authentication roaming	--	Y	--
web-authentication static-vlan force-authorized	Y	--	--
web-authentication static-vlan max-user	Y	--	--
web-authentication static-vlan max-user (interface)	Y	--	--
web-authentication static-vlan roaming	Y	--	--
web-authentication system-auth-control	Y	Y	Y
web-authentication user-group	Y	Y	N
web-authentication user replacement	Y	Y	Y
web-authentication vlan	--	--	Y
web-authentication web-port	Y	Y	--
default-router	--	Y	Y
dns-server	--	Y	Y
ip dhcp excluded-address	--	Y	Y
ip dhcp pool	--	Y	Y
lease	--	Y	Y
max-lease	--	Y	Y
network	--	Y	Y
service dhcp	--	Y	Y

Legend

F: Fixed VLAN mode

D: Dynamic VLAN mode

L: Legacy mode

Y :The command operates according to the settings.

: The command can be entered, but it will have no effect.

N :The command cannot be entered.

#1

For details about command input formats, see *21. Common to Layer 2 Authentication*.

#2

The specification of this command affects the switching of authentication modes.

#3

For details such as a description of the authentication modes, see the *Configuration Guide Vol. 2*.

aaa accounting web-authentication

Sends accounting information for Web authentication to the accounting server.

Syntax

To set information:

```
aaa accounting web-authentication default start-stop group radius
```

To delete information:

```
no aaa accounting web-authentication default
```

Input mode

```
(config)
```

Parameters

`default`

Sets the default accounting method of a Switch.

`start-stop`

If a user logs in, an accounting start notification is sent to the accounting server. If a user logs out, a stop accounting notification is sent to the accounting server.

`group radius`

The RADIUS server is used as the accounting server.

Default behavior

A notification is not sent to the accounting server.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All Web authentication settings take effect when the `web-authentication system-auth-control` command is set.
2. See *Table 23-1 Configuration commands and Web authentication modes* for the authentication mode in which the command's settings are operable.

Related commands

aaa authentication web-authentication

web-authentication system-auth-control

radius-server host or web-authentication radius-server host

aaa authentication web-authentication

Sets an authentication method group for Web authentication.

If the first specified method fails, the second specified method is used. You can change how authentication works when the first method failed by using the `aaa authentication web-authentication end-by-reject` command.

If `default` is set, one entry can be set. If an authentication method list name is specified, a maximum of four entries can be set.

Syntax

To set or change information:

```
aaa authentication web-authentication default <Method> [<Method>]
aaa authentication web-authentication <List name> group <Group name>
```

To delete information:

```
no aaa authentication web-authentication {default | <List name>}
```

Input mode

```
(config)
```

Parameters

`default` *<Method>* `[`*<Method>*`]`

Sets the default authentication method of a Switch. You cannot specify the same *<Method>* more than once.

For *<Method>*, specify `group radius` or `local`.

`group radius`

Web authentication is performed by a RADIUS server. The RADIUS server that can be used is a Web authentication RADIUS server or a general-use RADIUS server.

`local`

Local authentication is performed. The internal Web authentication database is used.

<List name>

Sets the name of an authentication method list.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a character string that has no more than 32 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

   We recommend that you use an upper-case letter for the first character.

   However, you cannot use the following character strings:

   - At mark (`@`)
   - `default` or a character string beginning with `default`
   - `end-by-reject` or a character string beginning with `end-by-reject`

`group` *<Group Name>*

Web authentication is performed by a RADIUS server. The RADIUS server to use is a RADIUS server group. Specify the group name set by the `aaa group server radius` command.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a character string that has no more than 32 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

Default behavior

User authentication is performed by using the internal Web authentication database instead of using the RADIUS server.

Impact on communication

When the Switch default is changed, authentication of the terminals authenticated by using the Switch default authentication method is canceled.

When the authentication method list is changed, authentication of terminals authenticated by the corresponding authentication method list is canceled.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All Web authentication settings take effect when the `web-authentication system-auth-control` command is set.
2. See *Table 23-1 Configuration commands and Web authentication modes* for the authentication mode in which the command's settings are operable.
3. Enabling of this command requires a separate authentication setting for the RADIUS server.
4. The forced authentication functionality for Web authentication operates when only RADIUS authentication is set. If multiple authentication methods are set, the forced authentication functionality does not operate.

Related commands

aaa authentication web-authentication end-by-reject

aaa group server radius

radius-server host or web-authentication radius-server host

web-authentication system-auth-control

web-authentication user-group

web-authentication authentication

aaa authentication web-authentication end-by-reject

Terminates authentication if login authentication is denied. If authentication fails due to a communication not being possible, such as an unresponsive RADIUS server, the next authentication method specified by the `aaa authentication web-authentication` command is used to perform authentication.

Syntax

To set information:

```
aaa authentication web-authentication end-by-reject
```

To delete information:

```
no aaa authentication web-authentication end-by-reject
```

Input mode

```
(config)
```

Parameters

None

Default behavior

If authentication fails, regardless of the reason for failure, the next authentication method specified by the `aaa authentication web-authentication` command is used to perform authentication.

Impact on communication

Authentication of terminals authenticated by the Web authentication functionality is canceled.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. See *Table 23-1 Configuration commands and Web authentication modes* for the authentication mode in which the command's settings are operable.
2. This command is only valid for authentication methods specified by the `aaa authentication web-authentication` command.

Related commands

aaa authentication web-authentication

web-authentication authentication

Sets the name of an authentication method list for the port-based authentication method.

Syntax

To set or change information:

```
web-authentication authentication <List name>
```

To delete information:

```
no web-authentication authentication
```

Input mode

```
(config-if)
```

Parameters

<List name>

Specify the authentication method list name set by using the `aaa authentication web-authentication` command.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a character string that has no more than 32 characters. For details about the characters that can be specified, see *Specifiable values for parameters* (with the exception of the at mark (`@`)).

   We recommend that you use an upper-case letter for the first character.

Default behavior

Web authentication uses the default values of the Switch.

Impact on communication

Authentication of a terminal for a port whose authentication method list name has been changed is canceled.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All Web authentication settings take effect when the `web-authentication system-auth-control` command is set.
2. See *Table 23-1 Configuration commands and Web authentication modes* for the authentication mode in which the command's settings are operable.
3. If at least one of the following commands is set for a Switch, this command cannot be set:
   - `dot1x vlan dynamic enable`
   - `dot1x vlan dynamic radius-vlan`
   - `web-authentication user-group`
   - `web-authentication vlan`
   - `mac-authentication interface`

- `mac-authentication vlan`

4. If the name of the authentication method list set by using this command does not match the name of the authentication method list set by using the `aaa authentication web-authentication` command, the Switch default is used.
5. This command can be set only for Ethernet interfaces.

Related commands

aaa authentication web-authentication

web-authentication system-auth-control

web-authentication port

web-authentication auto-logout

The `no web-authentication auto-logout` command disables the setting for automatic authentication logout when it is detected that the status that frames have not been received from a terminal authenticated via Web authentication for a certain period of time.

Syntax

To set information:

```
no web-authentication auto-logout
```

To delete information:

```
web-authentication auto-logout
```

Input mode

```
(config)
```

Parameters

None

Default behavior

An authentication is automatically logged out if no frames are received from a terminal authenticated via Web authentication for a certain period of time.

Impact on communication

After the `no web-authentication auto-logout` command has been set, an authentication is not automatically logged out even if it is detected that no frames have been received from a terminal authenticated via Web authentication for a certain period of time.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All Web authentication settings take effect when the `web-authentication system-auth-control` command is set.
2. See *Table 23-1 Configuration commands and Web authentication modes* for the authentication mode in which the command's settings are operable.

Related commands

web-authentication system-auth-control

web-authentication port

web-authentication vlan

mac-address-table aging-time

web-authentication force-authorized vlan

When the RADIUS authentication method is used, if the RADIUS server does not respond or a request to a RADIUS server fails due to route failure, this command forcibly changes the status of a terminal, that requests authentication on the applicable port, to authentication authorized and assigns a post-authentication VLAN.

Syntax

To set or change information:

```
web-authentication force-authorized vlan <VLAN ID> [action trap]
```

To delete information:

```
no web-authentication force-authorized vlan
```

Input mode

```
(config-if)
```

Parameters

<VLAN ID>

Sets the post-authentication VLAN ID to be assigned when authentication is permitted by forced authentication.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   See *Specifiable values for parameters*.

   Note, however, that the default VLAN (`VLAN ID = 1`) cannot be set.

`[action trap]`

When forced authentication is authorized, private traps are issued.

1. Default value when this parameter is omitted:

   Private traps are not issued if forced authentication is authorized.

2. Range of values:

   action trap

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All Web authentication settings take effect when the `web-authentication system-auth-control` command is set.
2. See *Table 23-1 Configuration commands and Web authentication modes* for the authentication mode in which the command's settings are operable.

3. Set a VLAN ID for which `mac-based` (MAC VLAN) has been set in the `vlan` command.
4. Be especially careful when using this functionality, as it can pose a security problem.
5. This command is enabled when the following condition exists:
   - All the following configurations have been set:
     - `radius-server host` or `web-authentication radius-server host`
     - `web-authentication system-auth-control`
     - `web-authentication port` #1, #4
     - `web-authentication vlan` #2, #3
     - `vlan` *<VLAN ID>* `mac-based` #3
     - `web-authentication force-authorized vlan` #3, #4
     - `switchport mac vlan` #2, #3, #4
     - `switchport mode mac-vlan` #4
     - `aaa authentication web-authentication` #5
     - `web-authentication authentication` #6

   #1

   Set this configuration when using dynamic VLAN mode.

   #2

   Set this command when using legacy mode.

   #3

   Set the same VLAN ID for commands marked #3.

   #4

   Specify the same Ethernet port.

   - The following accounting log data is collected when an authentication request is sent to the RADIUS server:

     No=21:

     NOTICE:LOGIN:(additional information) Login failed ; Failed to connection to RADIUS server.

     additional-information:MAC, USER, IP, PORT or CHGR, VLAN

     Check the account log with the show web-authentication logging operation command.

   #5

   When forced authentication is used as the Switch default, set only `default group radius`.

   #6

   Set `aaa authentication web-authentication` *<List name>* for forced authentication that uses the port-based authentication method.
6. The authorized forced authentication state is canceled if the applicable user logs out.
7. When private traps are issued, use the `snmp-server host` command to set the destination IP address for traps and `web-authentication`.
8. If either of the following commands has already been set, this command cannot be set:
   - `authentication force-authorized enable`
   - `authentication force-authorized vlan`

Related commands

aaa authentication web-authentication

radius-server host or web-authentication radius-server host

switchport mac

switchport mode

vlan

web-authentication port

web-authentication system-auth-control

web-authentication vlan

web-authentication html-fileset

Sets a custom file name for the Web authentication page displayed for each port.

Syntax

To set or change information:

```
web-authentication html-fileset <Name>
```

To delete information:

```
no web-authentication html-fileset
```

Input mode

```
(config-if)
```

Parameters

<Name>

Specify the custom file set name registered on the Switch by using the `set web-authentication html-files` operation command.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a character string that has no more than 16 characters. Specifiable characters are upper-case and numeric characters.

Default behavior

The basic Web authentication page is displayed when a user logs in.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All Web authentication settings take effect when the `web-authentication system-auth-control` command is set.
2. See *Table 23-1 Configuration commands and Web authentication modes* for the authentication mode in which the command's settings are operable.
3. To set this command, set the `web-authentication port` command for the applicable port in advance.
4. This command can be set only for Ethernet interfaces.

Related commands

web-authentication port

web-authentication system-auth-control

web-authentication ip address

Configure an IP address and a domain name to be used exclusively for Web authentication. When the Web authentication IP address has been set by using this command, you can log in from an unauthenticated terminal or log out from an authenticated terminal by using the same IP address on the switch.

Syntax

To set or change information:

```
web-authentication ip address <IP address> [fqdn <FQDN>]
```

To delete information:

```
no web-authentication ip address
```

Input mode

```
(config)
```

Parameters

<IP address>

Sets the Web authentication IP address.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Sets the IPv4 address (dot notation).

   1.0.0.0 to 126.255.255.255, 128.0.0.0 to 223.255.255.255

   IP address of a subnet that does not overlap a VLAN interface set for the Switch

`fqdn` *<FQDN>*

Use a fully qualified domain name (FQDN).

1. Default value when this parameter is omitted:

   Only *<IP address>* is used.

2. Range of values:

   Specify a character string that has no more than 256 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

Default behavior

The IP address of an pre-authentication VLAN is used.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All Web authentication settings take effect when the `web-authentication system-auth-control` command is set.

2. See *Table 23-1 Configuration commands and Web authentication modes* for the authentication mode in which the command's settings are operable.
3. This command cannot be set if the `system function` command is set and `extended-authentication` has not been set. (This command can be set if the `system function` command has not been set.) [AX1250S] [AX1240S]
4. Because the IP address set by using this command is used exclusively for Web authentication access on a Switch, the IP address is not sent outside the Switch.
5. When this setting is used, an IP address must be set for the pre-authentication VLAN.
6. To use the Web authentication IP address on a port in fixed VLAN mode or dynamic VLAN mode, you must set `authentication arp-relay`.
7. After this command is set or deleted, a user who is in the process of being authenticated must log in again.

Related commands

web-authentication system-auth-control

web-authentication port

authentication arp-relay

web-authentication jump-url

Configures a URL to be automatically displayed after the Authentication Success page is displayed and the time required before jumping to the URL.

Syntax

To set or change information:

```
web-authentication jump-url <URL> [ delay <Seconds> ]
```

To delete information:

```
no web-authentication jump-url
```

Input mode

```
(config)
```

Parameters

<URL>

Displays the page of the specified URL after the page indicating successful authentication is displayed.

Enter the URL starting from the first character (for example, http://.....). (See the configuration example below.)

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Enclose a character string consisting of 1 to 256 characters in double quotation marks. For the characters that can be specified, see *Specifiable values for parameters*.

   Examples

   (config)# web-authentication jump-url "http://www.example.com/"

`[ delay <Seconds> ]`

Specifies the time required before jumping to the specified *<URL>*. (See the configuration example below.)

1. Default value when this parameter is omitted:

   After five seconds, you are taken to the *URL* that has been set.

2. Range of values:

   0 to 60 (seconds)

   Examples

   ```
   (config)# web-authentication jump-url "http://www.example.com/"
   delay 20
   ```

Default behavior

After successful authentication, only the Authentication Success page is displayed because the automatically displayed URL has not been set yet.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All Web authentication settings take effect when the `web-authentication system-auth-control` command is set.
2. See *Table 23-1 Configuration commands and Web authentication modes* for the authentication mode in which the command's settings are operable.
3. When the Authentication Success page is replaced by using the `set web-authentication html-files` operation command, write the tag of the URL (*<!-- Redirect_URL -->*) to jump to after successful authentication and the settings of this command in the Authentication Success page file (`loginOK.html`) that is to be replaced. By doing this, the page specified by the URL appears automatically after successful authentication.
4. When fixed VLAN mode is used, setting the time required before jumping to the specified URL is not necessary. Specify the value if you want to automatically display the URL faster than the default setting.
5. When dynamic VLAN mode or legacy mode is used, the IP address of the authentication terminal must be changed for switching from a pre-authentication VLAN to a post-authentication VLAN. Therefore, set the time required before jumping to the specified URL to approximately 20 to 30 seconds.
   - If IP addresses have been distributed to unauthenticated terminals on the internal DHCP server (default lease time: 10 seconds), the IP addresses are obtained from the normal DHCP server for a post-authentication VLAN. Accordingly, it might take approximately 20-30 seconds before a post-authentication VLAN can communicate after the completion of authentication.

Related commands

web-authentication system-auth-control

web-authentication port

web-authentication vlan

web-authentication logout ping tos-windows

Sets the TOS value of a special frame used to log out from an authenticated terminal.

Syntax

To set or change information:

```
web-authentication logout ping tos-windows <TOS>
```

To delete information:

```
no web-authentication logout ping tos-windows
```

Input mode

```
(config)
```

Parameters

<TOS>

Sets the TOS value for the special frame used for logout.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 255

Default behavior

1 is set as the TOS value of the special frame.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All Web authentication settings take effect when the `web-authentication system-auth-control` command is set.
2. See *Table 23-1 Configuration commands and Web authentication modes* for the authentication mode in which the command's settings are operable.
3. When a ping frame that meets all the following conditions is received, the authenticated terminal is logged out.
   - A ping frame is sent from an authenticated terminal to the Web authentication IP address.
   - The TTL value of the ping frame must match the TTL value specified by using the `web-authentication logout ping ttl` command.
   - The TOS value of the ping frame must match the TOS value set by using this command.

Related commands

web-authentication system-auth-control

web-authentication logout ping ttl

web-authentication logout ping ttl

Sets the TTL value of a special frame used to log out from an authenticated terminal.

Syntax

To set or change information:

```
web-authentication logout ping ttl <TTL>
```

To delete information:

```
no web-authentication logout ping ttl
```

Input mode

```
(config)
```

Parameters

<TTL>

Sets the TTL value of the special frame used for logout.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 255

Default behavior

1 is set as the TTL value of the special frame.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All Web authentication settings take effect when the `web-authentication system-auth-control` command is set.
2. See *Table 23-1 Configuration commands and Web authentication modes* for the authentication mode in which the command's settings are operable.
3. When a ping frame that meets all the following conditions is received, the authenticated terminal is logged out.
   - A ping frame is sent from an authenticated terminal to the Web authentication IP address.
   - The TTL value of the ping frame must match the TTL value specified by using this command.
   - The TOS value of the ping frame must match the TOS value set by using the `web-authentication logout ping tos-windows` command.

Related commands

web-authentication system-auth-control

web-authentication logout ping tos-windows

web-authentication logout polling count

Specifies the number of times a Switch retransmits the monitoring frame when there is no response to a monitoring frame that periodically checks a connection status of authenticated terminals.

Syntax

To set or change information:

```
web-authentication logout polling count <Count>
```

To delete information:

```
no web-authentication logout polling count
```

Input mode

```
(config)
```

Parameters

<Count>

Sets the number of times a Switch retransmits a monitoring frame when there is no response to a monitoring frame.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 10 (times)

Default behavior

The monitoring frame is retransmitted a maximum of three times.

Impact on communication

None

When the change is applied

The setting takes effect the first time no response is detected following the change of value.

Notes

1. All Web authentication settings take effect when the `web-authentication system-auth-control` command is set.
2. See *Table 23-1 Configuration commands and Web authentication modes* for the authentication mode in which the command's settings are operable.
3. If the link for a monitored terminal goes down before periodic monitoring by the functionality that monitors the connection of authenticated terminals arrives, the Switch stops monitoring the terminal and logs it out due to its link-down state.
4. When the specified maximum connection time (set by using the `web-authentication max-timer` command) expires, the Switch stops monitoring the applicable terminal and logs it out.
5. If the number of retransmissions when a no-response state is detected is set to the maximum, the number of monitoring frames increases proportionately with the number of authenticated users, overloading the Switch.

   Set the polling interval by using the following formula as a guide:

Polling condition:

(1) Polling interval > (2) Retransmission interval × (3) Number of retransmissions

`web-authentication logout polling interval`

`web-authentication logout polling retry-interval`

`web-authentication logout polling count`

We recommend you use the default value for the number of retransmissions.

If a large value is set as the number of retransmissions, the difference between the polling interval and retransmission interval might increase depending on the retransmission frequency.

Related commands

web-authentication system-auth-control

web-authentication max-timer

web-authentication port

web-authentication logout polling enable

web-authentication logout polling interval

web-authentication logout polling retry-interval

web-authentication logout polling enable

The `no web-authentication logout polling enable` command disables the auto logout functionality executed when periodic connection monitoring detects that an authenticated terminal is not connected.

Syntax

To set information:

```
no web-authentication logout polling enable
```

To delete information:

```
web-authentication logout polling enable
```

Input mode

```
(config)
```

Parameters

None

Default behavior

The connection of authenticated terminals is monitored according to the following conditions, and a terminal is automatically logged out if a no-connection state is detected.

- Polling interval

  The interval set by using the `web-authentication logout polling interval` command. 300 seconds is set by default.

- Retransmission interval

  The interval set by using the `web-authentication logout polling retry-interval` command. 1 second is set by default.

- Number of retransmissions

  The number of retransmissions set by using the `web-authentication logout polling count` command. Three retransmissions is set by default.

Impact on communication

When the `no web-authentication logout polling enable` command is set, connection is not monitored periodically. As a result, a terminal is not logged out automatically even if it is disconnected.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All Web authentication settings take effect when the `web-authentication system-auth-control` command is set.
2. See *Table 23-1 Configuration commands and Web authentication modes* for the authentication mode in which the command's settings are operable.
3. If the link for a monitored terminal goes down before periodic monitoring by the functionality that monitors the connection of authenticated terminals arrives, the Switch stops monitoring the terminal and logs it out due to its link-down state.
4. When the specified maximum connection time (set by using the

`web-authentication max-timer` command) expires, the Switch stops monitoring the applicable terminal and logs it out.

5. The polling interval (set by using the `web-authentication logout polling interval` command) is the time between the receipt of ARP Reply from an authenticated terminal and the next polling monitoring.
6. If the number of retransmissions when a no-response state is detected is set to the maximum, the number of monitoring frames increases proportionately with the number of authenticated users, overloading the Switch.

   Set the polling interval by using the following formula as a guide:

   Polling condition:

   (1) Polling interval > (2) Retransmission interval × (3) Number of retransmissions

   `web-authentication logout polling interval`

   `web-authentication logout polling retry-interval`

   `web-authentication logout polling count`

   We recommend you use the default value for the number of retransmissions.

   If a large value is set as the number of retransmissions, the difference between the polling interval and retransmission interval might increase depending on the retransmission frequency.

Related commands

web-authentication system-auth-control

web-authentication max-timer

web-authentication port

web-authentication logout polling count

web-authentication logout polling interval

web-authentication logout polling retry-interval

web-authentication logout polling interval

Specifies the polling interval of a monitoring frame that periodically monitors the connection status of an authenticated terminal.

Syntax

To set or change information:

```
web-authentication logout polling interval <Seconds>
```

To delete information:

```
no web-authentication logout polling interval
```

Input mode

```
(config)
```

Parameters

<Seconds>

Sets the polling interval of monitoring frames.

- Default value when this parameter is omitted:

  This parameter cannot be omitted.

- Range of values:

  60 to 86400 (seconds)

Default behavior

Monitoring frames are sent every 300 seconds to an authenticated terminal only if the automatic logout command (the `web-authentication logout polling enable` command) used with periodic monitoring has been set.

Impact on communication

None

When the change is applied

The setting takes effect from the next polling interval.

Notes

1. All Web authentication settings take effect when the `web-authentication system-auth-control` command is set.
2. See *Table 23-1 Configuration commands and Web authentication modes* for the authentication mode in which the command's settings are operable.
3. If the link for a monitored terminal goes down before periodic monitoring by the functionality that monitors the connection of authenticated terminals arrives, the Switch stops monitoring the terminal and logs it out due to its link-down state.
4. When the maximum connection time set by using the `web-authentication max-timer` command expires, the Switch stops monitoring the applicable terminal and logs it out.
5. The polling interval is the time between the receipt of ARP Reply from a target authenticated terminal and the next polling monitoring.
6. If the number of retransmissions when a no-response state is detected is set to the maximum, the number of monitoring frames increases proportionately with the

number of authenticated users, overloading the Switch.

Set the polling interval by using the following formula as a guide:

Polling condition:

(1) Polling interval > (2) Retransmission interval × (3) Number of retransmissions

`web-authentication logout polling interval`

`web-authentication logout polling retry-interval`

`web-authentication logout polling count`

We recommend you use the default value for the number of retransmissions.

If a large value is set as the number of retransmissions, the difference between the polling interval and retransmission interval might increase depending on the retransmission frequency.

Related commands

web-authentication system-auth-control

web-authentication max-timer

web-authentication port

web-authentication logout polling count

web-authentication logout polling enable

web-authentication logout polling retry-interval

web-authentication logout polling retry-interval

Sets the interval between retransmissions of monitoring frames that periodically monitor the connection status of authenticated terminals when a no-response state is detected.

Syntax

To set or change information:

```
web-authentication logout polling retry-interval <Seconds>
```

To delete information:

```
no web-authentication logout polling retry-interval
```

Input mode

```
(config)
```

Parameters

<Seconds>

Sets the retransmission interval of monitoring frames.

- Default value when this parameter is omitted:

  This parameter cannot be omitted.

- Range of values:

  1 to 10 (seconds)

Default behavior

1 second is set as the retransmission interval of monitoring frames.

Impact on communication

None

When the change is applied

The setting takes effect from the next retransmission interval.

Notes

1. All Web authentication settings take effect when the `web-authentication system-auth-control` command is set.
2. See *Table 23-1 Configuration commands and Web authentication modes* for the authentication mode in which the command's settings are operable.
3. If the link for a monitored terminal goes down before periodic monitoring by the functionality that monitors the connection of authenticated terminals arrives, the Switch stops monitoring the terminal and logs it out due to its link-down state.
4. When the maximum connection time set by using the `web-authentication max-timer` command expires, the Switch stops monitoring the applicable terminal and logs it out.
5. If the number of retransmissions when a no-response state is detected is set to the maximum, the number of monitoring frames increases proportionately with the number of authenticated users, overloading the Switch.

   Set the polling interval by using the following formula as a guide:

   Polling condition:

(1) Polling interval > (2) Retransmission interval × (3) Number of retransmissions

`web-authentication logout polling interval`

`web-authentication logout polling retry-interval`

`web-authentication logout polling count`

We recommend you use the default value for the number of retransmissions.

If a large value is set as the number of retransmissions, the difference between the polling interval and retransmission interval might increase depending on the retransmission frequency.

Related commands

web-authentication system-auth-control

web-authentication max-timer

web-authentication port

web-authentication logout polling count

web-authentication logout polling enable

web-authentication logout polling interval

web-authentication max-timer

Sets the maximum connection time.

Syntax

To set or change information:

```
web-authentication max-timer { <Minutes> | infinity }
```

To delete information:

```
no web-authentication max-timer
```

Input mode

```
(config)
```

Parameters

`{ <Minutes> | infinity }`

Sets the maximum time (in minutes) that an authenticated user is allowed to be connected. After a user has logged in, if the time set by using this command elapses, the user is automatically logged out.

If `infinity` is set, there is no limit on the connection time.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   10 to 1440 (minutes) or `infinity`

Default behavior

60 minutes is set as the maximum connection time.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All Web authentication settings take effect when the `web-authentication system-auth-control` command is set.
2. See *Table 23-1 Configuration commands and Web authentication modes* for the authentication mode in which the command's settings are operable.
3. If the value for the maximum connection time is either decreased or increased, the previous setting is applied to a user that is currently authenticated, and the current setting takes effect only from the next login.
4. The time on the Switch is not used for the connection time for Web authentication. Accordingly, if the date and time is changed by using the `set clock` operation command, the connection time is not affected.

Related commands

web-authentication system-auth-control

web-authentication vlan

web-authentication auto-logout

web-authentication port

web-authentication max-user

Sets the maximum number of users that can be authenticated on a Switch.

Syntax

To set or change information:

```
web-authentication max-user <Count>
```

To delete information:

```
no web-authentication max-user
```

Input mode

```
(config)
```

Parameters

<Count>

Sets the maximum number of users that can be authenticated on a Switch on which user authentication is performed.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 256

Default behavior

The maximum number of users that can be authenticated on a Switch is 256.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All Web authentication settings take effect when the `web-authentication system-auth-control` command is set.
2. See *Table 23-1 Configuration commands and Web authentication modes* for the authentication mode in which the command's settings are operable.
3. When this command is set, the setting is not applied to users that have already been authenticated, and takes effect only from the next login.
4. The maximum number of users that can be authenticated on a Switch and a port can be set at the same time.
   - If the number of authenticated users reaches the maximum number for a port, no more new users can be authenticated on that port.
   - If the number of authenticated users reaches the maximum number for a Switch, no more new users can be authenticated on that Switch.
5. If the maximum number of users that can be authenticated is changed so that it is less than the number of users currently authenticated, communication by the current authenticated users can continue, but new users cannot be authenticated.

6. If the DHCP snooping functionality is also used, the maximum number of users is limited to 246.

Related commands

web-authentication system-auth-control

web-authentication port

web-authentication vlan

web-authentication auto-logout

web-authentication max-user (interface)

Sets the maximum number of users that can be authenticated on the applicable port.

Syntax

To set or change information:

```
web-authentication max-user <Count>
```

To delete information:

```
no web-authentication max-user
```

Input mode

```
(config-if)
```

Parameters

<Count>

Specify the maximum number of users that can be authenticated on the applicable port when the port requires authentication.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 256

Default behavior

The maximum number of users that can be authenticated on the port is 256.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All Web authentication settings take effect when the `web-authentication system-auth-control` command is set.
2. See *Table 23-1 Configuration commands and Web authentication modes* for the authentication mode in which the command's settings are operable.
3. When this command is set, the setting is not applied to users that have already been authenticated, and takes effect only from the next login.
4. The maximum number of users that can be authenticated on a Switch and a port can be set at the same time.
   - If the number of authenticated users reaches the maximum number for a port, no more new users can be authenticated on that port.
   - If the number of authenticated users reaches the maximum number for a Switch, no more new users can be authenticated on that Switch.
5. If the maximum number of users that can be authenticated is changed so that it is less than the number of users currently authenticated, communication by the current authenticated users can continue, but new users cannot be authenticated.

6. If the DHCP snooping functionality is also used, the maximum number of users is limited to 246.

Related commands

web-authentication system-auth-control

web-authentication port

web-authentication vlan

web-authentication auto-logout

web-authentication port

Sets the authentication mode for ports.

Syntax

To set information:

```
web-authentication port
```

To delete information:

```
no web-authentication port
```

Input mode

```
(config-if)
```

Parameters

None

Default behavior

When Web authentication is valid, the port operates in legacy mode.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All Web authentication settings take effect when the `web-authentication system-auth-control` command is set.
2. See *Table 23-1 Configuration commands and Web authentication modes* for the authentication mode in which the command's settings are operable.
3. This command cannot be set if the `system function` command is set and `extended-authentication` has not been set. (This command can be set if the `system function` command has not been set.) [AX1250S] [AX1240S]
4. This command can be set only for Ethernet interfaces.

Related commands

web-authentication html-fileset

web-authentication system-auth-control

authentication ip access-group

authentication arp-relay

web-authentication radius-server dead-interval

Configures the timer for monitoring automatic restoration to the primary Web authentication RADIUS server from the Web authentication RADIUS server.

The primary Web authentication RADIUS server is restored when either of the following occurs: The current server (the destination for RADIUS authentication requests in operation) switches to a valid secondary Web authentication RADIUS server, or when all servers are disabled, the monitoring timer starts, and the period of time set by this command elapses (when the monitoring timer expires).

Syntax

To set or change information:

```
web-authentication radius-server dead-interval <Minutes>
```

To delete information:

```
no web-authentication radius-server dead-interval
```

Input mode

```
(config)
```

Parameters

<Minutes>

Sets the timer for monitoring automatic restoration to the primary Web authentication RADIUS server from the secondary Web authentication RADIUS server.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 1440 (minutes)

   If 0 is set, RADIUS authentication requests are always initiated from the primary Web authentication RADIUS server.

Default behavior

The primary Web authentication RADIUS server is automatically restored 10 minutes after the current server switches to the secondary Web authentication RADIUS server.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

1. If the secondary Web authentication RADIUS server is operating as the current server, and if the value of the monitoring timer is changed, the progress to that time is used as the judgment value and the result is applied.
2. If this command configuration is deleted after the monitoring timer starts, the monitoring timer counter continues without being reset and runs for 10 minutes (default value).

Notes

1. All Web authentication settings take effect when the `web-authentication system-auth-control` command is set.

2. See *Table 23-1 Configuration commands and Web authentication modes* for the authentication mode in which the command's settings are operable.
3. If three or more Web authentication RADIUS servers are configured and another Web authentication RADIUS server becomes the current server after the monitoring timer starts, the monitoring timer is not reset and continues to run.
4. In general, when the monitoring timer has started, it does not reset until it expires. However, as exceptions, it resets in the following cases:
   - When `web-authentication dead-interval 0` is configured by using this command
   - When information about the Web authentication RADIUS server operating as the current server is deleted by using the `web-authentication radius-server host` configuration command
   - When the `clear radius-server` operation command is executed
5. If the monitoring timer expires while the authentication sequence is being executed on a terminal subject to authentication, restoration of the primary Web authentication RADIUS server is not performed until the executed authentication sequence is completed.

Related commands

aaa authentication web-authentication

web-authentication port

web-authentication system-auth-control

web-authentication radius-server host

web-authentication radius-server host

Configures the RADIUS server used for Web authentication.

Syntax

To set or change information:

```
web-authentication radius-server host <IP address> [auth-port <Port>]
[acct-port <Port>] [timeout <Seconds>] [retransmit <Retries>] [key
<String>]
```

To delete information:

```
no web-authentication radius-server host <IP address>
```

Input mode

```
(config)
```

Parameters

<IP address>

Specifies the IPv4 address of the RADIUS server.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify the IPv4 address (dot notation).

   1.0.0.0 to 126.255.255.255, 128.0.0.0 to 223.255.255.255

`auth-port` *<port>*

Specifies the RADIUS server port number.

1. Default value when this parameter is omitted:

   Port number 1812 is used.

2. Range of values:

   1 to 65535

`acct-port` *<Port>*

Specifies the port number for RADIUS server accounting.

1. Default value when this parameter is omitted:

   Port number 1813 is used.

2. Range of values:

   1 to 65535

`timeout` *<Seconds>*

Specifies the timeout period (in seconds) for a response from the RADIUS server.

1. Default value when this parameter is omitted:

   The period of time set by using the `radius-server timeout` command is used. If no period is set, the initial value is 5.

2. Range of values:

   1 to 30 (seconds)

`retransmit` *<Retries>*

Specifies the number of times an authentication request is resent to the RADIUS server.

1. Default value when this parameter is omitted:

   The number of times set by using the `radius-server retransmit` command is used. If no value is set, the initial value is 3.

2. Range of values:

   0 to 15 (times)

`key` *<String>*

Specifies the RADIUS key used for encryption or for authentication of communication with the RADIUS server. The same RADIUS key must be set for the client and the RADIUS server.

1. Default value when this parameter is omitted:

   The RADIUS key set by using the `radius-server key` command is used. If no key is set, the RADIUS server is disabled.

2. Range of values:

   Specify a character string that has no more than 64 characters. For details about the characters that can be specified, see *Any character string* in *Specifiable values for parameters*.

Default behavior

The RADIUS server settings registered by using the `radius-server host` command are used.

If the `radius-server host` command is not registered, user authentication is performed by using the internal Web authentication database without using the RADIUS server.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All Web authentication settings take effect when the `web-authentication system-auth-control` command is set.
2. See *Table 23-1 Configuration commands and Web authentication modes* for the authentication mode in which the command's settings are operable.
3. When this command is set, the setting information of the RADIUS server referenced by Web authentication has precedence over the information set by using the `radius-server host` command (the settings of the `radius-server host` command are not applied). For details about the settings of the general-use RADIUS server information and the Web authentication RADIUS server information, see the *Configuration Guide Vol. 2*.
4. A maximum of four Web authentication RADIUS servers can be specified for each Switch.
5. `127.*.*.*` cannot be set as an IPv4 address.
6. If the `key` parameter is omitted and the `radius-server key` command is not set, the RADIUS server is disabled.
7. If multiple Web authentication RADIUS servers are configured, the address

displayed first by using the `show radius-server` operation command is the address of the primary Web authentication RADIUS server. The primary Web authentication RADIUS server is used as the first current server (the destination for RADIUS authentication requests during operation).

If a failure occurred in the primary Web authentication RADIUS server, the current server switches to the next effective Web authentication RADIUS server (secondary RADIUS server). For details about automatic restoration of the primary Web authentication RADIUS server, see the description about the `web-authentication radius-server dead-interval` command.

8. If a RADIUS server with an IP address that matches has already been registered in the general-use RADIUS server configuration, other authentication-specific RADIUS server configuration, or the RADIUS server group configuration, all these parameters are replaced by the new commands that were entered automatically.

Related commands

aaa authentication web-authentication

web-authentication port

web-authentication system-auth-control

web-authentication redirect-mode

Sets a protocol to display the Web authentication Login page when the URL redirect functionality is enabled.

Syntax

To set or change information:

```
web-authentication redirect-mode {http | https}
```

To delete information:

```
no web-authentication redirect-mode
```

Input mode

```
(config)
```

Parameters

`{http | https}`

Sets a protocol to display the Web authentication Login page when the URL redirect functionality is enabled.

- Default value when this parameter is omitted:

  This parameter cannot be omitted.

- Range of values:

  `http`: The Login page for http is displayed.

  `https`: The Login page for https is displayed.

Default behavior

The Login page for https is displayed.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All Web authentication settings take effect when the `web-authentication system-auth-control` command is set.
2. See *Table 23-1 Configuration commands and Web authentication modes* for the authentication mode in which the command's settings are operable.
3. This command is invalid if the `no web-authentication redirect enable` command is set.

Related commands

web-authentication system-auth-control

web-authentication port

web-authentication redirect enable

web-authentication redirect enable

The `no web-authentication redirect enable` command disables the URL redirect functionality.

Syntax

To set information:

```
no web-authentication redirect enable
```

To delete information:

```
web-authentication redirect enable
```

Input mode

```
(config)
```

Parameters

None

Default behavior

The URL redirect functionality is enabled.

Impact on communication

After the `no web-authentication redirect enable` command has been set, the URL redirect functionality does not operate.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All Web authentication settings take effect when the `web-authentication system-auth-control` command is set.
2. See *Table 23-1 Configuration commands and Web authentication modes* for the authentication mode in which the command's settings are operable.

Related commands

web-authentication system-auth-control

web-authentication port

authentication ip access-group

authentication arp-relay

web-authentication redirect tcp-port

When the URL redirect functionality is enabled, this command sets an additional TCP destination port number for a frame subject to URL redirect on a Switch.

Usually, a port number can be added to the standard port number assigned for http (80).

Syntax

To set or change information:

```
web-authentication redirect tcp-port <Port>
```

To delete information:

```
no web-authentication redirect tcp-port
```

Input mode

```
(config)
```

Parameters

<Port>

Sets an additional TCP destination port number for a frame subject to URL redirection on a Switch when the URL redirect functionality is enabled. TCP destination port number 80 and the port number that has been set are subject to http protocol URL redirection.

- Default value when this parameter is omitted:

  This parameter cannot be omitted.

- Range of values:

  1 to 65535

Default behavior

Frames with the following initial port number are subject to URL redirection.

- http:80
- https:443

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All Web authentication settings take effect when the `web-authentication system-auth-control` command is set.
2. See *Table 23-1 Configuration commands and Web authentication modes* for the authentication mode in which the command's settings are operable.
3. Only one TCP destination port number can be set by using this command.
4. A port number that causes the https protocol to be subject to redirection cannot be added by using this command.
5. This command performs the same operation performed by the `web-authentication web-port` command.

If different port numbers are specified for these two commands, each specification becomes valid.

How the commands are handled if the same port number is specified is described in the following table.

		web-authentication redirect tcp-port	**web-authentication web-port**	
			http	**https**
web-authentication redirect tcp-port			Redirect as HTTP	Redirect as HTTP (The port number specified by https is ignored.)
web-authentication web-port	**http**	Redirect as HTTP		Command entered first is valid.
	https	Redirect as HTTP (The port number specified by https is ignored.)	Command entered first is valid.	

Related commands

web-authentication system-auth-control

web-authentication port

authentication ip access-group

authentication arp-relay

web-authentication web-port

web-authentication roaming

Sets communication permissions (roaming) when the port for an authenticated terminal changes to another port connected via a hub or similar means without a link-down event occurring.

Syntax

To set or change information:

```
web-authentication roaming [action trap]
```

To delete information:

```
no web-authentication roaming
```

Input mode

```
(config)
```

Parameters

`[action trap]`

When a change to another port due to roaming is detected, a private trap is issued.

- Default value when this parameter is omitted:

  When a change to another port due to roaming is detected, a private trap is not issued.

- Range of values:

  action trap

Default behavior

Changing the port of an authenticated terminal is not permitted.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All Web authentication settings take effect when the `web-authentication system-auth-control` command is set.
2. See *Table 23-1 Configuration commands and Web authentication modes* for the authentication mode in which the command's settings are operable.
3. If the destination port is a port in dynamic VLAN mode and the change of port is within the same VLAN, communication is possible after the change.
4. If the DHCP snooping functionality is also used when this command is set and if the port of an authenticated terminal changes to another port, the authentication status also moves to the destination port. However, communication is impossible because the binding database is not updated.
5. When private traps are issued, use the `snmp-server host` command to set the destination IP address for traps and `web-authentication`.

Related commands

web-authentication system-auth-control

web-authentication port

snmp-server host

web-authentication static-vlan force-authorized

When the RADIUS authentication method is used, this command forcibly changes the status of a terminal that requests authentication on the applicable port to authentication authorized if the RADIUS server does not respond or a request to the RADIUS server fails because of a route failure or other problem.

Syntax

To set or change information:

```
web-authentication static-vlan force-authorized [action trap]
```

To delete information:

```
no web-authentication static-vlan force-authorized
```

Input mode

```
(config-if)
```

Parameters

`[action trap]`

When forced authentication is authorized, private traps are issued.

- Default value when this parameter is omitted:

  Private traps are not issued if forced authentication is authorized.

- Range of values:

  action trap

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All Web authentication settings take effect when the `web-authentication system-auth-control` command is set.
2. See *Table 23-1 Configuration commands and Web authentication modes* for the authentication mode in which the command's settings are operable.
3. Be especially careful when using this functionality, as it can pose a security problem.
4. This command is enabled when the following condition exists:
   - All the following configurations have been set:
     - `radius-server host` or `web-authentication radius-server host`
     - `web-authentication port`[#1]
     - `web-authentication static-vlan force-authorized`[#1]
     - `web-authentication system-auth-control`
     - `aaa authentication web-authentication`[#2]

- `web-authentication authentication`#3

#1

Specify the same Ethernet port.

- The following accounting log data is collected when an authentication request is sent to the RADIUS server:

  No=21:

  NOTICE:LOGIN:(additional information) Login failed ; Failed to connection to RADIUS server.

  Additional information:MAC, USER, IP, PORT, VLAN

  Check the account log with the show web-authentication logging operation command.

#2

When forced authentication is used as the Switch default, set only `default group radius`.

#3

Set `aaa authentication web-authentication` *<List name>* for forced authentication that uses the port-based authentication method.

5. The authorized forced authentication state is canceled if the applicable user logs out.
6. When private traps are issued, use the `snmp-server host` command to set the destination IP address for traps and `web-authentication`.
7. If either of the following commands has already been set, this command cannot be set:
   - `authentication force-authorized enable`
   - `authentication force-authorized vlan`

Related commands

aaa authentication web-authentication

radius-server host or web-authentication radius-server host

snmp-server host

web-authentication port

web-authentication system-auth-control

web-authentication static-vlan max-user

Sets the maximum number of users that can be authenticated on a Switch.

Syntax

To set or change information:

```
web-authentication static-vlan max-user <Count>
```

To delete information:

```
no web-authentication static-vlan max-user
```

Input mode

```
(config)
```

Parameters

<Count>

Sets the maximum number of users that can be authenticated on a Switch on which user authentication is performed.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 1024

Default behavior

The maximum number of users that can be authenticated on a Switch is 1024.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All Web authentication settings take effect when the `web-authentication system-auth-control` command is set.
2. See *Table 23-1 Configuration commands and Web authentication modes* for the authentication mode in which the command's settings are operable.
3. When this command is set, the setting is not applied to users that have already been authenticated, and takes effect only from the next login.
4. The maximum number of users that can be authenticated on a Switch and a port can be set at the same time.
   - If the number of authenticated users reaches the maximum number for a port, no more new users can be authenticated on that port.
   - If the number of authenticated users reaches the maximum number for a Switch, no more new users can be authenticated on that Switch.
5. If the maximum number of users that can be authenticated is changed so that it is less than the number of users currently authenticated, communication by the current authenticated users can continue, but new users cannot be authenticated.

6. If the DHCP snooping functionality is also used, the maximum number of users is limited to 246.

Related commands

web-authentication system-auth-control

web-authentication port

web-authentication static-vlan max-user (interface)

Sets the maximum number of users that can be authenticated on the applicable port.

Syntax

To set or change information:

```
web-authentication static-vlan max-user <Count>
```

To delete information:

```
no web-authentication static-vlan max-user
```

Input mode

```
(config-if)
```

Parameters

<Count>

Specify the maximum number of users that can be authenticated on the applicable port when the port requires authentication.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 1024

Default behavior

The maximum number of users that can be authenticated on the port is 1024.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All Web authentication settings take effect when the `web-authentication system-auth-control` command is set.
2. See *Table 23-1 Configuration commands and Web authentication modes* for the authentication mode in which the command's settings are operable.
3. When this command is set, the setting is not applied to users that have already been authenticated, and takes effect only from the next login.
4. The maximum number of users that can be authenticated on a Switch and a port can be set at the same time.
   - If the number of authenticated users reaches the maximum number for a port, no more new users can be authenticated on that port.
   - If the number of authenticated users reaches the maximum number for a Switch, no more new users can be authenticated on that Switch.
5. If the maximum number of users that can be authenticated is changed so that it is less than the number of users currently authenticated, communication by the current authenticated users can continue, but new users cannot be authenticated.

6. If the DHCP snooping functionality is also used, the maximum number of users is limited to 246.

Related commands

web-authentication system-auth-control

web-authentication port

web-authentication static-vlan roaming

Sets communication permissions (roaming) when the port for an authenticated terminal changes to another port connected via a hub or similar means without a link-down event occurring.

Syntax

To set or change information:

```
web-authentication static-vlan roaming [action trap]
```

To delete information:

```
no web-authentication static-vlan roaming
```

Input mode

```
(config)
```

Parameters

`[action trap]`

When a change to another port due to roaming is detected, a private trap is issued.

- Default value when this parameter is omitted:

  When a change to another port due to roaming is detected, a private trap is not issued.

- Range of values:

  action trap

Default behavior

Communication is not permitted when an authenticated terminal moves to another port.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All Web authentication settings take effect when the `web-authentication system-auth-control` command is set.
2. See *Table 23-1 Configuration commands and Web authentication modes* for the authentication mode in which the command's settings are operable.
3. If the destination port is a port in fixed VLAN mode and the change of port is within the same VLAN, communication is possible after the move.
4. If the DHCP snooping functionality is also used when this command is set and if the port of an authenticated terminal changes to another port, the authentication status also moves to the destination port. However, communication is impossible because the binding database is not updated.
5. When private traps are issued, use the `snmp-server host` command to set the destination IP address for traps and `web-authentication`.

Related commands

web-authentication system-auth-control

web-authentication port

snmp-server host

web-authentication system-auth-control

Enables Web authentication.

Note that if the `no web-authentication system-auth-control` command is executed, Web authentication stops.

Syntax

To set information:

```
web-authentication system-auth-control
```

To delete information:

```
no web-authentication system-auth-control
```

Input mode

```
(config)
```

Parameters

None

Default behavior

Web authentication is not performed.

Impact on communication

If the `no web-authentication system-auth-control` configuration command is executed, authenticated users are logged out.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. See *Table 23-1 Configuration commands and Web authentication modes* for the authentication mode in which the command's settings are operable.
2. Even if the `no web-authentication system-auth-control` command is executed, user information registered in the internal Web authentication database is saved in its current state.

Related commands

None

web-authentication user-group

Enables the user ID-based authentication method.

To handle IDs in the forms `[<User ID>]` and `[<Authentication method list name>]`, use the at mark (`@`) to separate the entered user IDs.

Syntax

To set information:

```
web-authentication user-group
```

To delete information:

```
no web-authentication user-group
```

Input mode

```
(config)
```

Parameters

None

Default behavior

Entered user IDs are not separated by an at mark (`@`).

Impact on communication

If a change is made, all authentications are canceled.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All Web authentication settings take effect when the `web-authentication system-auth-control` command is set.
2. See *Table 23-1 Configuration commands and Web authentication modes* for the authentication mode in which the command's settings are operable.
3. If at least one of the following commands is set for a Switch, this command cannot be set:
   - `dot1x authentication`
   - `dot1x vlan dynamic enable`
   - `dot1x vlan dynamic radius-vlan`
   - `mac-authentication authentication`
   - `mac-authentication interface`
   - `mac-authentication vlan`
   - `web-authentication authentication`
   - `web-authentication vlan`
4. If the authentication method list name separated from entered user IDs does not match the authentication method list name set by using the `aaa authentication web-authentication` command, the default settings of the Switch are used.

Related commands

aaa authentication web-authentication

web-authentication system-auth-control

web-authentication port

web-authentication user replacement

Enables the switch-user option.

Enables authentication with a different user ID after successful authentication with the first user ID when several user IDs are used for a terminal.

Syntax

To set information:

```
web-authentication user replacement
```

To delete information:

```
no web-authentication user replacement
```

Input mode

```
(config)
```

Parameters

None

Default behavior

Login from an authenticated terminal by using another user name is not permitted.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All Web authentication settings take effect when the `web-authentication system-auth-control` command is set.
2. See *Table 23-1 Configuration commands and Web authentication modes* for the authentication mode in which the command's settings are operable.
3. If authentication is canceled when the user has been switched, it is not possible to return to the first user.

Related commands

web-authentication system-auth-control

web-authentication vlan

Sets the VLAN ID to dynamically switch after user authentication.

Unless this command is set, no VLANs can be switched after authentication.

Syntax

To set or change information:

```
web-authentication vlan <VLAN ID list>
```

To delete information:

```
no web-authentication vlan <VLAN ID list>
```

Input mode

```
(config)
```

Parameters

<VLAN ID list>

Sets the VLAN ID list of MAC VLANs that can be switched after user authentication.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to set *<VLAN ID list>* and the specifiable values, see *Specifiable values for parameters*. Note that the default VLAN (`VLAN ID = 1`) cannot be set.

Default behavior

No VLANs are switched after authentication.

Impact on communication

If a VLAN is deleted by using this command, users registered in the deleted VLAN are logged out.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All Web authentication settings take effect when the `web-authentication system-auth-control` command is set.
2. See *Table 23-1 Configuration commands and Web authentication modes* for the authentication mode in which the command's settings are operable.
3. All VLAN IDs you have set must be set for a MAC VLAN.
4. If at least one of the following commands is set for a Switch, this command cannot be set:
   - `authentication multi-step`
   - `dot1x authentication`
   - `mac-authentication authentication`
   - `web-authentication authentication`

- `web-authentication user-group`

Related commands

switchport mac

vlan

web-authentication system-auth-control

web-authentication web-port

When the URL redirect functionality is enabled, this command sets an additional TCP destination port number for a frame subject to URL redirect on a Switch.

Usually, one port number each can be added to the port number assigned for http (80) and for https (443).

Syntax

To set or change information:

```
web-authentication web-port  {http <port> | https <port>}
```

To delete information:

```
no web-authentication web-port {http | https}
```

Input mode

```
(config)
```

Parameters

`{http <port> | https <port>}`

Specify the port number to be used for http protocol or https protocol communication. Note that if OAN is also used, port numbers 832 and 9698 are used by OAN.

- Default value when this parameter is omitted:

  This parameter cannot be omitted.

- Range of values:

  For the http parameter: 1 to 65535 (except 443)

  For the https parameter: 1 to 65535 (except 80)

Default behavior

Frames with the following initial port number are subject to URL redirection.

- http:80
- https:443

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All Web authentication settings take effect when the `web-authentication system-auth-control` command is set.
2. See *Table 23-1 Configuration commands and Web authentication modes* for the authentication mode in which the command's settings are operable.
3. The number of TCP destination port numbers that can be set by using this command is one each for the http and https parameters.
4. This command performs the same operation performed by the `web-authentication redirect tcp-port` command.

If different port numbers are specified for these two commands, each specification becomes valid.

How the commands are handled if the same port number is specified is described in the following table.

		web-authentication redirect tcp-port	**web-authentication web-port**	
			http	**https**
web-authentication redirect tcp-port			Redirect as HTTP	Redirect as HTTP (The port number specified by https is ignored.)
web-authentication web-port	**http**	Redirect as HTTP		Command entered first is valid.
	https	Redirect as HTTP (The port number specified by https is ignored.)	Command entered first is valid.	

Related commands

authentication ip access-group

authentication arp-relay

web-authentication port

web-authentication redirect tcp-port

web-authentication system-auth-control

default-router

Sets the router option that is distributed to clients. A router option is an IP address the client can use as a router IP address over the subnet (default router).

Syntax

To set or change information:

```
default-router <IP address>
```

To delete information:

```
no default-router
```

Input mode

```
(dhcp-config)
```

Parameters

<IP address>

Sets a router IP address for the subnet of a client (default router).

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1.0.0.0 to 126.255.255.255, 128.0.0.0 to 223.255.255.255

   The following addresses cannot be set:

   - 127.0.0.0 to 127.255.255.255

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. A maximum of one router IP address (default router) can be set for a pool.

Related commands

ip dhcp pool

dns-server

Sets the domain name server option that is distributed to clients. The domain name server option is the IP address of a DNS server that a client can use.

Syntax

To set or change information:

```
dns-server <IP address> [<IP address>]
```

To delete information:

```
no dns-server
```

Input mode

```
(dhcp-config)
```

Parameters

<IP address>

Sets the IP address of the DNS server that a client can use. Specify the address of the server with the highest priority first.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1.0.0.0 to 126.255.255.255, 128.0.0.0 to 223.255.255.255

   The following addresses cannot be set:

   - 127.0.0.0 to 127.255.255.255

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. A maximum of two DNS server IP addresses can be specified for a pool.

Related commands

ip dhcp pool

ip dhcp excluded-address

Sets a range of IP addresses that are to be excluded from distribution in the IP address pool specified by using the `network` command.

Syntax

To set or change information:

```
ip dhcp excluded-address <Low address> [<High address>]
```

To delete information:

```
no ip dhcp excluded-address <Low address> [<High address>]
```

Input mode

```
(config)
```

Parameters

<Low address> [*<High address>*]

Sets an IP address that cannot be assigned to a DHCP client by a DHCP server or a range of IP addresses.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1.0.0.0 to 126.255.255.255, 128.0.0.0 to 223.255.255.255

   The following addresses cannot be set:

   - 127.0.0.0 to 127.255.255.255

Default behavior

All IP addresses in the range set by the `network` command can be assigned.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. The maximum number of IP addresses that can be set is 64.
2. If the number of IP address pools exceeds the maximum number when the setting for excluded addresses is deleted, you cannot delete the setting.

Related commands

ip dhcp pool

network

ip dhcp pool

Sets DHCP address pool information.

Syntax

To set or change information:

```
ip dhcp pool <Pool name>
```

To delete information:

```
no ip dhcp pool <Pool name>
```

Input mode

```
(config)
```

Parameters

<Pool Name>

Specify the name of the DHCP address pool.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a character string that is no more than 14 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. A maximum value of 32 (`network` set to 32) can be set.

Related commands

ip dhcp excluded-address

network

lease

Sets the default lease time of the IP addresses distributed to clients.

Syntax

To set or change information:

```
lease {<Time day> [<Time hour> [<Time min> [<Time sec>]]] | infinite}
```

To delete information:

```
no lease
```

Input mode

```
(dhcp-config)
```

Parameters

`{<Time day> [<Time hour> [<Time min> [<Time sec>]]] | infinite}`

Specify the lease time in days, hours, minutes, and seconds. If this information is not set, 10 seconds is set as the initial value for the lease time. This information cannot be set if the total value of *<Time day> /<Time hour>/<Time min>/<Time sec>* is less than 10 seconds. Specify a value from 10 (seconds) to 365 (days).

<Time day>

Specify the lease time in days.

1. Range of values:

   0 to 365 (days)

<Time hour>

Specify the lease time in hours.

1. Range of values:

   0 to 23 (hours)

<Time min>

Specify the lease time in minutes.

1. Range of values:

   0 to 59 (minutes)

<Time sec>

Specify the lease time in seconds.

1. Range of values:

   0 to 59 (seconds)

`infinite`

Sets the lease time to unlimited.

Default behavior

10 seconds is set as the lease time.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If a value exceeding the maximum lease time (`max-lease`) is set as the lease time, the maximum lease time has precedence.
2. The shorter the lease time set, the more frequently a client updates the lease. Therefore, do not specify an extremely short lease time except for a very limited usage such as a temporary IP address. Also, make sure the client can operate reliably if a short lease time is set.
3. Enter the lease time in the order indicated by the input format. If a value from 24 to 59 is entered after *<Time day>*, the value is treated as *<Time min>*. If you press the **Enter** key in such a case, an input error occurs.

Related commands

ip dhcp pool

max-lease

Sets the maximum allowable lease time when a client specifies the lease time and requests an IP address.

Syntax

To set or change information:

```
max-lease {<Time day> [<Time hour> [<Time min> [<Time sec>]]] | infinite}
```

To delete information:

```
no max-lease
```

Input mode

```
(dhcp-config)
```

Parameters

`{<Time day> [<Time hour> [<Time min> [<Time sec>]]] | infinite}`

By specifying the time in days, hours, minutes, and seconds, the maximum lease time when a client specifies a time can be set. If this information is not set, the default lease time is used. This information cannot be set if the total value of *<Time day>/<Time hour>/<Time min>/<Time sec>* is less than 10 seconds. Specify a value from 10 (seconds) to 365 (days).

<Time day>

Specify the lease time in days.

1. Range of values:

   0 to 365 (days)

<Time hour>

Specify the lease time in hours.

1. Range of values:

   0 to 23 (hours)

<Time min>

Specify the lease time in minutes.

1. Range of values:

   0 to 59 (minutes)

<Time sec>

Specify the lease time in seconds.

1. Range of values:

   0 to 59 (seconds)

`infinite`

Sets the lease time to unlimited.

Default behavior

The time set by using the `lease` command is set as the maximum lease time.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. The shorter the lease time set, the more frequently a client updates the lease. Therefore, do not specify an extremely short lease time except for a very limited usage such as a temporary IP address. Also, make sure the client can operate reliably if a short lease time is set.
2. Enter the lease time in the order indicated by the input format. If a value from 24 to 59 is entered after *<Time day>*, the value is treated as *<Time min>*. If you press the **Enter** key in such a case, an input error occurs.

Related commands

ip dhcp pool

network

Sets the subnet of the network in which IP addresses are dynamically distributed via DHCP. All subnets excluding those in which the host bits in the IP address host part are all 0s or 1s are actually registered in the DHCP address pool.

Syntax

To set or change information:

```
network <IP address> [ /<Masklen> ]
```

To delete information:

```
no network
```

Input mode

```
(dhcp-config)
```

Parameters

<IP address> `[ /<Masklen> ]`

Sets the network address of the DHCP address pool. If the mask is omitted, a mask corresponding to class A, B, or C is set.

Table 23-2 IP address range for each class

Class	IP address
class A (/8)	`1.x.x.x` to `126.x.x.x`
class B (/16)	`128.x.x.x` to `191.x.x.x`
class C (/24)	`192.x.x.x` to `223.x.x.x`

<IP address>

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   The following addresses cannot be set:

- 127.0.0.0 to 127.255.255.255
- An address whose host part is all binary 0s or 1s
- Addresses outside the address ranges shown in *Table 23-2 IP address range for each class*.

<Masklen>

1. Default value when this parameter is omitted:

   A mask corresponding to class A, B, or C as described in *Table 23-2 IP address range for each class*.

2. Range of values:

   8 to 32

   Dot notation (255.0.0.0 to 255.255.255.255) can also be used.

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. When this command is set, all IP addresses excluding those in which the bits in the host part of the target subnet are all 1s or all 0s are secured as the IP address pool. Therefore, designate IP addresses that should not be distributed in advance by using the `ip dhcp excluded-address` command.
2. Because a maximum of 32 subnets can be handled by the DHCP server of a Switch, you cannot create more than 32 pools that include `network` settings.

Related commands

ip dhcp excluded-address

ip dhcp pool

service dhcp

Sets the interface on which a DHCP server is enabled. Only the interface specified by using this command receives DHCP packets.

Syntax

To set or change information:

```
service dhcp vlan <VLAN ID>
```

To delete information:

```
no service dhcp vlan <VLAN ID>
```

Input mode

```
(config)
```

Parameters

`vlan` *<VLAN ID>*

Sets the VLAN ID of a VLAN for which an IPv4 address is set.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Sets the VLAN ID set by using the `interface vlan` command for *<VLAN ID>*.

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. A maximum of 32 interfaces can be set.

Related commands

interface vlan

24. MAC-based Authentication

Correspondence between configuration commands and authentication modes
aaa accounting mac-authentication
aaa authentication mac-authentication
aaa authentication mac-authentication end-by-reject
mac-authentication access-group
mac-authentication authentication
mac-authentication auto-logout
mac-authentication force-authorized vlan
mac-authentication id-format
mac-authentication interface
mac-authentication max-timer
mac-authentication max-user
mac-authentication max-user (interface)
mac-authentication password
mac-authentication port
mac-authentication radius-server dead-interval
mac-authentication radius-server host
mac-authentication roaming
mac-authentication static-vlan force-authorized
mac-authentication static-vlan max-user
mac-authentication static-vlan max-user (interface)
mac-authentication static-vlan roaming
mac-authentication system-auth-control
mac-authentication timeout quiet-period
mac-authentication timeout reauth-period
mac-authentication vlan
mac-authentication vlan-check

Correspondence between configuration commands and authentication modes

The following table describes MAC-based authentication modes in which MAC-based authentication configuration commands can be set.

Table 24-1 Configuration commands and MAC-based authentication modes

Command name	MAC-based authentication modes[#3]		
	F	**D**	**L**
aaa accounting mac-authentication	Y	Y	Y
aaa authentication mac-authentication	Y	Y	Y
aaa authentication mac-authentication end-by-reject	Y	Y	--
authentication arp-relay[#1]	Y	Y	N
authentication ip access-group[#1]	Y	Y	N
mac-authentication access-group	Y	Y	Y
mac-authentication authentication	Y	Y	N
mac-authentication auto-logout	Y	Y	Y
mac-authentication force-authorized vlan	--	Y	Y
mac-authentication id-format	Y	Y	Y
mac-authentication interface	--	--	Y
mac-authentication max-timer	Y	Y	Y
mac-authentication max-user	--	Y	Y
mac-authentication max-user (interface)	--	Y	Y
mac-authentication password	Y	Y	Y
mac-authentication port[#2]	Y	Y	--
mac-authentication radius-server dead-interval	Y	Y	Y
mac-authentication radius-server host	Y	Y	Y
mac-authentication roaming	--	Y	--
mac-authentication static-vlan force-authorized	Y	--	--
mac-authentication static-vlan max-user	Y	--	--

Command name	MAC-based authentication modes[#3]		
	F	D	L
mac-authentication static-vlan max-user (interface)	Y	--	--
mac-authentication static-vlan roaming	Y	--	--
mac-authentication system-auth-control	Y	Y	Y
mac-authentication timeout quiet-period	Y	Y	Y
mac-authentication timeout reauth-period	Y	Y	Y
mac-authentication vlan	--	--	Y
mac-authentication vlan-check	Y	--	--

Legend

F: Fixed VLAN mode

D: Dynamic VLAN mode

L: Legacy mode

Y: The command operates according to the settings.

-: The command can be entered, but it will have no effect.

N: The command cannot be entered.

#1

For details about command input formats, see *21. Common to Layer 2 Authentication*.

#2

The specification of this command affects the switching of authentication modes.

#3

For details such as a description of the authentication modes, see the *Configuration Guide Vol. 2*.

aaa accounting mac-authentication

Sends accounting information for MAC-based authentication to an accounting server.

Syntax

To set information:

```
aaa accounting mac-authentication default start-stop group radius
```

To delete information:

```
no aaa accounting mac-authentication default
```

Input mode

```
(config)
```

Parameters

`default`

Sets the default accounting method of a Switch.

`start-stop`

If authentication is successful, an accounting start notification message is sent to the accounting server. If authentication is canceled, an accounting stop notification message is sent to the accounting server.

`group radius`

The RADIUS server is used as the accounting server.

Default behavior

A notification is not sent to the accounting server.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All MAC-based authentication settings take effect when the `mac-authentication system-auth-control` command is set.
2. See *Table 24-1 Configuration commands and MAC-based authentication modes* for the authentication mode in which the command's settings are operable.

Related commands

aaa authentication mac-authentication

mac-authentication system-auth-control

radius-server host or mac-authentication radius-server host

aaa authentication mac-authentication

Sets an authentication method group for MAC-based authentication.

If the first specified method fails, the second specified method is used. If authentication fails, you can change the authentication method by using the `aaa authentication mac-authentication end-by-reject` command.

If `default` is set, one entry can be set. If an authentication method list name is specified, a maximum of four entries can be set.

Syntax

To set or change information:

`aaa authentication mac-authentication default` *<Method>* `[`*<Method>*`]`

`aaa authentication mac-authentication` *<List name>* `group` *<Group name>*

To delete information:

`no aaa authentication mac-authentication {default |` *<List name>*`}`

Input mode

`(config)`

Parameters

`default` *<Method>* `[`*<Method>*`]`

Sets the default authentication method of a Switch. You cannot specify the same *<Method>* more than once.

For *<Method>*, specify `group radius` or `local`.

`group radius`

MAC-based authentication is performed by a RADIUS server. The RADIUS server to use is a MAC-based authentication RADIUS server or a general-use RADIUS server.

`local`

Local authentication is performed. The internal MAC-based authentication database is used.

<List name>

Sets the name of an authentication method list.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a character string that has no more than 32 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

   We recommend that you use an upper-case letter for the first character.

   However, you cannot use the following character strings:

   - At mark (`@`)

   - `default` or a character string beginning with `default`

   - `end-by-reject` or a character string beginning with `end-by-reject`

`group` *<Group Name>*

MAC-based authentication is performed by a RADIUS server. The RADIUS server to use is a RADIUS server group. Specify the group name set by the `aaa group server radius` command.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a character string that has no more than 32 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

Default behavior

Authentication is performed by using the internal MAC-based authentication database instead of using the RADIUS server.

Impact on communication

When the Switch default is changed, the authentication of any terminals that were authenticated by the previous default authentication method is canceled.

When the authentication method list is changed, the authentication of any terminals that were authenticated by the previous authentication method list is canceled.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All MAC-based authentication settings take effect when the `mac-authentication system-auth-control` command is set.
2. See *Table 24-1 Configuration commands and MAC-based authentication modes* for the authentication mode in which the command's settings are operable.
3. Enabling of this command requires a separate authentication setting for the RADIUS server.
4. The forced authentication functionality for MAC-based authentication operates only when RADIUS authentication is set. If multiple authentication methods are set, the forced authentication functionality does not operate.

Related commands

aaa authentication mac-authentication end-by-reject

aaa group server radius

mac-authentication system-auth-control

mac-authentication authentication

radius-server host or mac-authentication radius-server host

aaa authentication mac-authentication end-by-reject

Terminates authentication if authentication is denied. If authentication fails due to a communication abnormality, such as an unresponsive RADIUS server, the next authentication method specified by the `aaa authentication mac-authentication` command is used to perform authentication.

Syntax

To set information:

```
aaa authentication mac-authentication end-by-reject
```

To delete information:

```
no aaa authentication mac-authentication end-by-reject
```

Input mode

```
(config)
```

Parameters

None

Default behavior

If authentication fails, regardless of the reason for the failure, the next authentication method specified by the `aaa authentication mac-authentication` command is used to perform authentication.

Impact on communication

Authentication of terminals authenticated by the MAC-based authentication functionality is canceled.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. See *Table 24-1 Configuration commands and MAC-based authentication modes* for the authentication mode in which the command's settings are operable.
2. This command is only valid for authentication methods specified by the `aaa authentication mac-authentication` command.

Related commands

aaa authentication mac-authentication

mac-authentication access-group

By applying the MAC access list to MAC-based authentication ports, sets whether terminals are to be authenticated or not by using MAC addresses.

Syntax

To set or change information:

```
mac-authentication access-group <ACL ID>
```

To delete information:

```
no mac-authentication access-group
```

Input mode

```
(config)
```

Parameters

<ACL ID>

Specifies the identifier of the MAC access list that is to be set.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify an access list name that is 3 to 31 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

Default behavior

All terminals connected to MAC-based authentication ports are subject to authentication.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All MAC-based authentication settings take effect when the `mac-authentication system-auth-control` command is set.
2. See *Table 24-1 Configuration commands and MAC-based authentication modes* for the authentication mode in which the command's settings are operable.
3. Implicit discard is present in a registered MAC access list. If the MAC address of a terminal is not found in the MAC access list you have set, the terminal is not subject to authentication due to implicit discard.
4. If a non-existent MAC access list is set, no operation is performed. The identifier of the MAC access list is registered.

Related commands

mac-authentication system-auth-control

mac access-list extended

mac-authentication authentication

Sets the name of an authentication method list for the port-based authentication method.

Syntax

To set or change information:

```
mac-authentication authentication <List name>
```

To delete information:

```
no mac-authentication authentication
```

Input mode

```
(config-if)
```

Parameters

<List name>

Sets the authentication method list name set by using the `aaa authentication mac-authentication` command.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a character string that has no more than 32 characters. For details about the characters that can be specified, see *Specifiable values for parameters* (with the exception of the at mark (`@`)).

   We recommend that you use an upper-case letter for the first character.

Default behavior

MAC-based authentication is performed by using the default values of the Switch.

Impact on communication

Authentication of a terminal for a port whose authentication method list name has been changed is canceled.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All MAC-based authentication settings take effect when the `mac-authentication system-auth-control` command is set.
2. See *Table 24-1 Configuration commands and MAC-based authentication modes* for the authentication mode in which the command's settings are operable.
3. If at least one of the following commands is set for a Switch, this command cannot be set:
   - `dot1x vlan dynamic enable`
   - `dot1x vlan dynamic radius-vlan`
   - `web-authentication user-group`
   - `web-authentication vlan`
   - `mac-authentication interface`

- `mac-authentication vlan`

4. If the authentication method list name set by using this command does not match the authentication method list name set by using the `aaa authentication mac-authentication` command, the default settings of the Switch are used.
5. This command can be set only for Ethernet interfaces.

Related commands

aaa authentication mac-authentication

mac-authentication system-auth-control

mac-authentication port

mac-authentication auto-logout

The `no mac-authentication auto-logout` command disables automatic cancellation of authentication if no frames are received from a terminal authenticated by MAC-based authentication for a certain period of time.

Setting `delay-time` changes the time, but the actual operation varies according to the authentication mode.

Syntax

To set information:

```
no mac-authentication auto-logout
```

To change information:

```
mac-authentication auto-logout delay-time <Seconds>
```

To delete information:

```
mac-authentication auto-logout
```

Input mode

```
(config)
```

Parameters

`delay-time <Seconds>`

- Fixed VLAN mode, dynamic VLAN mode

  MAC-based authentication entries registered in the MAC address table after authentication in either of these modes are subject to the delay time.

  If no frames have been received from a terminal after the period of time set by using this command (non-communication monitoring time) elapses, the applicable MAC-based authentication entries are deleted from the MAC table and authentication is canceled.

  If 0 is set, the default value (3600 seconds) is used as the non-communication monitoring time.

  1. Default value when this parameter is omitted:

     3600 seconds is used as the non-communication monitoring time for the MAC-based authentication entries registered after authentication in either of the authentication modes.

  2. Range of values:

     0, 60 to 86400

- Legacy mode

  Dynamic entries in the MAC address table that have already been authenticated in this authentication mode are subject to the delay time.

  After the MAC address table aging period times out#, when the period of time set by using this command (delay time) elapses, authentication of the applicable MAC address is canceled if the command is not re-registered.

  #: The aging time is determined by the `mac-address-table aging` command configuration.

  If 0 is set, authentication is canceled as soon as an aging timeout is detected.

  1. Default value when this parameter is omitted:

     After an aging timeout, authentication is not canceled for 3600 seconds.

2. Range of values:

   0, 60 to 86400

Default behavior

- Fixed VLAN mode, dynamic VLAN mode

  After authentication in either of these authentication modes, if no frames are received from a terminal for the applicable MAC-based authentication entry when 3600 seconds has passed, the applicable MAC-based authentication entry is deleted from the MAC table automatically and authentication is canceled.

- Legacy mode

  When 3600 seconds have passed after the MAC address table aging period has timed out, authentication of the terminal to which the applicable MAC address is assigned is automatically canceled.

Impact on communication

After the `no mac-authentication auto-logout` command is set, authentication is not automatically canceled even if a terminal authenticated using MAC-based authentication detects that forwarding has not been performed on the terminal for a certain period of time.

If `mac-authentication auto-logout delay-time` is set, the terminal operates according to the time that has been set.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All MAC-based authentication settings take effect when the `mac-authentication system-auth-control` command is set.
2. See *Table 24-1 Configuration commands and MAC-based authentication modes* for the authentication mode in which the command's settings are operable.
3. The non-communication monitoring time on an authenticated terminal in fixed VLAN mode or dynamic VLAN mode takes effect if the following condition exists:
   - The MAC-based authentication fixed VLAN mode or dynamic VLAN mode is in effect and `mac-authentication auto-logout` is enabled.

Related commands

mac-authentication system-auth-control

mac-authentication port

mac-address-table aging-time

mac-authentication force-authorized vlan

When the RADIUS authentication method is used, if the RADIUS server does not respond or a request to a RADIUS server fails due to route failure, this command forcibly changes the status of a terminal requesting authentication on the applicable port to authenticated and assigns the terminal to a post-authentication VLAN.

Syntax

To set or change information:

```
mac-authentication force-authorized vlan <VLAN ID> [action trap]
```

To delete information:

```
no mac-authentication force-authorized vlan
```

Input mode

```
(config-if)
```

Parameters

<VLAN ID>

Sets the post-authentication VLAN ID to be assigned when forced authentication is authorized.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   See *Specifiable values for parameters*.

   Note, however, that the default VLAN (`VLAN ID = 1`) cannot be set.

`[action trap]`

When forced authentication is authorized, private traps are issued.

1. Default value when this parameter is omitted:

   Private traps are not issued if forced authentication is authorized.

2. Range of values:

   action trap

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All MAC-based authentication settings take effect when the `mac-authentication system-auth-control` command is set.
2. See *Table 24-1 Configuration commands and MAC-based authentication modes* for the authentication mode in which the command's settings are operable.

3. Set a VLAN ID for which `mac-based` (MAC VLAN) has been set in the `vlan` command.
4. Be especially careful when using this functionality, as it can pose a security problem.
5. This command is enabled when the following condition exists:
   - All the following configurations have been set:
     - `radius-server host` or `mac-authentication radius-server host`
     - `mac-authentication system-auth-control`
     - `mac-authentication port`[#1, #4]
     - `2mac-authentication interface`[#2]
     - `mac-authentication vlan`[#2, #3]
     - `vlan` *<VLAN ID list>* `mac-based`[#3]
     - `mac-authentication force-authorized vlan`[#3, #4]
     - `switchport mac vlan`[#2, #3, #4]
     - `switchport mode mac-vlan`[#4]
     - `aaa authentication mac-authentication`[#5]
     - `mac-authentication authentication`[#6]

   #1

   Set this command when using dynamic VLAN mode.

   #2

   Set this command when using legacy mode.

   #3

   Set the same VLAN ID for commands marked [#3].

   #4

   Specify the same Ethernet port.

   - The following accounting log data is collected when an authentication request is sent to the RADIUS server:

     No=21:

     NOTICE:`LOGIN:`(*<Additional information>*) `Login failed ; Failed to connection to RADIUS server.`

     <Additional information>:`MAC`, `PORT`, `VLAN`

   The accounting log data can be confirmed by using the `show mac-authentication logging` operation command.

   #5

   When forced authentication is used as the Switch default, set only `default group radius`.

   #6

   When forced authentication is used for the port-based authentication method, set `aaa authentication mac-authentication` *<List name>*.
6. The forced authentication authorization state is canceled if authentication for the applicable terminal is canceled.
7. Before issuing private traps, you must use the `snmp-server host` command to set the destination IP address for traps and `mac-authentication`.
8. If either of the following commands has already been set, this command cannot be set:

- `authentication force-authorized enable`
- `authentication force-authorized vlan`

Related commands

aaa authentication mac-authentication

mac-authentication interface

mac-authentication port

mac-authentication system-auth-control

mac-authentication vlan

radius-server host or mac-authentication radius-server host

switchport mac

switchport mode

vlan

mac-authentication id-format

When using RADIUS authentication, specifies MAC address format for authentication requests to the RADIUS server.

Syntax

To set or change information:

```
mac-authentication id-format <Type> [capitals]
```

To delete information:

```
no mac-authentication id-format
```

Input mode

```
(config)
```

Parameters

<Type>

Sets MAC address format used when an authentication request is sent to the RADIUS server.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 3

   0: *xx-xx-xx-xx-xx-xx*

   1: *xxxxxxxxxxxx*

   2: *xxxx.xxxx.xxxx*

   3: *xx:xx:xx:xx:xx:xx*

`capitals`

Use this parameter to set a MAC address used when an authentication request is sent to the RADIUS server in hexadecimal uppercase format.

1. Default value when this parameter is omitted:

   Lowercase characters are used.

2. Range of values:

   `capitals`

Default behavior

Authentication requests are sent to the RADIUS server in hexadecimal lowercase character format, such as `Type 0 (xx-xx-xx-xx-xx-xx)`.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All MAC-based authentication settings take effect when the `mac-authentication`

`system-auth-control` command is set.

2. See *Table 24-1 Configuration commands and MAC-based authentication modes* for the authentication mode in which the command's settings are operable.

Related commands

mac-authentication system-auth-control

aaa authentication mac-authentication

mac-authentication interface

Sets the applicable interface ports in MAC-based authentication legacy mode.

Syntax

To set or change information:

`mac-authentication interface fastethernet` *<IF# list>* [AX1250S] [AX1240S]

`mac-authentication interface gigabitethernet` *<IF# list>*

To delete information:

`no mac-authentication interface fastethernet` [AX1250S] [AX1240S]

`no mac-authentication interface gigabitethernet`

Input mode

`(config)`

Parameters

<IF# list>

Sets ports for MAC-based authentication.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   See *Specifiable values for parameters*.

Default behavior

MAC-based authentication legacy mode is not used.

Impact on communication

If an interface is deleted by using this command, the legacy mode authentication terminal registered on the interface you have deleted is released.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All MAC-based authentication settings take effect when the `mac-authentication system-auth-control` command is set.
2. See *Table 24-1 Configuration commands and MAC-based authentication modes* for the authentication mode in which the command's settings are operable.
3. If at least one of the following commands is set for a Switch, this command cannot be set:
   - `authentication multi-step`
   - `dot1x authentication`
   - `mac-authentication authentication`
   - `web-authentication authentication`
   - `web-authentication user-group`

Related commands

mac-authentication system-auth-control

mac-authentication max-timer

Sets the maximum connection time.

Syntax

To set or change information:

```
mac-authentication max-timer { <Minutes> | infinity }
```

To delete information:

```
no mac-authentication max-timer
```

Input mode

```
(config)
```

Parameters

`{ <Minutes> | infinity }`

Sets the maximum time (in minutes) an authenticated terminal is allowed to be connected. After a successful authentication, if the period of time set by using this command elapses, the authentication is canceled automatically.

If `infinity` is specified, there is no limit to the connection time.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   10 to 1440 (minutes) or `infinity`

Default behavior

Authentication is not canceled.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All MAC-based authentication settings take effect when the `mac-authentication system-auth-control` command is set.
2. See *Table 24-1 Configuration commands and MAC-based authentication modes* for the authentication mode in which the command's settings are operable.
3. If the value for the maximum connection time is decreased or increased, the previous setting is applied to terminal that is currently authenticated, and the setting values take effect only from the next login.
4. The connection time for MAC-based authentication does not use the time of a Switch. Accordingly, if the date and time is changed by using the `set clock` operation command, the connection time is not affected.

Related commands

mac-authentication system-auth-control

mac-authentication max-user

Sets the maximum number of terminals that can be authenticated on a Switch.

Syntax

To set or change information:

```
mac-authentication max-user <Count>
```

To delete information:

```
no mac-authentication max-user
```

Input mode

```
(config)
```

Parameters

<Count>

Sets the maximum number of terminals that can be authenticated on a Switch.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 256

Default behavior

The maximum number of terminals that can be authenticated on a Switch is 256.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All MAC-based authentication settings take effect when the `mac-authentication system-auth-control` command is set.
2. See *Table 24-1 Configuration commands and MAC-based authentication modes* for the authentication mode in which the command's settings are operable.
3. When this command is set, the setting is not applied to terminals that have already been authenticated, and takes effect only from the next login.
4. The maximum number of terminals that can be authenticated on a Switch and a port can be set at the same time.
   - If the number of authenticated terminals reaches the maximum number allowed for port-based authentication terminals, no more terminals can be authenticated on the applicable port.
   - If the number of authenticated terminals reaches the maximum number for a Switch, no more terminals can be authenticated on that Switch.
5. If the maximum number of terminals that can be authenticated is changed to a value smaller than the number of terminals currently authenticated, the authenticated terminals can continue communication, but no more terminals can be authenticated.

6. If the port to which an authenticated terminal is connected is moved, the number of actually connected terminals might be different from the number of authenticated terminals.
7. If the DHCP snooping functionality is also used, the maximum number of terminals is limited to 246.

Related commands

mac-authentication system-auth-control

mac-authentication interface

mac-authentication port

mac-authentication max-user (interface)

Sets the maximum number of authentication terminals that can be authenticated on the applicable port.

Syntax

To set or change information:

```
mac-authentication max-user <Count>
```

To delete information:

```
no mac-authentication max-user
```

Input mode

```
(config-if)
```

Parameters

<Count>

Sets the maximum number of authentication terminals that can be authenticated on the applicable port.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 256

Default behavior

The maximum number of authentication terminals that can be authenticated on the port is 256.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All MAC-based authentication settings take effect when the `mac-authentication system-auth-control` command is set.
2. See *Table 24-1 Configuration commands and MAC-based authentication modes* for the authentication mode in which the command's settings are operable.
3. When this command is set, the setting is not applied to terminals that have already been authenticated, and takes effect only from the next login.
4. The maximum number of terminals that can be authenticated on a Switch and a port can be set at the same time.
   - If the number of authenticated terminals reaches the maximum number allowed for port-based authentication terminals, no more terminals can be authenticated on the applicable port.
   - If the number of authenticated terminals reaches the maximum number for a Switch, no more terminals can be authenticated on that Switch.

5. If the maximum number of terminals that can be authenticated is changed to a value smaller than the number of terminals currently authenticated, the authenticated terminals can continue communication, but no more terminals can be authenticated.
6. If the port to which an authenticated terminal is connected is moved, the number of actually connected terminals might be different from the number of authenticated terminals.
7. If the DHCP snooping functionality is also used, the maximum number of terminals is limited to 246.

Related commands

mac-authentication system-auth-control

mac-authentication interface

mac-authentication port

mac-authentication password

When the RADIUS authentication method is used, this command sets the password used for sending authentication requests to the RADIUS server.

Syntax

To set or change information:

```
mac-authentication password <Password>
```

To delete information:

```
no mac-authentication password
```

Input mode

```
(config)
```

Parameters

<Password>

Sets the password used when sending authentication requests to the RADIUS server.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   The password can be 1 to 32 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

Default behavior

When the `mac-authentication id-format` command is set, the MAC address of the terminal subject to authentication in the format set by using that command becomes the password.

If the `mac-authentication id-format` command is not set, the MAC address of a terminal subject to authentication in `xx-xx-xx-xx-xx-xx` format (a to f must be lowercase) becomes the password.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All MAC-based authentication settings take effect when the `mac-authentication system-auth-control` command is set.
2. See *Table 24-1 Configuration commands and MAC-based authentication modes* for the authentication mode in which the command's settings are operable.
3. The passwords set by using this command are common to all MAC-based authentication RADIUS authentication terminals.

Related commands

mac-authentication system-auth-control

mac-authentication id-format

aaa authentication mac-authentication

mac-authentication port

Sets the authentication mode for ports.

Syntax

To set information:

```
mac-authentication port
```

To delete information:

```
no mac-authentication port
```

Input mode

```
(config-if)
```

Parameters

None

Default behavior

When MAC-based authentication is valid, the port operates in legacy mode.

Impact on communication

If a port subject to authentication is deleted by using this command, authentication is canceled on all applicable ports.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All MAC-based authentication settings take effect when the `mac-authentication system-auth-control` command is set.
2. See *Table 24-1 Configuration commands and MAC-based authentication modes* for the authentication mode in which the command's settings are operable.
3. This command cannot be set if the `system function` command is set and `extended-authentication` has not been set. (This command can be set if the `system function` command has not been set.) [AX1250S] [AX1240S]
4. This command can be set only for Ethernet interfaces.

Related commands

mac-authentication system-auth-control

authentication ip access-group

authentication arp-relay

mac-authentication radius-server dead-interval

Configures the timer for monitoring automatic restoration to the primary MAC-based authentication RADIUS server from the MAC-based authentication RADIUS server.

The primary MAC-based authentication RADIUS server is restored when either of the following occurs: The current server (the destination for RADIUS authentication requests in operation) switches to a valid secondary MAC-based authentication RADIUS server, or when all servers are disabled, the monitoring timer starts, and the period of time set by this command elapses (when the monitoring timer expires).

Syntax

To set or change information:

```
mac-authentication radius-server dead-interval <Minutes>
```

To delete information:

```
no mac-authentication radius-server dead-interval
```

Input mode

```
(config)
```

Parameters

<Minutes>

Configures the timer for monitoring automatic restoration to the primary MAC-based authentication RADIUS server from the secondary MAC-based authentication RADIUS server.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 1440 (minutes)

   If 0 is set, RADIUS authentication requests are always initiated from the primary MAC-based authentication RADIUS server.

Default behavior

The primary MAC-based authentication RADIUS server is automatically restored 10 minutes after the current server switches to the secondary MAC-based authentication RADIUS server.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

1. If the secondary MAC-based authentication RADIUS server is operating as the current server, and if the value of the monitoring timer is changed, the progress to that time is used as the judgment value and the result is applied.
2. If this command configuration is deleted after the monitoring timer starts, the monitoring timer counter continues without being reset and runs for 10 minutes (default value).

Notes

1. All MAC-based authentication settings take effect when the `mac-authentication system-auth-control` command is set.
2. See *Table 24-1 Configuration commands and MAC-based authentication modes* for the authentication mode in which the command's settings are operable.
3. If three or more MAC-based authentication RADIUS servers are configured and another MAC-based authentication RADIUS server becomes the current server after the monitoring timer starts, the monitoring timer is not reset and continues to run.
4. In general, when the monitoring timer has started, it does not reset until it expires. However, as exceptions, it resets in the following cases:
   - When `mac-authentication dead-interval 0` is configured by using this command
   - When information about the MAC-based authentication RADIUS server operating as the current server is deleted by using the `mac-authentication radius-server host` configuration command
   - When the `clear radius-server` operation command is executed
5. If the monitoring timer expires while the authentication sequence is being executed on a terminal subject to authentication, restoration of the primary MAC-based authentication RADIUS server is not performed until the executed authentication sequence is completed.

Related commands

aaa authentication mac-authentication

mac-authentication port

mac-authentication system-auth-control

mac-authentication radius-server host

mac-authentication radius-server host

Configures the RADIUS server used for MAC-based authentication.

Syntax

To set or change information:

```
mac-authentication radius-server host <IP address> [auth-port <Port>] [acct-port <Port>] [timeout <Seconds>] [retransmit <Retries>] [key <String>]
```

To delete information:

```
no mac-authentication radius-server host <IP address>
```

Input mode

```
(config)
```

Parameters

<IP address>

Specifies the IPv4 address of the RADIUS server.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify the IPv4 address (dot notation).

   1.0.0.0 to 126.255.255.255, 128.0.0.0 to 223.255.255.255

`auth-port` *<Port>*

Specifies the RADIUS server port number.

1. Default value when this parameter is omitted:

   Port number 1812 is used.

2. Range of values:

   1 to 65535

`acct-port` *<Port>*

Specifies the port number for RADIUS server accounting.

1. Default value when this parameter is omitted:

   Port number 1813 is used.

2. Range of values:

   1 to 65535

`timeout` *<Seconds>*

Specifies the timeout period (in seconds) for a response from the RADIUS server.

1. Default value when this parameter is omitted:

   The period of time set by using the `radius-server timeout` command is used. If no period is set, the initial value is 5.

2. Range of values:

   1 to 30 (seconds)

`retransmit` *<Retries>*

Specifies the number of times an authentication request is resent to the RADIUS server.

1. Default value when this parameter is omitted:

   The number of times set by using the `radius-server retransmit` command is used. If no value is set, the initial value is 3.

2. Range of values:

   0 to 15 (times)

`key` *<String>*

Specifies the RADIUS key used for encryption or for authentication of communication with the RADIUS server. The same RADIUS key must be set for the client and the RADIUS server.

1. Default value when this parameter is omitted:

   The RADIUS key set by using the `radius-server key` command is used. If no key is set, the RADIUS server is disabled.

2. Range of values:

   Specify a character string that has no more than 64 characters. For details about the characters that can be specified, see *Any character string* in *Specifiable values for parameters*.

Default behavior

The RADIUS server settings registered by using the `radius-server host` command are used.

If the `radius-server host` command is not registered, user authentication is performed by using the internal MAC-based authentication database without using the RADIUS server.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All MAC-based authentication settings take effect when the `mac-authentication system-auth-control` command is set.
2. See *Table 24-1 Configuration commands and MAC-based authentication modes* for the authentication mode in which the command's settings are operable.
3. When this command is set, the setting information of the RADIUS server referenced by MAC-based authentication has precedence over the information set by using the `radius-server host` command (the settings of the `radius-server host` command are not applied). For details about settings for the general-use RADIUS server information and the MAC-based authentication RADIUS server information, see the *Configuration Guide Vol. 2*.
4. A maximum of 4 MAC-based authentication RADIUS servers can be specified for each Switch.
5. `127.*.*.*` cannot be set as an IPv4 address.
6. If the `key` parameter is omitted and the `radius-server key` command is not set, the RADIUS server is disabled.
7. If multiple MAC-based authentication RADIUS servers are configured, the address

displayed first by using the `show radius-server` operation command is the primary MAC-based authentication RADIUS server. The primary MAC-based authentication RADIUS server is used as the first current server (the destination for RADIUS authentication requests during operation).

If a failure occurs on the primary MAC-based authentication RADIUS server, the current server switches to the next effective MAC-based authentication RADIUS server (secondary RADIUS server). For details about automatic restoration of the primary MAC-based authentication RADIUS server, see the description for the `mac-authentication radius-server dead-interval` command.

8. If a RADIUS server with an IP address that matches has already been registered in the general-use RADIUS server configuration, some other authentication-specific RADIUS server configuration, or the RADIUS server group configuration, all these parameters are replaced by the new commands that were entered automatically.

Related commands

aaa authentication mac-authentication

mac-authentication port

mac-authentication system-auth-control

mac-authentication roaming

Sets communication permissions (roaming) when the port for an authenticated terminal changes to another port connected via a hub or similar means without a link-down event occurring.

Syntax

To set or change information:

```
mac-authentication roaming [action trap]
```

To delete information:

```
no mac-authentication roaming
```

Input mode

```
(config)
```

Parameters

`[action trap]`

When a change to another port due to roaming is detected, a private trap is issued.

- Default value when this parameter is omitted:

  When a change to another port due to roaming is detected, a private trap is not issued.

- Range of values:

  action trap

Default behavior

Communication is not permitted when an authenticated terminal moves to another port.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All MAC-based authentication settings take effect when the `mac-authentication system-auth-control` command is set.
2. See *Table 24-1 Configuration commands and MAC-based authentication modes* for the authentication mode in which the command's settings are operable.
3. If the destination port is a port in dynamic VLAN mode and the change of port is within the same VLAN, communication is possible after the change.
4. If the DHCP snooping functionality is also used when this command is set and if the port of an authenticated terminal changes to another port, the authentication status also moves to the destination port. However, communication is impossible because the binding database is not updated.
5. Before issuing private traps, you must use the `snmp-server host` command to set the destination IP address for traps and `mac-authentication`.

Related commands

mac-authentication system-auth-control

mac-authentication port

snmp-server host

mac-authentication static-vlan force-authorized

When the RADIUS authentication method is used, this command forcibly changes the status of a terminal that requests authentication on the applicable port to authentication authorized if the RADIUS server does not respond or a request to the RADIUS server fails because of a route failure or other problem.

Syntax

To set or change information:

```
mac-authentication static-vlan force-authorized [action trap]
```

To delete information:

```
no mac-authentication static-vlan force-authorized
```

Input mode

```
(config-if)
```

Parameters

`[action trap]`

When forced authentication is authorized, private traps are issued.

- Default value when this parameter is omitted:

  Private traps are not issued if forced authentication is authorized.

- Range of values:

  action trap

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All MAC-based authentication settings take effect when the `mac-authentication system-auth-control` command is set.
2. See *Table 24-1 Configuration commands and MAC-based authentication modes* for the authentication mode in which the command's settings are operable.
3. Be especially careful when using this functionality, as it can pose a security problem.
4. This command is enabled when the following condition exists:
   - All the following configurations have been set:
     - `radius-server host` or `mac-authentication radius-server host`
     - `mac-authentication port`[#1]
     - `mac-authentication static-vlan force-authorized`[#1]
     - `mac-authentication system-auth-control`
     - `aaa authentication mac-authentication`[#2]

- `mac-authentication authentication`#3

#1

Specify the same Ethernet port.

- The following accounting log data is collected when an authentication request is sent to the RADIUS server:

  No=21:

  NOTICE:LOGIN: `(`*<Additional information>*`) Login failed ; Failed to connection to RADIUS server.`

  <Additional information>:`MAC`, `PORT`, `VLAN`

  The accounting log data can be confirmed by using the `show mac-authentication logging` operation command.

#2

When forced authentication is used as the Switch default, set only `default group radius`.

#3

When forced authentication is used for the port-based authentication method, set `aaa authentication mac-authentication` *<List name>*.

5. The forced authentication authorization state is canceled if authentication for the applicable terminal is canceled.
6. Before issuing private traps, you must use the `snmp-server host` command to set the destination IP address for traps and `mac-authentication`.
7. If either of the following commands has already been set, this command cannot be set:
   - `authentication force-authorized enable`
   - `authentication force-authorized vlan`

Related commands

aaa authentication mac-authentication

mac-authentication port

mac-authentication system-auth-control

radius-server host or mac-authentication radius-server host

snmp-server host

mac-authentication static-vlan max-user

Sets the maximum number of terminals that can be authenticated on a Switch.

Syntax

To set or change information:

```
mac-authentication static-vlan max-user <Count>
```

To delete information:

```
no mac-authentication static-vlan max-user
```

Input mode

```
(config)
```

Parameters

<Count>

Sets the maximum number of terminals that can be authenticated on a Switch.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 1024

Default behavior

The maximum number of terminals that can be authenticated on a Switch is 1024.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All MAC-based authentication settings take effect when the `mac-authentication system-auth-control` command is set.
2. See *Table 24-1 Configuration commands and MAC-based authentication modes* for the authentication mode in which the command's settings are operable.
3. When this command is set, the setting is not applied to terminals that have already been authenticated, and takes effect only from the next login.
4. The maximum number of terminals that can be authenticated on a Switch and a port can be set at the same time.
   - If the number of authenticated terminals reaches the maximum number allowed for port-based authentication terminals, no more terminals can be authenticated on the applicable port.
   - If the number of authenticated terminals reaches the maximum number for a Switch, no more terminals can be authenticated on that Switch.
5. If the maximum number of terminals that can be authenticated is changed to a value smaller than the number of terminals currently authenticated, the authenticated terminals can continue communication, but no more terminals can be authenticated.

6. If the DHCP snooping functionality is also used, the maximum number of terminals is limited to 246.

Related commands

mac-authentication system-auth-control

mac-authentication port

mac-authentication static-vlan max-user (interface)

Sets the maximum number of authentication terminals that can be authenticated on the applicable port.

Syntax

To set or change information:

```
mac-authentication static-vlan max-user <Count>
```

To delete information:

```
no mac-authentication static-vlan max-user
```

Input mode

```
(config-if)
```

Parameters

<Count>

Sets the maximum number of authentication terminals that can be authenticated on the applicable port.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 1024

Default behavior

The maximum number of authentication terminals that can be authenticated on the port is 1024.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All MAC-based authentication settings take effect when the `mac-authentication system-auth-control` command is set.
2. See *Table 24-1 Configuration commands and MAC-based authentication modes* for the authentication mode in which the command's settings are operable.
3. When this command is set, the setting is not applied to terminals that have already been authenticated, and takes effect only from the next login.
4. The maximum number of terminals that can be authenticated on a Switch and a port can be set at the same time.
   - If the number of authenticated terminals reaches the maximum number allowed for port-based authentication terminals, no more terminals can be authenticated on the applicable port.
   - If the number of authenticated terminals reaches the maximum number for a Switch, no more terminals can be authenticated on that Switch.

5. If the maximum number of terminals that can be authenticated is changed to a value smaller than the number of terminals currently authenticated, the authenticated terminals can continue communication, but no more terminals can be authenticated.
6. If the DHCP snooping functionality is also used, the maximum number of terminals is limited to 246.

Related commands

mac-authentication system-auth-control

mac-authentication port

mac-authentication static-vlan roaming

Sets communication permissions (roaming) when the port for an authenticated terminal changes to another port connected via a hub or similar means without a link-down event occurring.

Syntax

To set or change information:

```
mac-authentication static-vlan roaming [action trap]
```

To delete information:

```
no mac-authentication  static-vlan roaming
```

Input mode

```
(config)
```

Parameters

```
[action trap]
```

When a change to another port due to roaming is detected, a private trap is issued.

- Default value when this parameter is omitted:

  When a change to another port due to roaming is detected, a private trap is not issued.

- Range of values:

  action trap

Default behavior

Communication is not permitted when an authenticated terminal moves to another port.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All MAC-based authentication settings take effect when the `mac-authentication system-auth-control` command is set.
2. See *Table 24-1 Configuration commands and MAC-based authentication modes* for the authentication mode in which the command's settings are operable.
3. If the destination port is a port in fixed VLAN mode and the port is still in the same VLAN after it is moved, communication is possible after the move.
4. If the DHCP snooping functionality is also used when this command is set and if the port of an authenticated terminal changes to another port, the authentication status also moves to the destination port. However, communication is impossible because the binding database is not updated.
5. Before issuing private traps, you must use the `snmp-server host` command to set the destination IP address for traps and `mac-authentication`.

Related commands

mac-authentication system-auth-control

mac-authentication port

snmp-server host

mac-authentication system-auth-control

Enables MAC-based authentication.

Note that if the `no mac-authentication system-auth-control` command is executed, MAC-based authentication stops.

Syntax

To set information:

```
mac-authentication system-auth-control
```

To delete information:

```
no mac-authentication system-auth-control
```

Input mode

```
(config)
```

Parameters

None

Default behavior

MAC-based authentication is not performed.

Impact on communication

If `no mac-authentication system-auth-control` is executed, the authentication of the authenticated terminals is canceled.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. See *Table 24-1 Configuration commands and MAC-based authentication modes* for the authentication mode in which the command's settings are operable.
2. If `no mac-authentication system-auth-control` is executed, terminal information registered in the internal MAC-based authentication database is saved in its current state.

Related commands

None

mac-authentication timeout quiet-period

Sets the time during which re-authentication will not be attempted (re-authentication delay timer) for the same terminal (MAC address) when authentication fails. No authentication processing is performed during this period.

Syntax

To set or change information:

```
mac-authentication timeout quiet-period <Seconds>
```

To delete information:

```
no mac-authentication timeout quiet-period
```

Input mode

```
(config)
```

Parameters

<Seconds>

Specifies the re-authentication delay timer in seconds. If you want to restart authentication processing immediately after authentication fails, set 0.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0, 60 to 86400 (seconds)

Default behavior

No authentication processing for the same terminal is performed for 300 seconds after MAC-based authentication failure.

Impact on communication

None

When the change is applied

1. When authentication fails
2. When the re-authentication delay timer that is running times out and the value of the timer becomes 0.
3. When the `clear mac-authentication auth-state` operation command is executed to cancel the authentication of specific terminals or the authentication of all authenticated terminals for an entire Switch.

Notes

1. All MAC-based authentication settings take effect when the `mac-authentication system-auth-control` command is set.
2. See *Table 24-1 Configuration commands and MAC-based authentication modes* for the authentication mode in which the command's settings are operable.
3. When multistep authentication is used, a value other than 0 must be set for this command.

Related commands

mac-authentication system-auth-control

mac-authentication timeout reauth-period

Sets the interval for re-authenticating terminals after an authentication has been successful.

Syntax

To set or change information:

```
mac-authentication timeout reauth-period <Seconds>
```

To delete information:

```
no mac-authentication timeout reauth-period
```

Input mode

```
(config)
```

Parameters

<Seconds>

Specifies the interval (in seconds) for re-authenticating a terminal. If 0 is set, re-authentication is not performed and operation continues.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0, 600 to 86400 (seconds)

Default behavior

3600 seconds is used as the interval for re-authenticating a terminal.

Impact on communication

None

When the change is applied

- When the interval for re-authenticating the current terminals times out, and the value of the timer becomes 0.
- When the `clear mac-authentication auth-state` operation command is executed to cancel the authentication of specific terminals or the authentication of all authenticated terminals for an entire Switch.
- When the authentication of a terminal succeeds when no authenticated terminals exist

Notes

1. All MAC-based authentication settings take effect when the `mac-authentication system-auth-control` command is set.
2. See *Table 24-1 Configuration commands and MAC-based authentication modes* for the authentication mode in which the command's settings are operable.

Related commands

mac-authentication system-auth-control

mac-authentication vlan

Sets the VLAN IDs of VLANs to be switched dynamically after legacy mode authentication.

If this command is not set, no VLANs are switched after legacy-mode authentication.

Syntax

To set or change information:

```
mac-authentication vlan <VLAN ID list>
```

To delete information:

```
no mac-authentication vlan <VLAN ID list>
```

Input mode

```
(config)
```

Parameters

<VLAN ID list>

Sets the VLAN ID list of MAC VLANs to be switched after authentication.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to set *<VLAN ID list>* and the specifiable values, see *Specifiable values for parameters*. Note that the default VLAN (`VLAN ID = 1`) cannot be set.

Default behavior

No VLANs are switched dynamically after legacy-mode authentication.

Impact on communication

If VLANs are deleted by using this command, authentication of authenticated terminals registered in the VLANs you have deleted is canceled.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All MAC-based authentication settings take effect when the `mac-authentication system-auth-control` command is set.
2. See *Table 24-1 Configuration commands and MAC-based authentication modes* for the authentication mode in which the command's settings are operable.
3. All VLAN IDs you have set must be set for a MAC VLAN.
4. If at least one of the following commands is set for a Switch, this command cannot be set:
   - `authentication multi-step`
   - `dot1x authentication`
   - `mac-authentication authentication`
   - `web-authentication authentication`

- `web-authentication user-group`

Related commands

mac-authentication system-auth-control

switchport mac

mac-authentication vlan-check

Checks the VLAN ID when checking a MAC address during authentication processing.

For the RADIUS authentication method, the MAC address string, the string set by using this command (`%VLAN` is set by default), and the VLAN ID are combined and used as the user ID for sending an authentication request to the RADIUS server.

For the local authentication method, the MAC address string and the VLAN ID are checked against the internal MAC-based authentication DB (if there is no VLAN ID information in the internal MAC-based authentication DB, only the MAC address string is used for the check).

Syntax

To set or change information:

```
mac-authentication  vlan-check [ key <String> ]
```

To delete information:

```
no mac-authentication vlan-check
```

Input mode

```
(config)
```

Parameters

`key` *<String>*

This parameter applies only to the RADIUS authentication method.

The parameter sets a character string that is added to the user ID when an authentication request is sent to the RADIUS server.

This parameter is invalid for the local authentication method.

1. Default value when this parameter is omitted:

   `%VLAN` is set.

2. Range of values:

   The password can be 1 to 64 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

Default behavior

No VLAN IDs are added during the MAC-based authentication check.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. All MAC-based authentication settings take effect when the `mac-authentication system-auth-control` command is set.
2. See *Table 24-1 Configuration commands and MAC-based authentication modes* for the authentication mode in which the command's settings are operable.

Related commands

mac-authentication system-auth-control

mac-authentication port

aaa authentication mac-authentication

25. Multistep Authentication

authentication multi-step

authentication multi-step

Configure a multistep authentication port.

Syntax

To set or change information:

```
authentication multi-step  [{permissive | dot1x}]
```

To delete information:

```
no authentication multi-step
```

Input mode

```
(config-if)
```

Parameters

`{permissive | dot1x}`

`permissive`

Permits both Web authentication and IEEE 802.1X authentication for a terminal on which the first step (MAC-based authentication) has failed.

1. Default value when this parameter is omitted:

   For a terminal on which the first step (MAC-based authentication) has failed, neither Web authentication nor IEEE 802.1X authentication is permitted.

`dot1x`

Permits MAC-based authentication and IEEE 802.1X authentication as the first step of authentication. For a terminal on which the first step (MAC-based authentication or IEEE 802.1X authentication) has failed, Web authentication is not permitted.

1. Default value when this parameter is omitted:

   For a terminal on which the first step (MAC-based authentication) has failed, neither Web authentication nor IEEE 802.1X authentication is permitted.

2. Range of values:

   `permissive` or `dot1x`

Default behavior

The port operates as a single authentication port.

Impact on communication

The authenticated state of a terminal connected to the applicable port is canceled.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If at least one of the following commands is set for a Switch, this command cannot be set:
   - `dot1x vlan dynamic enable`
   - `dot1x vlan dynamic radius-vlan`

- `mac-authentication interface`
- `mac-authentication vlan`
- `web-authentication vlan`

2. This command can be set only for Ethernet interfaces.

Related commands

None

26. Secure Wake-on-LAN [OP-WOL]

http-server [OP-WOL]

http-server [OP-WOL]

Enables the HTTP server functionality.

Syntax

To set information:

```
http-server
```

To delete information:

```
no http-server
```

Input mode

```
(config)
```

Parameters

None

Default behavior

When the `web-authentication system-auth-control` command is set: Enabled

When the `web-authentication system-auth-control` command is not set: Disabled

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. When this command has been set, display of the Secure Wake-on-LAN user authentication screen and Web authentication Login page can be enabled.
2. When the `web-authentication system-auth-control` command has been set, display of the Secure Wake-on-LAN user authentication screen and Web authentication Login page can be enabled.
3. When the `web-authentication system-auth-control` command has been set, operation of the Web authentication functionality is also enabled. Therefore, when using the Secure Wake-on-LAN user authentication screen only, set the `http-server` command.
4. If both this command and the `web-authentication system-auth-control` command have been set, operation of the Secure Wake-on-LAN functionality is not affected. The following table explains the combinations of command settings.

Configuration settings		Secure Wake-on-LAN		Web Authentication	
http-server	**web-authentication system-auth-control**	**User authentication screen**	**Functionality**	**Login page**	**Functionality**
Not set	Not set	Not displayed.	Does not	Not displayed.	Does not

Configuration settings		Secure Wake-on-LAN		Web Authentication	
http-server	**web-authentication system-auth-control**	**User authentication screen**	**Functionality**	**Login page**	**Functionality**
			operate.		operate.
	MethodSet	Can be displayed.	Operates.	Can be displayed.	Operates.
MethodSet	Not set	Can be displayed.	Operates.	Can be displayed.	Does not operate.
	MethodSet	Can be displayed.	Operates.	Can be displayed.	Operates.

Related commands

None

Part 10: High Reliability Based on Redundant Configurations

27. Uplink Redundancy

switchport backup interface
switchport backup flush request transmit
switchport backup mac-address-table update exclude-vlan
switchport backup mac-address-table update retransmit
switchport backup mac-address-table update transmit
switchport-backup startup-active-port-selection

switchport backup interface

Specifies the primary or secondary port, and an automatic switch-back time or a timer-based switch-back time.

Syntax

To set or change information:

`switchport backup interface {gigabitethernet` *<IF#>* `| port-channel` *<Channel group#>*`} [ preemption delay` *<Seconds>* `]` [AX2200S]

`switchport backup interface {{fastethernet | gigabitethernet}` *<IF#>* `| port-channel` *<Channel group#>*`} [ preemption delay` *<Seconds>* `]` [AX1250S] [AX1240S]

To delete information:

`no switchport backup interface`

Input mode

`(config-if)`

Parameters

`{gigabitethernet` *<IF#>* `| port-channel` *<Channel group#>*`}` [AX2200S]

`{fastethernet` *<IF#>* `| gigabitethernet` *<IF#>* `| port-channel` *<Channel group#>*`}` [AX1250S] [AX1240S]

Sets the secondary port. The port on which this command is set will be the primary port. Specifiable interfaces are Ethernet and port channel.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   <IF#>: See *Specifiable values for parameters*.

   <Channel group#>: See *Specifiable values for parameters*.

`preemption delay` *<Seconds>*

Sets an automatic switch-back time or a timer-based switch-back time.

Setting the time enables automatic or timer-based switch-backs.

1. Default value when this parameter is omitted:

   A manual switch-back is performed by using the `select switchport backup interface` operation command.

2. Range of values:

   0 (seconds): Automatic switch-back

   1 to 300 (seconds): Timer-based switch-back

Default behavior

Uplink redundancy is disabled.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. When the Spanning Tree Protocol is used at the upstream switch, the status will be `listening` or `learning` after recovering from the link-down state. Communication cannot be restored immediately. In this case, we recommend that you set the timer-based switch-back time to 30 seconds or longer.

Related commands

None

switchport backup flush request transmit

Enables the sending of flush control frames to request that the upstream switches clear their MAC address tables.

Syntax

To set or change information:

```
switchport backup flush request transmit [vlan <VLAN ID>]
```

To delete information:

```
no switchport backup flush request transmit
```

Input mode

```
(config-if)
```

Parameters

`vlan <VLAN ID>`

Sets the VLAN Tag value to be added to flush control frames.

1. Default value when this parameter is omitted:

   Flush control frames are sent in the form of untagged frames.

2. Range of values:

   See *Specifiable values for parameters*.

Default behavior

Flush control frames are not sent.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If a VLAN Tag value is set here, the flush control frames are sent in the form of tagged frames even if the target port is an access port.
2. Set this command for the primary port.

Related commands

switchport backup interface

switchport backup mac-address-table update exclude-vlan

Sets the VLAN to be excluded when sending MAC address update frames.

Syntax

To set or change information:

```
switchport backup mac-address-table update exclude-vlan <VLAN ID list>
```

To delete information:

```
no switchport backup mac-address-table update exclude-vlan
```

Input mode

```
(config-if)
```

Parameters

<VLAN ID list>

Sets the list of VLANs to be excluded when MAC address update frames are sent.

Entering a new value overwrites the existing information.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to set *<VLAN ID list>* and the specifiable values, see *Specifiable values for parameters*.

Default behavior

MAC address update frames are sent to all VLANs included on the primary port.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. You can set a maximum of 200 parameter values for excluding VLANs.

   Example when four VLAN parameter values are set:

   ```
   switchport backup mac-address-table update exclude-vlan 10-20,25-30
   ```

   When a hyphen (`-`) is used in the VLAN list specification, the value before and the value after the hyphen are counted as two values.

2. Setting the `switchport backup mac-address-table update transmit` command enables this command.
3. Set this command for the primary port.

Related commands

switchport backup interface

switchport backup mac-address-table update transmit

switchport backup mac-address-table update retransmit

Specifies the number of re-transmissions of MAC address update frames.

Syntax

To set or change information:

```
switchport backup mac-address-table update retransmit <Count>
```

To delete information:

```
no switchport backup mac-address-table update retransmit
```

Input mode

```
(config-if)
```

Parameters

<Count>

Sets the number of re-transmissions of MAC address update frames when the primary port and the secondary port are switched.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 3 (times)

Default behavior

MAC address update frames are not re-transmitted.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If the setting is changed while MAC address update frames are being transmitted, the new value is applied from the next time values are transmitted.
2. Setting the `switchport backup mac-address-table update transmit` command enables this command.
3. Set this command for the primary port.

Related commands

switchport backup interface

switchport backup mac-address-table update transmit

switchport backup mac-address-table update transmit

Enables the sending of MAC address update frames to request that the upstream switches update their MAC address tables.

Syntax

To set information:

```
switchport backup mac-address-table update transmit
```

To delete information:

```
no switchport backup mac-address-table update transmit
```

Input mode

```
(config-if)
```

Parameters

None

Default behavior

MAC address update frames are not sent.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. Set this command for the primary port.

Related commands

switchport backup interface

switchport-backup startup-active-port-selection

Enables active port locking at Switch startup.

Syntax

To set information:

```
switchport-backup startup-active-port-selection primary-only
```

To delete information:

```
no switchport-backup startup-active-port-selection
```

Input mode

```
(config)
```

Parameters

`primary-only`

Sets only the primary port as the active port at Switch startup.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   primary-only

Default behavior

The secondary port can also be selected as the active port at Switch startup.

Impact on communication

None

When the change is applied

The change is operational as soon as the setting value is changed and every time the Switch starts.

Notes

1. Even when this configuration has been deleted, the uplink port on which the active port locking functionality at Switch startup is operating enters a state in which no active ports are set until link-up occurs on the primary port.
2. On the uplink port on which the active port locking functionality at Switch startup is operating, the active port locking functionality is released if the following conditions exist:
   - Link-up occurs on the primary port.
   - Execution of the `select switchport backup interface` operation command makes the secondary port the active port.

Related commands

None

Part 11: High Reliability Based on Network Failure Detection

28. IEEE 802.3ah/UDLD

efmoam active
efmoam disable
efmoam udld-detection-count

efmoam active

Sets the port to be monitored by the IEEE 802.3ah/OAM functionality to active mode.

Syntax

To set or change information:

```
efmoam active [udld]
```

To delete information:

```
no efmoam active
```

Input mode

```
(config-if)
```

Parameters

`udld`

Sets the applicable port as the port to be monitored by the IEEE 802.3ah/UDLD functionality and enables the unidirectional link failure detection functionality.

1. Default value when this parameter is omitted:

   The unidirectional link failure detection functionality is not executed on the applicable port.

2. Range of values:

   None

Default behavior

The applicable port operates in passive mode and does not detect a unidirectional link failure.

Impact on communication

If this functionality is enabled and a line failure is detected, the applicable port is deactivated.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If the `udld` parameter is not set on both connected ports, link failures cannot be detected by using this functionality.

Related commands

None

efmoam disable

Enables or disables the IEEE 802.3ah/OAM functionality on a switch.

To disable the IEEE 802.3ah/OAM functionality, set the `efmoam disable` command.

To enable the IEEE 802.3ah/OAM functionality again, set the `no efmoam disable` command.

In passive mode, the send process starts when an OAMPDU from the active mode is received.

Syntax

To set information:

```
efmoam disable
```

To delete information:

```
no efmoam disable
```

Input mode

```
(config)
```

Parameters

None

Default behavior

The IEEE 802.3ah/OAM functionality operates.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

efmoam udld-detection-count

Sets the number of OAMPDU response timeouts that must occur to recognize a failure. (The OAMPDU is a monitoring packet of the IEEE 802.3ah/UDLD functionality.)

Syntax

To set or change information:

```
efmoam udld-detection-count <Count>
```

To delete information:

```
no efmoam udld-detection-count
```

Input mode

```
(config)
```

Parameters

<Count>

Sets the number of OAMPDU response timeouts that must occur to determine that a line failure has occurred when timeouts occur repeatedly. When the occurrence reaches the specified number of times, the applicable port is deactivated.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   3 to 300 (times)

Default behavior

30 is used as the number of times for determining a line failure.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If a value smaller than the initial value is set, a unidirectional link failure might be falsely detected.

Related commands

None

29. Storm Control

storm-control

storm-control

Configures the storm control functionality. This functionality sets the threshold of frames to be flooded and received by a Switch. When a broadcast storm or another problem occurs, the flooded frames exceeding the threshold are discarded. As a result, network load and Switch load decrease.

The following are specifiable when storm control is used:

- A storm detection threshold (upper threshold), recovery-from-storm threshold, and flow rate limit value (lower threshold) specified as a number of received frames
- Deactivating the target port or limiting the flow rate of received frames
- Monitoring time for canceling the flow rate limit
- Issuing SNMP traps or outputting an operation log data

Syntax

To set or change information:

```
storm-control broadcast level pps <Packet/s 1> [ <Packet/s 2> ]
storm-control multicast level pps <Packet/s 1> [ <Packet/s 2> ]
storm-control unicast level pps <Packet/s 1> [ <Packet/s 2> ]
storm-control action { inactivate | filter }
storm-control action trap
storm-control action log
storm-control filter-broadcast <Packet/s>
storm-control filter-multicast <Packet/s>
storm-control filter-unicast <Packet/s>
storm-control filter-recovery-time <Seconds>
```

To delete information:

```
no storm-control broadcast
no storm-control multicast
no storm-control unicast
no storm-control action { inactivate | filter }
no storm-control action trap
no storm-control action log
no storm-control filter-broadcast
no storm-control filter-multicast
no storm-control filter-unicast
no storm-control filter-recovery-time
```

Input mode

```
(config-if)
```

Parameters

`broadcast`

Sets broadcast frames as subject to storm control.

1. Default value when this parameter is omitted:

   The storm control functionality is not set.

`multicast`

Sets multicast frames as subject to storm control.

1. Default value when this parameter is omitted:

   The storm control functionality is not set.

`unicast`

Sets unicast frames as subject to storm control.

1. Default value when this parameter is omitted:

   The storm control functionality is not set.

`level pps` *<Packet/s 1>* `[` *<Packet/s 2>* `]`

<Packet/s 1>: Sets the storm detection threshold (upper limit) for the number of received frames subject to storm control. Frames exceeding the threshold are discarded. If 0 is set, all applicable frames are discarded.

<Packet/s 2>: Sets a value (recovery-from-storm threshold) used for determining that the Switch has recovered following a storm. If this value is omitted, the storm detection threshold is used as the recovery-from-storm threshold.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 10000000 (Sets a value equal to or smaller than the storm detection threshold as the recovery-from-storm threshold).

`action { inactivate | filter }`

Sets the Switch operation to be performed when a storm is detected.

`inactivate`

Deactivates the applicable port. If the port belongs to a channel group, deactivates all ports belonging to the channel group. When this parameter has been set and a port is deactivated after a storm is detected, a message is always output regardless of the action log settings. Accordingly, it is not necessary to set an action log. The action trap settings are applied when SNMP traps are issued.

`filter`

Limits the flow rate of frames received from the applicable port. If the port belongs to a channel group, only the port itself is subject to the limit.

1. Default value when this parameter is omitted:

   If a storm is detected, only the frames exceeding the storm detection threshold are discarded. The port status does not change.

2. Range of values:

   `inactivate` or `filter`

`action trap`

Issues an SNMP trap when a storm or the end of a storm is detected.

1. Default value when this parameter is omitted:

   If a storm is detected, no SNMP traps are issued.

`action log`

Outputs operation log data when a storm or the end of a storm is detected.

1. Default value when this parameter is omitted:

   Operation log data is not output when a storm is detected.

`filter-broadcast` *<Packet/s>*

When the flow rate of broadcast frames has a limit, this parameter sets the limit value (lower threshold) as the number of broadcast frames that can be forwarded. The frames exceeding the flow rate limit value are discarded. If 0 is set, all applicable frames are discarded.

1. Default value when this parameter is omitted:

   When the flow rate has a limit, all broadcast frames are discarded.

2. Range of values:

   0 to 10000000

`filter-multicast` *<Packet/s>*

When the flow rate of multicast frames has a limit, this parameter sets the limit value (lower threshold) as the number of multicast frames that can be forwarded. The frames exceeding the flow rate limit value are discarded. If 0 is set, all applicable frames are discarded.

1. Default value when this parameter is omitted:

   When the flow rate has a limit, all multicast frames are discarded.

2. Range of values:

   0 to 10000000

`filter-unicast` *<Packet/s>*

When the flow rate of unknown unicast frames has a limit, this parameter sets the limit value (lower threshold) as the number of unknown unicast frames that can be forwarded. The frames exceeding the flow rate limit value (lower threshold) are discarded. If 0 is set, all applicable frames are discarded.

1. Default value when this parameter is omitted:

   When the flow rate has a limit, all unknown unicast frames are discarded.

2. Range of values:

   0 to 10000000

`filter-recovery-time` *<Seconds>*

Sets the monitoring time for cancellation of the flow rate limit after flow rate limit has gone into effect due to the detection of a storm. The monitoring time begins when the number of received frames drops below the recovery-from-storm threshold, and the flow rate limit is canceled when the time expires.

1. Default value when this parameter is omitted:

   The initial value is 1 seconds.

2. Range of values:

   1 to 30 (seconds)

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. Storm control is controlled by the number of received frames. Frame length is irrelevant.
2. When received frames exceed the storm detection threshold, control frames are also discarded. To prevent necessary control frames from being discarded, do not specify too small a value.
3. When the number of received frames exceeds the storm detection threshold set by using `storm-control broadcast`, `storm-control multicast`, or `storm-control unicast`, the operation set for `storm-control action` is treated as detection of a storm. If the number of received frames drops below the storm detection threshold after a storm is detected, the Switch is considered to have recovered from the storm. If a storm detection threshold has not been set, the operation set for `storm-control action` is not performed.
4. When `storm-control action inactivate` is set, if a storm has been detected and the port is deactivated, use the `activate` operation command to activate the port. If a storm is detected and a port is deactivated, no frames are received. In this state, the end of the storm cannot be detected.
5. When using SNMP traps, you must use the `snmp-server host` command to set the destination IP address and `storm-control`.

Related commands

snmp-server host

30. L2 Loop Detection

loop-detection
loop-detection auto-restore-time
loop-detection enable
loop-detection hold-time
loop-detection interval-time
loop-detection threshold

loop-detection

Sets the port type for the L2 loop detection functionality.

Syntax

To set or change information:

```
loop-detection {send-inact-port | send-port | uplink-port |
exception-port}
```

To delete information:

```
no loop-detection
```

Input mode

```
(config-if)
```

Parameters

```
{send-inact-port | send-port | uplink-port | exception-port}
```

`send-inact-port`

Sets a port as a detecting and blocking port. When an L2 loop detection frame is sent and an L2 loop detection frame sent from the local switch is received, log data is output and the port is blocked.

`send-port`

Sets a port as a detecting and sending port. When an L2 loop detection frame is sent and an L2 loop detection frame sent from the local switch is received, log data is output.

`uplink-port`

Sets a port as an uplink port. No L2 loop detection frames are sent. When an L2 loop detection frame from the local switch is received, log data is output from the frame source. If the port type of the frame source is detecting and blocking port, the frame source is blocked.

`exception-port`

Sets a port as exempt from L2 loop detection. When an L2 loop detection frame is received, no operation is performed.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   `send-inact-port`, `send-port`, `uplink-port`, `exception-port`

Default behavior

The port operates as a detecting port. If an L2 loop detection frame is not sent and an L2 loop detection frame sent from the local switch is detected, log data is output.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. Changing the port type clears the following information:
   - - The number of L2 loop detections until the port is blocked
   - - The time from blocking of the port until automatic recovery occurs.
2. If the port type is changed, the statistics for sending and receiving L2 loop detection frames for each port are not cleared.

Related commands

loop-detection enable

loop-detection auto-restore-time

Sets the time required for automatic activation of a blocked port.

Syntax

To set or change information:

```
loop-detection auto-restore-time <Seconds>
```

To delete information:

```
no loop-detection auto-restore-time
```

Input mode

```
(config)
```

Parameters

<Seconds>

Sets the time (in seconds) required for automatic activation of a blocked port.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   60 to 86400 (seconds)

Default behavior

The blocked port is not activated automatically.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. When this command has been set and the parameter is changed, if time remains until the port is activated automatically, the change becomes operational only after the remaining time has been cleared.

Related commands

loop-detection enable

loop-detection enable

Enables L2 loop detection.

Syntax

To set information:

```
loop-detection enable
```

To delete information:

```
no loop-detection enable
```

Input mode

```
(config)
```

Parameters

None

Default behavior

L2 loop detection is disabled.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

loop-detection hold-time

Sets the time for holding the number of L2 loop detections before a port is blocked.

If the period of time for holding the number of L2 loop detections elapses without an L2 loop detection frame being received since the last L2 loop detection frame was received, the number of L2 loop detections held on the port is cleared.

Syntax

To set or change information:

```
loop-detection hold-time <Seconds>
```

To delete information:

```
no loop-detection hold-time
```

Input mode

```
(config)
```

Parameters

<Seconds>

Sets the period of time in seconds for holing the number of L2 loop detections.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 86400 (seconds)

Default behavior

The number of L2 loop detections continue to be held.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. When this command has been set and the parameter is changed, if any time remains for holding the number of L2 loop detections, the change becomes operational only after the remaining time has been cleared.

Related commands

loop-detection enable

loop-detection interval-time

Sets the interval for sending L2 loop detection frames.

Syntax

To set or change information:

```
loop-detection interval-time <Seconds>
```

To delete information:

```
no loop-detection interval-time
```

Input mode

```
(config)
```

Parameters

<Seconds>

Sets the interval (in seconds) for sending L2 loop detection frames.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 3600 (seconds)

Default behavior

The interval for sending L2 loop detection frames is 10 seconds.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

loop-detection enable

loop-detection threshold

Sets the number of L2 loop detections before a port is blocked. If the number of detections becomes equal to or greater than the specified number, the port is blocked.

Syntax

To set or change information:

```
loop-detection threshold <Count>
```

To delete information:

```
no loop-detection threshold
```

Input mode

```
(config)
```

Parameters

<Count>

Sets the number of L2 loop detections before a port is blocked.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 10000

Default behavior

The number of L2 loop detections before a port is deactivated is 1.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. When this command has been set and the parameter is changed, if any L2 loop detections still remain, the change becomes operational only after the remaining number of detections has been cleared.

Related commands

loop-detection enable

31. CFM

domain name
ethernet cfm cc alarm-priority
ethernet cfm cc alarm-reset-time
ethernet cfm cc alarm-start-time
ethernet cfm cc enable
ethernet cfm cc interval
ethernet cfm domain
ethernet cfm enable (global)
ethernet cfm enable (interface)
ethernet cfm mep
ethernet cfm mip
ma name
ma vlan-group

domain name

Sets the name used for the applicable domain.

Syntax

To set or change information:

`domain name {no-present | str` *<Strings>* `| dns` *<Name>* `| mac` *<MAC>* *<ID>*`}`

To delete information:

`no domain name`

Input mode

`(config-ether-cfm)`

Parameters

`{no-present | str` *<Strings>* `| dns` *<Name>* `| mac` *<MAC>* *<ID>*`}`

Sets the parameter to be used as the domain name.

`no-present`

If this parameter is set, the Maintenance Domain Name field in CCM is not used.

`str` *<Strings>*

Use a character string that is no more than 43 characters to set a domain name.

`dns` *<Name>*

Uses the domain name server name as the domain name.

`mac` *<MAC>* *<ID>*

Uses the MAC address and a 2-byte ID as a domain name.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a character string that is no more than 43 characters for *<Strings>*. For details about the characters that can be specified, see *Specifiable values for parameters*.

   Specify a character string that is no more than 63 characters for *<Name>*. For details about the characters that can be specified, see *Specifiable values for parameters*.

   Specify a value from `0000.0000.0000` to `feff.ffff.ffff` for *<Mac>*. Note, however, that a multicast MAC address (for which the least significant bit of the first byte is set to 1) cannot be set.

   Specify a value from `0` to `65535` for *<ID>*.

Default behavior

`no-present` is set.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

ethernet cfm domain

ethernet cfm cc alarm-priority

Sets the failure level to be detected by CC.

Failure levels equal to or higher than the parameter you set are detected.

Syntax

To set or change information:

```
ethernet cfm cc level <Level> ma <No.> alarm-priority <Priority>
```

To delete information:

```
no ethernet cfm cc level <Level> ma <No.> alarm-priority
```

Input mode

```
(config)
```

Parameters

`level` *<Level>*

Specifies the domain level that has been set by using the `ethernet cfm domain` command.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 7

`ma` *<No.>*

Sets the MA ID number set by using the `ma` command. Even if the `ma name` command is used to specify the MA name, using a character string, or a VLAN ID, this parameter specifies the MA ID number.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 65535

`alarm-priority` *<Priority>*

Sets the lowest failure level that will be detected by CC.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 5

   The following table shows levels detected by CC and failure descriptions.

Table 31-1 Levels detected by CC and failures descriptions

Setting level	Failure type	Command display	Failure description
5	DefXconCCM	OtherCCM	A CCM with a different domain and MA was received.

Setting level	Failure type	Command display	Failure description
4	DefErrorCCM	ErrorCCM	A CCM with an incorrect MEP ID or transmission interval was received.
3	DefRemoteCCM	Timeout	CCMs are no longer being received.
2	DefMACstatus	PortState	The port on the target Switch cannot communicate.
1	DefRDICCM	RDI	A CCM that reported the detection of a failure was received. Remote Defect Indication
0	none	−	No failure was detected.

Default behavior

Level 2 or higher failures are detected.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

ethernet cfm domain

ma name

ma vlan-group

ethernet cfm cc alarm-reset-time

Sets the time interval for identifying re-detection when CC repeatedly detects failures. If a failure is detected within the time set by using this command after a failure has been detected, the failure is treated as a re-detection and no trap is sent.

Note, however, that if a failure with a failure level higher than the currently detected failure level is detected, a trap is sent.

Syntax

To set or change information:

```
ethernet cfm cc level <Level> ma <No.> alarm-reset-time <Time>
```

To delete information:

```
no ethernet cfm cc level <Level> ma <No.> alarm-reset-time
```

Input mode

```
(config)
```

Parameters

`level` *<Level>*

Specifies the domain level that has been set by using the `ethernet cfm domain` command.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 7

`ma` *<No.>*

Specifies an MA ID number that has been set by using the `ma name` command or the `ma vlan-group` command. Even if the `ma name` command is used to specify the MA name, using a character string, or a VLAN ID, this parameter specifies the MA ID number.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 65535

`alarm-reset-time` *<Time>*

Sets the time for re-detecting a failure.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Multiples of 100 from 2500 to 10000 in milliseconds

Default behavior

The maximum time for treatment as a re-detection is 10000 milliseconds.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If higher level MAs are not included as lower level MAs, a communication overload might occur.

Related commands

ethernet cfm domain

ma name

ma vlan-group

ethernet cfm cc alarm-start-time

Sets the time after CC detects a failure until a trap is sent.

Syntax

To set or change information:

```
ethernet cfm cc level <Level> ma <No.> alarm-start-time <Time>
```

To delete information:

```
no ethernet cfm cc level <Level> ma <No.> alarm-start-time
```

Input mode

```
(config)
```

Parameters

`level` *<Level>*

Specifies the domain level that has been set by using the `ethernet cfm domain` command.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 7

`ma` *<No.>*

Specifies an MA ID number that has been set by using the `ma name` command or the `ma vlan-group` command. Even if the `ma name` command is used to specify the MA name, using a character string, or a VLAN ID, this parameter specifies the MA ID number.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 65535

`alarm-start-time` *<Time>*

Sets the time until a trap is sent following detection of a failure.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Multiples of 100 from 2500 to 10000 in milliseconds

Default behavior

2500 milliseconds are used as the time until a trap is sent following detection of a failure.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

ethernet cfm domain

ma name

ma vlan-group

ethernet cfm cc enable

Sets in a domain an MA in which the CC functionality is used.

If the `ethernet cfm mep` command has already been set, the applicable port starts to send CCMs.

Syntax

To set information:

```
ethernet cfm cc level <Level> ma <No.> enable
```

To delete information:

```
no ethernet cfm cc level <Level> ma <No.> enable
```

Input mode

```
(config)
```

Parameters

`level` *<Level>*

Specifies the domain level that has been set by using the `ethernet cfm domain` command.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 7

`ma` *<No.>*

Specifies an MA ID number that has been set by using the `ma name` command or the `ma vlan-group` command. Even if the `ma name` command is used to specify the MA name, using a character string, or a VLAN ID, this parameter specifies the MA ID number.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 65535

Default behavior

Monitoring by CC is not performed.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

ethernet cfm domain

ma name

ma vlan-group

ethernet cfm cc interval

Sets the CCM transmission interval for a target MA.

Syntax

To set or change information:

```
ethernet cfm cc level <Level> ma <No.> interval {1s | 10s | 1min | 10min}
```

To delete information:

```
no ethernet cfm cc level <Level> ma <No.> interval
```

Input mode

```
(config)
```

Parameters

`level` *<Level>*

Specifies the domain level that has been set by using the `ethernet cfm domain` command.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 7

`ma` *<No.>*

Specifies an MA ID number that has been set by using the `ma name` command or the `ma vlan-group` command. Even if the `ma name` command is used to specify the MA name, using a character string, or a VLAN ID, this parameter specifies the MA ID number.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 65535

`interval {1s | 10s | 1min | 10min}`

Sets the interval for sending CCMs.

`1s`

Sets the interval for sending CCMs to 1 second.

`10s`

Sets the interval for sending CCMs to 10 seconds.

`1min`

Sets the interval for sending CCMs to 1 minute.

`10min`

Sets the interval for sending CCMs to 10 minutes.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   `1s`, `10s`, `1min`, or `10min`

3. Note on using this parameter:

   If a value smaller than the default value is set for this parameter, the Switch CPU becomes overloaded with possible adverse effects on communication.

Default behavior

`1min` is used as the interval for sending CCMs.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

ethernet cfm domain

ma name

ma vlan-group

ethernet cfm domain

Sets a domain. Executing this command switches to `config-ether-cfm` mode in which the domain name and MA can be set.

Syntax

To set information:

```
ethernet cfm domain level <Level> [direction-up]
```

To delete information:

```
no ethernet cfm domain level <Level>
```

Input mode

```
(config)
```

Parameters

`level <Level>`

Sets the domain level.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 7

`direction-up`

When up/down is not explicitly set by using the `ethernet cfm mep` command, you can set this parameter to have the Switch operate in Up MEP mode.

1. Default value when this parameter is omitted:

   The Switch operates in Down MEP mode.

2. Range of values:

   None

3. Note on using this parameter:

   This parameter cannot be changed. If you want to change the parameter, delete the applicable command first, and then set the parameter.

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If any of the following commands references a domain set by using this command, this command cannot be deleted:
   - ethernet cfm cc enable
   - ethernet cfm mep

- ethernet cfm mip

Related commands

None

ethernet cfm enable (global)

Starts CFM.

Syntax

To set information:

```
ethernet cfm enable
```

To delete information:

```
no ethernet cfm enable
```

Input mode

```
(config)
```

Parameters

None

Default behavior

CFM does not operate even if another CFM command has been set.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

ethernet cfm enable (interface)

When `no ethernet cfm enable` is set, CFM PDU transmission processing on the applicable port or the applicable port channel stops.

Syntax

To set information:

```
no ethernet cfm enable
```

To delete information:

```
ethernet cfm enable
```

Input mode

```
(config-if)
```

Parameters

None

Default behavior

CFM PDUs can be received.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. This command cannot be set for an Ethernet interface that is set for a channel group. Also, an Ethernet interface set by using this command cannot be set for a channel group. Set this command for the port channel interface to which the applicable Ethernet interface belongs.

Related commands

None

ethernet cfm mep

Sets a MEP used by the CFM functionality.

Syntax

To set information:

```
ethernet cfm mep level <Level> ma <No.> mep-id <MEPID> [{down | up}]
```

To delete information:

```
no ethernet cfm mep level <Level> ma <No.> mep-id <MEPID>
```

Input mode

```
(config-if)
```

Parameters

`level` *<Level>*

Specifies the domain level that has been set by using the `ethernet cfm domain` command.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 7

`ma` *<No.>*

Specifies an MA ID number that has been set by using the `ma name` command or the `ma vlan-group` command.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 65535

`mep-id` *<MEPID>*

Sets the MEP ID.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 8191

3. Note on using this parameter:

   Set a value unique within the MA.

`{down | up}`

Specifies the direction of a domain.

`down`

Sets the MEP as Down MEP so that the line side will be maintained.

`up`

Sets the MEP as Up MEP so that the relay side (toward the switch) will be maintained.

1. Default value when this parameter is omitted:

When `direction-up` has been set by using the `ethernet cfm domain` command, Up MEP is used. If it has not been set, Down MEP is used.

2. Range of values:

   `down` or `up`

3. Note on using this parameter:

   This parameter cannot be changed. If you want to change this parameter, delete this configuration first, and then reset it.

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If the `ethernet cfm mip` command is set on the same interface, a domain level equal to or higher than the `ethernet cfm mip` command cannot be specified.
2. This command cannot be set for an Ethernet interface that is set for a channel group. Also, an Ethernet interface set by using this command cannot be set for a channel group. Set this command for the port channel interface to which the applicable Ethernet interface belongs.

Related commands

ethernet cfm domain

ethernet cfm mip

Sets a MIP used by the CFM functionality.

Syntax

To set information:

```
ethernet cfm mip level <Level>
```

To delete information:

```
no ethernet cfm mip level <Level>
```

Input mode

```
(config-if)
```

Parameters

`level <Level>`

Specifies the domain level that has been set by using the `ethernet cfm domain` command.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 7

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If the `ethernet cfm mep` command is set on the same interface, a domain level equal to or lower than the `ethernet cfm mep` command cannot be specified.
2. This command cannot be set for an Ethernet interface that is set for a channel group. Also, an Ethernet interface set by using this command cannot be set for a channel group. Set this command for the port channel interface to which the applicable Ethernet interface belongs.

Related commands

ethernet cfm domain

ma name

Sets the name of an MA to be used in the applicable domain.

Syntax

To set or change information:

```
ma <No.> name {str <Strings> | vlan <VLAN ID>}
```

To delete information:

```
no ma <No.> name
```

Input mode

```
(config-ether-cfm)
```

Parameters

<No.>

Sets the MA ID number.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 65535

`{str` *<Strings>* `| vlan` *<VLAN ID>*`}`

Specifies the name of an MA by using a character string or a VLAN ID.

`str` *<Strings>*

A character string specified for *<Strings>* is used for the name of an MA.

`vlan` *<VLAN ID>*

The VLAN ID specified for *<VLAN ID>* is used as the name of the MA.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a character string that is no more than 45 characters for *<Strings>*. For details about the characters that can be specified, see *Specifiable values for parameters*.

   Specify a value from 1 to 4094 for *<VLAN ID>*.

3. Note on using this parameter:

   - If a parameter other than `no-present` has been set by using the `domain name` command and you specify a character string that is 44 characters or more for *<Strings>*, the 44th and subsequent characters are not used in the Short MA Name field in the CCM.

   - *<Strings>* or *<VLAN ID>* that has already been set in the same domain cannot be set.

Default behavior

<No.> of the `ma vlan-group` command is used for a name of an MA.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

ethernet cfm domain

ma vlan-group

Sets the VLAN belonging to the MA used in the applicable domain.

Syntax

To set or change information:

```
ma <No.> vlan-group <VLAN ID List> [primary-vlan <VLAN ID>]
```

To delete information:

```
no ma <No.> vlan-group
```

Input mode

```
(config-ether-cfm)
```

Parameters

<No.>

Sets the MA ID number.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 65535

<VLAN ID List>

Sets the VLANs to be used in the applicable MA.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For details about how to set *<VLAN ID List>* and the specifiable values, see *Specifiable values for parameters*.

`primary-vlan` *<VLAN ID>*

Sets the primary VLAN to be used when CFM PDUs are sent in the applicable MA.

1. Default value when this parameter is omitted:

   From the VLAN list specified by using `vlan-group` *<VLAN ID List>*, a lower-numbered VLAN is used as the primary VLAN.

2. Range of values:

   1 to 4094

3. Note on using this parameter:

   Specify the VLAN IDs that were specified by using vlan-group *<VLAN ID List>*.

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

ethernet cfm domain

32. SNMP

hostname
rmon alarm
rmon collection history
rmon event
snmp-server community
snmp-server contact
snmp-server host
snmp-server location
snmp-server traps
snmp trap link-status

hostname

Sets the identification name of a Switch.

Syntax

To set or change information:

```
hostname <Name>
```

To delete information:

```
no hostname
```

Input mode

```
(config)
```

Parameters

<Name>

The identification name of a Switch. Set a name that is unique in the network that will be used. This information can be referenced by using the name set in `[sysName]` in the system group for enquiries from the SNMP manager. This parameter is equivalent to `sysName` defined in RFC 1213.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a character string that is no more than 60 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

Default behavior

No identification name is initially set.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. To reference information about `name`, `contact`, and `location` from the SNMP manager, you must use the `snmp-server community` command to register the SNMP manager.

Related commands

snmp-server community

rmon alarm

Sets the control information for the RMON (RFC 1757) alarm group. This command can configure a maximum of 128 entries.

Syntax

To set or change information:

```
rmon alarm <Number> <Variable> <Interval> {delta | absolute}
rising-threshold <Value> rising-event-index <Event#> falling-threshold
<Value> falling-event-index <Event#> [owner <Owner string>]
[ startup-alarm { rising-falling | rising | falling } ]
```

To delete information:

```
no rmon alarm <Number>
```

Input mode

```
(config)
```

Parameters

<Number>

Sets the information identification number for the RMON alarm group control information. This parameter is equivalent to `alarmIndex` defined in RFC 1757.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 65535

<Variable>

Sets the object identifier for the MIB used for checking the threshold. This parameter is equivalent to `alarmVariable` defined in RFC 1757.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Enclose a MIB object identifier (in dot format) in double quotation marks ("). Only the object identifiers listed below that can be set in no more than 63 characters are valid.

   If an input character string contains only alphanumeric characters and periods (.), you do not have to enclose the character string in double quotation marks (").

   - Object name

     See *Table 32-1 The setting range of object identifiers subject to alarm monitoring*.

   - Instance number

     `x` in *Table 32-1 The setting range of object identifiers subject to alarm monitoring* is the instance number, which sets `ifIndex` of the MIB. For details about the ifIndex range, see the manual *MIB Reference*.

Table 32-1 The setting range of object identifiers subject to alarm monitoring

Object name (setting range from the console)	Object ID (setting value from the SNMP manager)
ifInOctets.*x*	1.3.6.1.2.1.2.2.1.10.*x*
ifInUcastPkts.*x*	1.3.6.1.2.1.2.2.1.11.*x*
ifInNUcastPkts.*x*	1.3.6.1.2.1.2.2.1.12.*x*
ifInDiscards.*x*	1.3.6.1.2.1.2.2.1.13.*x*
ifInErrors.*x*	1.3.6.1.2.1.2.2.1.14.*x*
ifInUnknownProtos.*x*	1.3.6.1.2.1.2.2.1.15.*x*
ifOutOctets.*x*	1.3.6.1.2.1.2.2.1.16.*x*
ifOutUcastPkts.*x*	1.3.6.1.2.1.2.2.1.17.*x*
ifOutNUcastPkts.*x*	1.3.6.1.2.1.2.2.1.18.*x*
ifOutDiscards.*x*	1.3.6.1.2.1.2.2.1.19.*x*
ifOutErrors.*x*	1.3.6.1.2.1.2.2.1.20.*x*
etherStatsDropEvents.*x*	1.3.6.1.2.1.16.1.1.1.3.*x*
etherStatsOctets.*x*	1.3.6.1.2.1.16.1.1.1.4.*x*
etherStatsPkts.*x*	1.3.6.1.2.1.16.1.1.1.5.*x*
etherStatsBroadcastPkts.*x*	1.3.6.1.2.1.16.1.1.1.6.*x*
etherStatsMulticastPkts.*x*	1.3.6.1.2.1.16.1.1.1.7.*x*
etherStatsCRCAlignErrors.*x*	1.3.6.1.2.1.16.1.1.1.8.*x*
etherStatsUndersizePkts.*x*	1.3.6.1.2.1.16.1.1.1.9.*x*
etherStatsOversizePkts.*x*	1.3.6.1.2.1.16.1.1.1.10.*x*
etherStatsFragments.*x*	1.3.6.1.2.1.16.1.1.1.11.*x*
etherStatsJabbers.*x*	1.3.6.1.2.1.16.1.1.1.12.*x*
etherStatsCollisions.*x*	1.3.6.1.2.1.16.1.1.1.13.*x*
etherStatsPkts64Octets.*x*	1.3.6.1.2.1.16.1.1.1.14.*x*
etherStatsPkts65to127Octets.*x*	1.3.6.1.2.1.16.1.1.1.15.*x*
etherStatsPkts128to255Octets.*x*	1.3.6.1.2.1.16.1.1.1.16.*x*
etherStatsPkts256to511Octets.*x*	1.3.6.1.2.1.16.1.1.1.17.*x*
etherStatsPkts512to1023Octets.*x*	1.3.6.1.2.1.16.1.1.1.18.*x*

Object name (setting range from the console)	Object ID (setting value from the SNMP manager)
etherStatsPkts1024to1518Octets.*x*	1.3.6.1.2.1.16.1.1.1.19.*x*
ifInMulticastPkts.*x*	1.3.6.1.2.1.31.1.1.1.2.*x*
ifInBroadcastPkts.*x*	1.3.6.1.2.1.31.1.1.1.3.*x*
ifOutMulticastPkts.*x*	1.3.6.1.2.1.31.1.1.1.4.*x*
ifOutBroadcastPkts.*x*	1.3.6.1.2.1.31.1.1.1.5.*x*

x: instance number

<Interval>

Sets the time interval (in seconds) for checking the threshold. This parameter is equivalent to `alarmInterval` defined in RFC 1757.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 4294967295 (seconds)

`{ delta | absolute }`

Sets the method for checking the threshold. If `delta` is specified, the difference between the current value and the value of the last sampling is compared with the threshold. If `absolute` is specified, the current value is compared directly with the threshold. This parameter is equivalent to `alarmSampleType` defined in RFC 1757.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   `delta` or `absolute`

`rising-threshold` *<Value>*

Sets the upper threshold. This parameter is equivalent to `alarmRisingThreshold` defined in RFC 1757.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   -2147483648 to 2147483647

`rising-event-index` *<Event#>*

Sets the identification number of the method for generating an event if the upper threshold is exceeded. The method for generating an event is the information identification number set by using the `rmon event` command. This parameter is equivalent to `alarmRisigEventIndex` defined in RFC 1757.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   An information identification number from 1 to 65535 in the control information set by using the `rmon event` command for *<Event#>*.

`falling-threshold <Value>`

Sets the lower threshold value. This parameter is equivalent to `alarmFallingThreshold` defined in RFC 1757.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   -2147483648 to 2147483647

`falling-event-index <Event#>`

Sets the identification number of the method for generating an event if a value drops below the lower threshold. The method for generating an event is the information identification number set by using the `rmon event` command. This parameter is equivalent to `alarmFallingEventIndex` defined in RFC 1757.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   An information identification number from 1 to 65535 in the control information set by using the `rmon event` command for *<Event#>*.

`owner <Owner string>`

Sets the identification information of the person who specified this setting. This information is used to identify the person who specified this setting. This parameter is equivalent to `alarmOwner` defined in RFC 1757.

1. Default value when this parameter is omitted:

   `Null`

2. Range of values:

   Specify a character string that is no more than 24 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

`startup-alarm { rising-falling | rising | falling }`

Sets the timing for checking the threshold in the first sampling. If `rising` is set, an alarm is generated when the upper threshold is exceeded in the first sampling. If `falling` is set, an alarm is generated when a value drops below the lower threshold in the first sampling. If `rising-falling` is set, an alarm is generated when the upper or lower threshold is crossed in the first sampling. This parameter is equivalent to `alarmstartUpAlarm` defined in RFC 1757.

1. Default value when this parameter is omitted:

   `rising-falling`

2. Range of values:

   `rising`, `falling`, or `rising-falling`

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. To access an alarm group from the SNMP manager, you must register the SNMP manager by using the `snmp-server community` command.
2. As the value for `rising-event-index` or `falling-event-index` of an alarm group, set the information identification number that has been set for the corresponding event group.
3. When setting this command from a console, you must use an object name. If you use an object ID for setting this command from the SNMP manager, and you execute the `show running-config` operation command on the console, the object name is displayed.

Related commands

snmp-server host

rmon event

rmon collection history

Configures the control information for the RMON (RFC 1757) Ethernet statistics history. This command can configure a maximum of 32 entries.

Syntax

To set or change information:

```
rmon collection history controlEntry <Integer> [owner <Owner name>]
[buckets <Bucket number>] [interval <Seconds>]
```

To delete information:

```
no rmon collection history controlEntry <Integer>
```

Input mode

```
(config-if)
```

Parameters

<Integer>

Sets the information identification number for the statistics history control information. This parameter is equivalent to `historyControlIndex` defined in RFC 1757.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 65535

`owner` *<Owner name>*

Sets the identification information of the person who specified this setting. This information is used to identify the person who specified this setting. This parameter is equivalent to `historyControlOwner` defined in RFC 1757.

1. Default value when this parameter is omitted:

   Blank

2. Range of values:

   Specify a character string that is no more than 24 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

`buckets` *<Bucket number>*

Sets the number of history entries in which statistics information can be stored. This parameter is equivalent to `historyControlBucketsRequested` defined in RFC 1757.

1. Default value when this parameter is omitted:

   50

2. Range of values:

   1 to 65535

   Note: If a value from 51 to 65535 is set for *<Bucket number>*, operation is the same as if 50 had been set.

`interval` *<Seconds>*

Sets the time interval (in seconds) for collecting statistics information. This parameter is equivalent to `historyControlInterval` defined in RFC 1757.

1. Default value when this parameter is omitted:

1800 (seconds)

2. Range of values:

   1 to 3600 (seconds)

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. To access an Ethernet history group from the SNMP manager, you must register the SNMP manager by using the `snmp-server community` command.

Related commands

interface

snmp-server community

rmon event

Sets the control information for an RMON (RFC 1757) event group. This command can configure a maximum of 16 entries.

Syntax

To set or change information:

`rmon event` *<Event#>* `[log] [trap` *<Community>*`] [description` *<Description string>*`] [owner` *<Owner string>*`]`

To delete information:

`no rmon event` *<Event#>*

Input mode

`(config)`

Parameters

<Event#>

Sets the control information for an RMON event group. This parameter is equivalent to `eventIndex` defined in RFC 1757.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 65535

`log`

This parameter specifies the method for generating an alarm (event) and generates an alarm log. This parameter is equivalent to `eventType` defined in RFC 1757.

1. Default value when this parameter is omitted:

   An alarm log is not generated.

2. Range of values:

   None

`trap` *<Community>*

This parameter sets the method for generating alarms and sends SNMP traps to the community specified for *<Community>*. This parameter is equivalent to `eventCommunity` defined in RFC 1757.

1. Default value when this parameter is omitted:

   No traps are issued.

2. Range of values:

   Sets `trap` and the community name.

   Specify a character string that is no more than 60 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

`description` *<Description string>*

Uses a character string to set the description of an event. Use this parameter as a note regarding the event. This parameter is equivalent to `eventDescription` defined in RFC 1757.

1. Default value when this parameter is omitted:

Blank

2. Range of values:

   Specify a character string that is no more than 79 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

`owner` *<Owner string>*

Sets the identification information of the person who specified this setting. This information is used to identify the person who specified this setting. This parameter is equivalent to `eventOwner` defined in RFC 1757.

1. Default value when this parameter is omitted:

   Blank

2. Range of values:

   Specify a character string that is no more than 24 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. When an event group is accessed from the SNMP manager and traps are sent to the SNMP manager, you must register the SNMP manager by using the `snmp-server community` and `snmp-server host` commands.
2. To send a trap to the SNMP manager, set the IP address of the SNMP manager and `rmon` by using the `snmp-server host` command.
3. A trap is sent only if the community name used when the SNMP manager is registered matches the community name of the event group.
4. As the value for `rising-event-index` or `falling-event-index` of an alarm group, set the information identification number that has been set for the corresponding event group. If the values are different, no event is executed when an alarm is generated.

Related commands

snmp-server host

rmon alarm

snmp-server community

Sets the access list for the SNMP community. The command can configure up to 4 entries.

Syntax

To set or change information:

```
snmp-server community <String> [ {ro|rw} ] [<ACL ID>]
```

To delete information:

```
no snmp-server community <String>
```

Input mode

```
(config)
```

Parameters

<String>

Sets the community name for the SNMP manager.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Enclose a character string of no more than 60 characters in double quotation marks ("). Specifiable characters are alphanumeric characters and special characters. To enter a character string that does not include any special characters such as a space, you do not need to enclose the character string in double quotation marks ("). For details, see *Any character string* in *Specifiable values for parameters*.

`{ ro | rw }`

Sets the MIB operating mode for the manager whose IP address belongs to the community that has been set. If `ro` is set, `Get Request` and `GetNext Request` are permitted. If `rw` is set, `Get Request`, `GetNext Request`, and `Set Request` are permitted.

1. Default value when this parameter is omitted:

   ro

2. Range of values:

   `ro` or `rw`

<ACL ID>

Sets the name of the standard access list in which the permissions for this community are set. If *<ACL ID>* is omitted, all accesses are permitted. In addition, if the specified *<ACL ID>* has not been set, all access is permitted.

One access list is permitted for one community.

1. Default value when this parameter is omitted:

   None. (all accesses are permitted.)

2. Range of values:

   Specify an access list name that is 3 to 31 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

ip access-list standard

snmp-server contact

Sets the contact information of the Switch.

Syntax

To set or change information:

```
snmp-server contact <Text>
```

To delete information:

```
no snmp-server contact
```

Input mode

```
(config)
```

Parameters

<Text>

Sets the contact information for the Switch used when a failure occurs on the Switch. This information can be referenced by using the name set in `[sysContact]` of the system group for inquiries from the SNMP manager.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a character string that is no more than 60 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

Default behavior

The initial value is null.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. To reference information about `name`, `contact`, and `location` from the SNMP manager, you must use the `snmp-server community` command to register the SNMP manager.

Related commands

None

snmp-server host

Registers the network management switch (SNMP manager) to which traps are sent. This command can configure a maximum of 4 entries.

Syntax

To set or change information:

```
snmp-server host <Manager address> traps <Community string> [version { 1 | 2c }] [snmp] [rmon] [air-fan] [login] [temperature] [storm-control] [efmoam] [poe] [dot1x] [web-authentication] [mac-authentication] [loop-detection] [switchport-backup] [cfm]
```

To delete information:

```
no snmp-server host <Manager address>
```

Input mode

```
(config)
```

Parameters

<Manager address>

Sets the IP address of the SNMP manager.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Sets the IPv4 address (dot notation) for *<Manager address>*.

   1.0.0.0 to 126.255.255.255, 128.0.0.0 to 223.255.255.255

<Community string>

For SNMPv1 and SNMPv2C, this parameter sets the name of the community for the SNMP manager.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a character string that is no more than 60 characters. For details about the characters that can be specified, see *Specifiable values for parameters*.

`version { 1 | 2c }`

Sets the version for sending traps for the manager with the IP address associated with the community with the specified community name. If `1` is specified, SNMPv1 version traps are issued. If `2c` is specified, SNMPv2C version traps are issued.

1. Default value when this parameter is omitted:

   1

2. Range of values:

   1 or 2c

`[snmp] [rmon] [air-fan] [login] [temperature] [storm-control] [efmoam] [poe] [dot1x] [web-authentication] [mac-authentication] [loop-detection] [switchport-backup] [cfm]`

By setting each parameter, you can select the traps to be sent. The following table describes traps that will be sent when parameters are set.

Table 32-2 Correspondence between parameters and traps

Parameter	Traps
snmp	coldStart
	warmStart
	linkUp
	linkDown
	authenticationFailure
rmon	risingAlarm
	fallingAlarm
temperature	ax2230sTemperatureTrap [AX2200S]
	ax1250sTemperatureTrap [AX1250S]
	ax1240sTemperatureTrap [AX1240S]
air-fan	ax2230sAirFanStopTrap [AX2200S]
	ax1240sAirFanStopTrap [AX1240S]
login	ax2230sLoginSuccessTrap [AX2200S]
	ax1250sLoginSuccessTrap [AX1250S]
	ax1240sLoginSuccessTrap [AX1240S]
	ax2230sLoginFailureTrap [AX2200S]
	ax1250sLoginFailureTrap [AX1250S]
	ax1240sLoginFailureTrap [AX1240S]
	ax2230sLogoutTrap [AX2200S]
	ax1250sLogoutTrap [AX1250S]
	ax1240sLogoutTrap [AX1240S]
storm-control	ax2230sBroadcastStormDetectTrap [AX2200S]
	ax1250sBroadcastStormDetectTrap [AX1250S]
	ax1240sBroadcastStormDetectTrap [AX1240S]
	ax2230sMulticastStormDetectTrap [AX2200S]
	ax1250sMulticastStormDetectTrap [AX1250S]

Parameter	Traps
	ax1240sMulticastStormDetectTrap [AX1240S]
	ax2230sUnicastStormDetectTrap [AX2200S]
	ax1250sUnicastStormDetectTrap [AX1250S]
	ax1240sUnicastStormDetectTrap [AX1240S]
	ax2230sBroadcastStormPortInactivateTrap [AX2200S]
	ax1250sBroadcastStormPortInactivateTrap [AX1250S]
	ax1240sBroadcastStormPortInactivateTrap [AX1240S]
	ax2230sMulticastStormPortInactivateTrap [AX2200S]
	ax1250sMulticastStormPortInactivateTrap [AX1250S]
	ax1240sMulticastStormPortInactivateTrap [AX1240S]
	ax2230sUnicastStormPortInactivateTrap [AX2200S]
	ax1250sUnicastStormPortInactivateTrap [AX1250S]
	ax1240sUnicastStormPortInactivateTrap [AX1240S]
	ax2230sBroadcastStormRecoverTrap [AX2200S]
	ax1250sBroadcastStormRecoverTrap [AX1250S]
	ax1240sBroadcastStormRecoverTrap [AX1240S]
	ax2230sMulticastStormRecoverTrap [AX2200S]
	ax1250sMulticastStormRecoverTrap [AX1250S]
	ax1240sMulticastStormRecoverTrap [AX1240S]
	ax2230sUnicastStormRecoverTrap [AX2200S]
	ax1250sUnicastStormRecoverTrap [AX1250S]
	ax1240sUnicastStormRecoverTrap [AX1240S]
efmoam	ax2230sEfmoamUdldPortInactivateTrap [AX2200S]
	ax1250sEfmoamUdldPortInactivateTrap [AX1250S]
	ax1240sEfmoamUdldPortInactivateTrap [AX1240S]
poe	pethPsePortOnOffNotification [AX2200S] [AX1240S]

Parameter	Traps
	pethMainPowerUsageOnNotification [AX2200S] [AX1240S]
	pethMainPowerUsageOffNotification [AX2200S] [AX1240S]
dot1x	ax2230sDot1xFailureTrap [AX2200S]
	ax1250sDot1xFailureTrap [AX1250S]
	ax1240sDot1xFailureTrap [AX1240S]
	ax2230sDot1xEventTrap [AX2200S]
	ax1250sDot1xEventTrap [AX1250S]
	ax1240sDot1xEventTrap [AX1240S]
web-authentication	ax2230sWauthFailureTrap [AX2200S]
	ax1250sWauthFailureTrap [AX1250S]
	ax1240sWauthFailureTrap [AX1240S]
	ax2230sWauthEventTrap [AX2200S]
	ax1250sWauthEventTrap [AX1250S]
	ax1240sWauthEventTrap [AX1240S]
	ax2230sWauthSystemTrap [AX2200S]
	ax1250sWauthSystemTrap [AX1250S]
	ax1240sWauthSystemTrap [AX1240S]
mac-authentication	ax2230sMauthFailureTrap [AX2200S]
	ax1250sMauthFailureTrap [AX1250S]
	ax1240sMauthFailureTrap [AX1240S]
	ax2230sMauthEventTrap [AX2200S]
	ax1250sMauthEventTrap [AX1250S]
	ax1240sMauthEventTrap [AX1240S]
	ax2230sMauthSystemTrap [AX2200S]
	ax1250sMauthSystemTrap [AX1250S]
	ax1240sMauthSystemTrap [AX1240S]

Parameter	Traps
loop-detection	ax2230sL2ldLinkDown [AX2200S]
	ax1250sL2ldLinkDown [AX1250S]
	ax1240sL2ldLinkDown [AX1240S]
	ax2230sL2ldLinkUp [AX2200S]
	ax1250sL2ldLinkUp [AX1250S]
	ax1240sL2ldLinkUp [AX1240S]
	ax2230sL2ldLoopDetection [AX2200S]
	ax1250sL2ldLoopDetection [AX1250S]
	ax1240sL2ldLoopDetection [AX1240S]
switchport-backup	ax2230sUlrChangeSecondary [AX2200S]
	ax1250sUlrChangeSecondary [AX1250S]
	ax1240sUlrChangeSecondary [AX1240S]
	ax2230sUlrChangePrimary [AX2200S]
	ax1250sUlrChangePrimary [AX1250S]
	ax1240sUlrChangePrimary [AX1240S]
cfm	dot1agCfmFaultAlarm

`snmp`

`coldStart`, `warmStart`, `linkDown`, `linkUp`, and `authenticationFailure` traps are sent.

`rmon`

A trap is sent when the value exceeds the upper threshold or drops below the lower threshold of the `rmon` alarm.

`air-fan` [AX2200S] [AX1240S]

A trap is sent when a fan stops.

`login`

A trap is sent when a login fails or succeeds or when a logout occurs.

`temperature`

A trap is sent when the temperature changes.

`storm-control`

A trap is sent when a storm is detected by the storm control functionality or when a Switch recovers from a storm.

`efmoam`

A trap is sent when a unidirectional link failure is detected.

`poe` [AX2200S] [AX1240S]

A trap is sent when the power status changes or the total power consumption of a Switch exceeds the threshold.

`dot1x`

A trap is sent for specific types of authentication accounting log data during IEEE 802.1X authentication.

`web-authentication`

A trap is sent for specific types of authentication accounting log data during Web authentication.

`mac-authentication`

A trap is sent for specific types of authentication accounting log data during MAC-based authentication.

`loop-detection`

A trap is sent when an L2 loop is detected.

`switchport-backup`

A trap is sent if a line is switched due to uplink redundancy.

`cfm`

A trap is sent when a failure is detected by CC.

1. Default value when this parameter is omitted:

   No traps corresponding to those parameters are issued.

2. Range of values:

   `snmp`, `rmon`, `air-fan`, `login`, `temperature`, `storm-control`, `efmoam`, `poe`, `dot1x`, `web-authentication`, `mac-authentication`, `loop-detection`, `switchport-backup`, and `cfm`

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. For the list of supported MIBs and supported traps, see the manual *MIB Reference*.
2. For details about the conditions for issuing private traps for specific types of authentication accounting log data and each authentication functionality (IEEE 802.1X, Web authentication, and MAC-based authentication), see the description about the accounting functionality of each type of authentication in the *Configuration Guide Vol. 2*.
3. `air-fan` can be set only for models with a fan and `poe` can be set only for models that supports the PoE functionality.
4. `127.*.*.*` cannot be specified as an IPv4 address.

Related commands

None

snmp-server location

Sets the name of the location where the Switch is installed.

Syntax

To set or change information:

```
snmp-server location <Text>
```

To delete information:

```
no snmp-server location
```

Input mode

```
(config)
```

Parameters

<Text>

Sets the name of the location where the Switch is installed. This information can be referenced by using the name set in `[sysLocation]` of the system group for inquiries from the SNMP manager.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Enclose a character string of no more than 60 characters in double quotation marks ("). Specifiable characters are alphanumeric characters and special characters. To enter a character string that does not include any special characters such as a space, you do not need to enclose the character string in double quotation marks ("). For details, see *Any character string* in *Specifiable values for parameters*.

Default behavior

The initial value is null.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. To reference information about `name`, `contact`, and `location` from the SNMP manager, you must use the `snmp-server community` command to register the SNMP manager.

Related commands

None

snmp-server traps

Sets the timing for issuing a trap.

Syntax

To set or change information:

```
snmp-server traps [{ limited-coldstart-trap |
unlimited-coldstart-trap }] [link-trap-bind-info  {private |
standard} ] [agent-address <Agent address>] [dot1x-trap {failure | all}]
[web-authentication-trap {failure | all}] [mac-authentication-trap
{failure | all}]
```

To delete information:

```
no snmp-server traps
```

Input mode

```
(config)
```

Parameters

`{ limited-coldstart-trap | unlimited-coldstart-trap }`

Limits the times when `coldStart Trap` is issued. The following table provides an overview of the events that cause the `coldStart Trap` set by using this parameter to be issued.

Table 32-3 Events causing coldStart Trap to be issued for each parameter

Parameter	Events
`limited-coldstart-trap`	● A Switch is started (the Switch is turned on).
`unlimited-coldstart-trap`	● A Switch is started (the Switch is turned on). ● An IP configuration is added or deleted. ● When the time is changed by using the `set clock` command

1. Default value when this parameter is omitted:

   `limited-coldstart-trap`

2. Range of values:

   `limited-coldstart-trap` or `unlimited-coldstart-trap`

`link-trap-bind-info {private | standard}`

Configures the MIB to be added when `link up/down Trap` is issued.

The following table describes the MIBs to be added when `link up/down Trap` set by using this parameter is issued.

Table 32-4 MIBs to be added when link up/down Trap is issued for each parameter

Parameter	MIBs to be added when a link up/down trap is issued
private	● (Common to SNMPv1 and SNMPv2C traps) `ifIndex`, `ifDescr`, and `ifType`
standard	● (For SNMPv1 traps) `ifIndex` ● (For SNMPv2C traps) `ifIndex`, `ifAdminStatus`, and `ifOperStatus`

1. Default value when this parameter is omitted:

   standard

2. Range of values:

   `private` or `standard`

`agent-address <Agent address>`

Sets the IPv4 address to be used for *<Agent address>* in a trap notification frame in SNMPv1 format. Because only the SNMPv1 frame format can have the *<Agent address>* field in their Trap-PDUs, the address set by using this command is applied to SNMPv1 traps.

1. Default value when this parameter is omitted:

   If this parameter is not set, the IPv4 address of the VLAN ID whose *<Agent address>* value is the smallest in the trap notification frame is used.

2. Range of values:

   Set an IPv4 address from `0.0.0.0` to `255.255.255.255` for *<Agent address>*.

`dot1x-trap {failure | all}`

Sets the trap type for IEEE 802.1X authentication.

`failure`

Only traps for an authentication failure are issued.

all

A trap is issued when authentication is successful, fails, or is canceled.

1. Default value when this parameter is omitted:

   `failure`

2. Range of values:

   `failure` or `all`

`web-authentication-trap {failure | all}`

Sets the trap type for Web authentication.

`failure`

Only traps for an authentication failure are issued.

all

A trap is issued when authentication is successful, fails, or is canceled.

1. Default value when this parameter is omitted:

   `failure`

2. Range of values:

   `failure` or `all`

`mac-authentication-trap {failure | all}`

Sets the trap type for MAC-based authentication.

`failure`

Only traps for an authentication failure are issued.

all

A trap is issued when authentication is successful, fails, or is canceled.

1. Default value when this parameter is omitted:

   `failure`

2. Range of values:

`failure` or `all`

Default behavior

The initial values for all parameters of this command are used.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. For the list of supported MIBs and supported traps, see the manual *MIB Reference*.
2. You cannot omit all of the parameters in this command. You must set at least one.

Related commands

None

snmp trap link-status

When `no snmp trap link-status` is set, linkDown and linkUp traps are not transmitted whenever a link-up failure or a link-down failure occurs on a line.

Syntax

To set information:

```
no snmp trap link-status
```

To delete information:

```
snmp trap link-status
```

Input mode

```
(config-if)
```

Parameters

None

Default behavior

Sending linkDown and linkUp traps is not suppressed.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

33. Log Data Output Functionality

logging event-kind
logging facility
logging host
logging syslog-header
logging trap

logging event-kind

Sets the event type of the log information to be sent to the syslog server. Multiple event types can be set.

Syntax

To set or change information:

```
logging event-kind <Event kind>
```

To delete information:

```
no logging event-kind <Event kind>
```

Input mode

```
(config)
```

Parameters

<Event kind>

Specifies the event type of the log information to be output.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify `key`, `rsp`, `err`, or `evt`.

Default behavior

`evt` or `err` is set as the event type.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. The event type set by using this command is applied to all output destinations specified by the `logging host` command.
2. If the event type is set by using this command, the default event types (`evt` and `err`) become invalid and only the event types that have been set take effect.

Related commands

logging host

logging facility

Sets a facility to which log information is output via the syslog interface.

Syntax

To set or change information:

```
logging facility <Facility>
```

To delete information:

```
no logging facility
```

Input mode

```
(config)
```

Parameters

<Facility>

Specifies the facility for syslog.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify `local0`, `local1`, `local2`, `local3`, `local4`, `local5`, `local6`, or `local7`.

Default behavior

`local0` is used as the facility.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. The facility set by using this command is applied to all output destinations specified by the `logging host` command.

Related commands

logging host

logging host

Sets the output destination for log information. The command can configure up to 4 entries.

Syntax

To set or change information:

```
logging host  <IP address>
```

To delete information:

```
no logging host  <IP address>
```

Input mode

```
(config)
```

Parameters

<IP address>

Specifies the IPv4 address of the log output destination.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   <IP address>

   Specifies the IPv4 address in dot notation.

   1.0.0.0 to 126.255.255.255, 128.0.0.0 to 223.255.255.255

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. To use the syslog functionality, a syslog daemon program must be running on the destination host and the host must be configured so that it can receive the syslog information from the Switch.
2. `127.*.*.*` cannot be set as an IPv4 address.

Related commands

None

logging syslog-header

Adds HOSTNAME, TIMESTAMP, or a functionality number to the message to be sent to the syslog server.

Output from the following commands is not affected:

- show dot1x logging
- show logging
- show web-authentication logging
- show mac-authentication logging

Syntax

To set information:

```
logging syslog-header
```

To delete information:

```
no logging syslog-header
```

Input mode

```
(config)
```

Parameters

None

Default behavior

Operation is the same as in the previous version.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. A functionality number is added to match the format of the message with the format of the syslog message to be output from a higher-level switch.

Related commands

None

logging trap

Sets the level of importance for log information to be sent to the syslog server.

Syntax

To set or change information:

```
logging trap { <Level> | <Keyword> }
```

To delete information:

```
no logging trap
```

Input mode

```
(config)
```

Parameters

`{ <Level> | <Keyword> }`

Select either a level or a keyword as the priority of syslog messages.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   The following table describes the priorities that can be set. Note that if a level is specified, information is displayed with the keyword.

Level	Keyword	Description
1	fatal	Immediate action required
2	critical	Critical state
3	error	Error state
4	warning	Warning state
6	information	Message reporting information
7	debugging	Message displayed during debugging only

Default behavior

`information` (priority level 6) is used.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. The severity set by using this command is applied to all output destinations specified by the `logging host` command.

Related commands

logging host

Part 13: Management of Neighboring Device Information

34. LLDP

lldp enable
lldp hold-count
lldp interval-time
lldp run

lldp enable

Enables operation of LLDP for a port.

Syntax

To set information:

```
lldp enable
```

To delete information:

```
no lldp enable
```

Input mode

```
(config-if)
```

Parameters

None

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

lldp run

lldp hold-count

Sets the time that a neighboring device retains an LLDP frame sent from a Switch.

Syntax

To set or change information:

```
lldp hold-count <Count>
```

To delete information:

```
no lldp hold-count
```

Input mode

```
(config)
```

Parameters

<Count>

Sets the scaling for the value set by the `lldp interval-time` command as the time that a neighboring device retains the LLDP frame sent from a Switch. If the time exceeds 65535, which is the maximum value, 65535 is used.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   2 to 10

Default behavior

`4` is set as the time that a neighboring device retains LLDP frames sent from the Switch.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

lldp run

lldp interval-time

Sets the transmission interval between LLDP frames sent from a Switch.

Syntax

To set or change information:

```
lldp interval-time <Seconds>
```

To delete information:

```
no lldp interval-time
```

Input mode

```
(config)
```

Parameters

<Seconds>

Sets the transmission interval between LLDP frames sent from a Switch.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   5 to 32768 (seconds)

Default behavior

30 seconds is used as the sending interval between LLDP frames sent from the Switch.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

lldp run

lldp run

Enables the LLDP functionality.

Syntax

To set information:

```
lldp run
```

To delete information:

```
no lldp run
```

Input mode

```
(config)
```

Parameters

None

Default behavior

The LLDP functionality is disabled.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

lldp run

35. Port Mirroring

monitor session

monitor session

Configures the port mirroring functionality.

Syntax

To set or change information:

`monitor session` <*Session#*> `source interface` <*IF# list*> `[{rx | tx | both}] destination interface gigabitethernet` <*IF#*> [AX2200S]

`monitor session` <*Session#*> `source interface` <*IF# list*> `[{rx | tx | both}] destination interface {fastethernet` <*IF#*>`| gigabitethernet` <*IF#*>`}` [AX1250S] [AX1240S]

To delete information:

`no monitor session` <*Session#*>

Input mode

`(config)`

Parameters

<*Session#*>

Specifies a port mirroring session number.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1

`source interface` <*IF# list*>

Specifies a monitor port for port mirroring.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   See *Specifiable values for parameters*.

`{rx | tx | both}`

Specifies the direction of the traffic subject to port mirroring.

`rx`

Received frames are mirrored.

`tx`

Sent frames are mirrored.

`both`

Both sent and received frames are mirrored.

1. Default value when this parameter is omitted:

   both

2. Range of values:

   None

`destination interface gigabitethernet` <*IF#*> [AX2200S]

`destination interface {fastethernet` <*IF#*>`| gigabitethernet` <*IF#*>`}` [AX1250S]

[AX1240S]

Specifies a mirror port for port mirroring. A port for which Layer 2 information has been set cannot be specified.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   See *Specifiable values for parameters*.

Default behavior

None

Impact on communication

If a line in use is set as the mirror port, communication is no longer possible on the line. If a line is set as the monitor port, communication is not affected.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. Only one combination of monitor port and mirror port can be set at the same time.
2. A port that has already been set as a monitor port cannot be set as a mirror port.
3. One mirror port can be set for multiple monitor ports. You cannot specify multiple mirror ports for one monitor port.
4. If the number of frames copied by port mirroring exceeds the line bandwidth, the frames are discarded.
5. Regular frames cannot be sent or received on a port that has been set as a mirror port.
6. A port for which Layer 2 information has been set cannot be set as a mirror port. If you use a port for which Layer 2 information has already been set as a mirror port, delete the Layer 2 information of the applicable interface before setting the port as a mirror port.

Related commands

None

36. Error Messages Displayed When Editing the Configuration

36.1 Error messages displayed when editing the configuration

36.1.1 Common

Table 36-1 Common error messages

Message	Description
Access denied.	Access was denied.
Ambiguous command.	The command can be interpreted in two or more ways and therefore cannot be identified uniquely.
Ambiguous data.	The data cannot be identified uniquely because it can be interpreted in various ways.
Ambiguous parameter.	The parameter cannot be identified uniquely because it can be interpreted in various ways.
Authorization error.	An authentication error occurred.
Bad command.	The command was not entered correctly.
Bad value.	The value is incorrect.
Cannot execute.	The command cannot be executed.
Cannot register this command in a range mode.	The command cannot be registered in range mode.
Command chaining not allowed.	Chained commands cannot be entered.
Don't specify a *<MSTI ID list>*.	*<MSTI ID list>* is not required.
Event not found.	The event could not be found.
File not found.	The file could not be found.
Incomplete command.	The command is incomplete.
Inconsistent name.	The name is inconsistent.
Inconsistent value.	The value is inconsistent.
interface: Invalid IPv4 address.	Interface: The IPv4 address is invalid.
interface: Invalid Mask.	Interface: The mask is invalid.
Invalid parameter order.	Parameters are specified in the wrong order.
Invalid parameter.	An entered parameter was invalid.
Invalid value.	The entered value is invalid.
It will be logged out if it remains idle for another *<min>* minutes.	You will be logged out if the idle state continues for *<min>* more minutes.

Message	Description
Log out by the system.	You have been logged out by the system.
Login incorrect.	You are not permitted to log in to the specified host.
Missing parameter.	A parameter is missing.
Missing parameter data.	Parameter data is missing.
No Access.	Access is not provided.
No help available.	The Help file is invalid.
'no' is not applicable.	"no" cannot be entered.
No such name.	No such name was found.
Not found:	The item could not be found.
Not writable.	Writing is not possible.
Out of range. Valid range is: *<range>*	The value is not in the specifiable range. The valid range is *<range>*.
Please set parameter more than one.	No parameters have been set.
Read only.	This information is read only.
Resource unavailable.	The resource is invalid.
String must be more than 0 characters.	A string must have at least one character.
String too long.	The character string is too long.
The command execution failed, because "*xxx*" is executing.	The command is being executed by another user. Wait a while and then try again, or else check whether another user is running the command. *xxx*: Information regarding another user (for example, `console`, `vty0`, `vty1` is displayed.)
The number of the *<HEX enum>* exceeds a maximum number.	The number of *<HEX enum>* parameters exceeds the maximum.
This command is not supported with this model.	The command is not supported by this model.
This command uses the "no" prefix.	The command uses the "no" prefix.
Too big.	The value is too large.
Too many parameters.	There are too many parameters.
Unknown user.	The specified user name is not registered.
Wrong encoding.	The encoding method is incorrect.
Wrong length.	The length is incorrect.

Message	Description
Wrong type.	The type is incorrect.
Wrong value.	The value is incorrect.
Invalid parameter `'xxx'`.	The *xxx* parameter is invalid.
Some parameters are insufficient.	Some parameters are missing.
Cannot set TOS/Precedence and DSCP at the same time.	Both TOS/Precedence and DSCP cannot be set at the same time. Set one or the other.

36.1.2 Login Security and RADIUS

Table 36-2 Error messages related to login security and RADIUS

Message	Description
Can't delete it because data is not corresponding.	The specified configuration cannot be deleted because it does not exist.
radius-server: Cannot add new group because the maximum number is already set.	No more entries can be registered because maximum number of entries are registered.
radius-server: Cannot add new radius-server host because the maximum number is already set.	No more entries can be registered because maximum number of entries are registered.
radius-server: Port Number is duplicate between auth port and acct port.	The port numbers for `auth-port` and `acct-port` are the same.

36.1.3 Time settings and NTP information

Table 36-3 Error messages related to time settings and NTP

Message	Description
Entry count over	No more NTP server addresses can be set. Check the NTP server addresses that have already been set.

36.1.4 Switch management information

Table 36-4 Error messages related to Switch management

Message	Description
dhcp-snooping is in use.	This setting cannot be changed because the DHCP snooping functionality is enabled. Delete the setting of `ip dhcp snooping`.

Message	Description
extended-authentication is in use.	This setting cannot be changed because at least one of the following is enabled: ● Authentication IPv4 access list ● IEEE 802.1X: Port-based authentication (dynamic) ● Web authentication: Fixed VLAN mode, dynamic VLAN mode, or Web authentication IP address ● MAC-based authentication: Fixed VLAN mode or dynamic VLAN mode Delete the following: ● authentication arp-relay ● authentication ip access-group ● dot1x port-control ● web-authentication ip address ● web-authentication port ● mac-authentication port
filter is in use.	This setting cannot be changed because the filter functionality is enabled. Delete the setting of `ip access-group` and of `mac access-group`.
igmp-snooping is in use.	The setting cannot be changed because the IGMP snooping functionality is enabled. Delete the setting of `ip igmp snooping`.
mld-snooping is in use.	This setting cannot be changed because the MLD snooping functionality is enabled. Delete the setting of `ipv6 mld snooping`.
qos is in use.	The setting cannot be changed because the QoS functionality is enabled. Delete the setting of `ip qos-flow-group` and of `mac qos-flow-group`.
resource unavailable	The total number of specified resources exceeds 7. Sets a value equal to or smaller than 7.

36.1.5 Information about the power saving functionality

Table 36-5 Error messages related to the power saving functionality

Message	Description
Can't execute.	The command could not be executed. Re-execute the command.
Invalid time-range.	An end date that is earlier than the start data is specified. Revise the setting.

36.1.6 Ethernet information

Table 36-6 Ethernet error messages

Message	Description
Cannot attach the interface specified as a ring-port to the channel-group.	The interface set as a ring port cannot participate in the port channel. To allow the specified interface to participate in the port channel, first delete the ring-related configuration.

Message	Description
port:Relations between media type and <*command*> configuration are inconsistent.	The <*command*> information cannot be changed because `media-type auto` is set. <*command*>: `duplex`, `mdix auto`, and `speed`
this command is different from this one in channel-group port.	The configured command and the port channel configuration do not match. Match the configuration of the port channel to the configuration of the command.

36.1.7 Link aggregation information

Table 36-7 Link aggregation error messages

Message	Description
Can't delete port-channel configuration referred by other configuration.	The VLAN cannot be deleted because it is being used by another configuration.
Cannot attach the interface specified as a ring-port to the channel-group.	The interface set as a ring port cannot participate in the port channel. To allow the specified interface to participate in the port channel, first delete the ring-related configuration.
dot1x(link-aggregation): The specified ethernet <*IF#*> cannot add to the specified port-channel(<*Channel group#*>) because 802.1X configuration is different.	`ethernet` <*IF#*> cannot be registered for the specified `port-channel (`<*Channel group#*>`)` because the IEEE 802.1X settings, which must all be the same for link aggregation, are different. <*IF#*>: Interface port number <*Channel group#*>: Channel group number
interface : Cannot attach the interface that specified cfm enable to the channel-group.	The interface for which CFM is set to `enable` cannot participate in the port channel. To allow the specified interface to participate in the port channel, first delete `enable` for CFM.
interface : Cannot attach the interface that specified mep to the channel-group.	The interface for which MEP is set cannot participate in the port channel. To allow the specified interface to participate in the port channel, first delete MEP.
interface : Cannot attach the interface that specified mip to the channel-group.	The interface for which MIP is set cannot participate in the port channel. To allow the specified interface to participate in the port channel, first delete MIP.
interface : Invalid authentication arp-relay configuration.	Participation in the port channel is not possible because the `authentication arp-relay` settings are different.
interface : Invalid authentication ip access-group configuration.	Participation in the port channel is not possible because the `authentication ip access-group` settings are different.
interface : Relations between authentication configuration and channel-group configuration within same port.	Participation in the port channel is not possible because the specified port is being used by an authentication common command.

Message	Description
interface : Relations between the mac-authentication configuration and the channel-group configuration within same port.	Participation in the port channel is not possible because the specified port is being used by the MAC-based authentication setting.
interface : Relations between the web-authentication configuration and the channel-group configuration within same port.	Participation in the port channel is not possible because the specified port is being used by the Web authentication setting.
interface : this command is different from this one in channel-group port.	Participation in the port channel is not possible because the configuration is different.
invalid data[channel-group].	The port channel number specification is invalid.
invalid data[ethernet-if].	The interface port number specification is invalid.
Maximum number of channel-group port are already defined.	No more ports can be set. Check the number of ports for each channel group.
Mirror port and port-channel are inconsistent.	Participation in the port channel is not possible because the port is being used as a mirror port.
Relations between ip dhcp snooping configuration and channel-group configuration are inconsistent.	Participation in the port channel is not possible because the port is being used by the `ip dhcp snooping` setting. Delete the `ip dhcp snooping` setting, and then set it again.
Relations between ip source binding configuration and channel-group configuration are inconsistent.	Participation in the port channel is not possible because the port is being used by the `ip source binding` setting. Delete the `ip source binding` setting, and then set it again.
	The specified port cannot be deleted because it is being used by the `ip source binding` setting. Delete the `ip source binding` setting, and then set it again.
Relations between ip verify source configuration and channel-group configuration are inconsistent.	The specified port cannot participate in the port channel because the port is being used by the `ip verify source` setting. Delete the `ip verify source` setting, and then set it again.
Relations between vlan in mac-address-table static configuration and channel-group configuration are inconsistent.	Participation in the port channel is not possible because the interface is being used by `mac-address-table static`.
this command is different from this one in channel-group port.	Different settings were found on ports specified for the same channel group. The configuration of the ports specified for the same channel group must either match or be deleted.
vlan : Data(port-channel) is invalid.	The port channel number specification is invalid.
vlan : This command is different from vlan configuration in channel-group port.	The VLAN cannot join the port channel because the VLAN configuration is different.

36.1.8 MAC address table information

Table 36-8 MAC address table error messages

Message	Description
Can't set mac-address-table because of port-channel nothing.	`mac-address-table` cannot be set because no port channels exist.
Relations between vlan in mac-address-table static configuration and switchport configuration are inconsistent.	The `mac-address-table static` VLAN specification and the `switchport` configuration do not match. A VLAN set by using `mac-address-table static` must be set by `switchport access/switchport trunk allowed vlan/switchport mac vlan/switchport protocol vlan` of the interface that has been set.

36.1.9 VLAN information

Table 36-9 VLAN error messages

Message	Description
ChGr *<Channel group#>*: Inconsistency is found between the dot1x port-control and the switchport mode configuration.	The port channel cannot be deleted because it is being used for IEEE 802.1X authentication or as a switch port. *<Channel group#>*: Channel group number
Inconsistency is found between the dot1x vlan enable or dot1x vlan dynamic radius-vlan *<VLAN ID>* and the vlan configuration.	The specified VLAN cannot be deleted because it is being used as the VLAN for IEEE 802.1X VLAN-based authentication (dynamic). *<VLAN ID>*: VLAN ID
interface : Relations between the mac-authentication configuration and the vlan mode configuration are inconsistent.	The configuration of the specified port cannot be changed because the port is being used for MAC-based authentication. Delete the `mac-authentication port` configuration, and then reconfigure.
interface : Relations between the web-authentication configuration and the vlan mode configuration are inconsistent.	The configuration of the specified port cannot be changed because the port is used for Web authentication. Delete the `web-authentication port` configuration, and then reconfigure.
Mirror port and switchport are inconsistent.	Both mirror port and switchport settings cannot be specified simultaneously.
port *<IF#>*: Inconsistency is found between the dot1x port-control and the switchport mode configuration.	The configuration of the specified port cannot be changed because the port is being used for IEEE 802.1X authentication. *<IF#>*: Interface port number
Relations between vlan in access-group configuration and switchport configuration are inconsistent.	The configuration of the specified VLAN cannot be changed because the VLAN is being used by `ip access-group` or `mac access-group`. Delete the configuration of `ip access-group` or `mac access-group` for the applicable VLAN, and then reconfigure.
Relations between vlan in dot1q configuration and mac vlan configuration are inconsistent.	`switchport mac dot1q vlan` and `switchport mac vlan` cannot be set because they use the same VLAN.

Message	Description
Relations between vlan in dot1q configuration and native configuration are inconsistent.	`switchport mac dot1q vlan` and `switchport mac native vlan` cannot be set because they are set for the same VLAN.
Relations between vlan in ip source binding configuration and switchport configuration are inconsistent.	The configurations cannot be changed because `ip source binding` is using it. Delete the `ip source binding` setting, and then set it again.
Relations between vlan in qos-flow-group configuration and switchport configuration are inconsistent.	The configuration of the specified VLAN cannot be changed because it is used by `ip qos-flow-group` or `mac qos-flow-group`. Delete the configuration of `ip qos-flow-group` or `mac qos-flow-group` for which the applicable VLAN is set, and then reconfigure.
vlan : Can't change mode from {nothing|protocol-based|mac-based } to {nothing|protocol-based|mac-based }.	The VLAN types of the specified VLAN modes do not match. (VLAN range specification)
vlan : Can't delete vlan configuration because of default vlan.	The VLAN cannot be deleted because it is the default VLAN.
vlan : Can't setting port[*<IF#>*] because of channel-group port.	The specified port number cannot be set from the port because the port number belongs to the channel group. *<IF#>*: Interface port number
vlan : Data(mac-address) is invalid.	The specified `mac-address` cannot be registered because it is not in the specifiable range.
vlan : maximum number which can be used is exceeded.	No more entries can be generated because the number of VLANs exceeds the maximum number of entries.
vlan : Not found protocol name.	The VLAN cannot be set because `vlan-protocol` has not been set.
vlan : Some port's setting have been failed.	Setting of a port from a channel has failed.
vlan : Some setting can't have been done because of vlan unmatch.	Some VLANs cannot be set because at least one of the VLANs does not exist.
vlan[*<VLAN ID>*] : Can't change mode from {nothing|protocol-based|mac-based} to {nothing|protocol-based|mac-based}.	The VLAN types of the specified VLAN modes do not match. (Only VLAN is specified.) *<VLAN ID>*: VLAN ID
vlan[*<VLAN ID>*] : Can't delete it because data is not corresponding.	The specified VLAN cannot be deleted because it does not exist. The specified `mac-address` cannot be deleted because it is not registered. The specified `mac-address-table` cannot be deleted because it does not exist. *<VLAN ID>*: VLAN ID
vlan[*<VLAN ID>*] : Can't delete port-channel configuration referred by other configuration.	The VLAN cannot be deleted because it is being used by another configuration. *<VLAN ID>*: VLAN ID

Message	Description
vlan[<*VLAN ID*>] : Can't delete vlan configuration referred by other configuration.	The VLAN cannot be deleted because it is being used by another configuration. <*VLAN ID*>: VLAN ID
vlan[<*VLAN ID*>] : Can't set access-vlan which is not configured to use vlan.	The access VLAN cannot be set because the VLAN does not exist. <*VLAN ID*>: VLAN ID
vlan[<*VLAN ID*>] : Can't set mac-address-table static which is not configured to use vlan.	`mac-address-table` cannot be set because the VLAN does not exist. <*VLAN ID*>: VLAN ID
vlan[<*VLAN ID*>] : Can't set native-vlan which is not configured to use vlan.	The native VLAN cannot be set because the VLAN does not exist. <*VLAN ID*>: VLAN ID
vlan[<*VLAN ID*>] : Data can't be set because of not mac-based.	`mac-address` cannot be registered because the specified VLAN is not a MAC VLAN. <*VLAN ID*>: VLAN ID
vlan[<*VLAN ID*>] : Data can't be set because of not protocol-based.	`protocol` cannot be registered because the specified VLAN is not a protocol VLAN. <*VLAN ID*>: VLAN ID
vlan[<*VLAN ID*>] : mac-address has already been set to other VLAN[<VLAN ID>].	The specified `mac-address` cannot be registered because it has already been registered for another VLAN. <*VLAN ID*>: VLAN ID
vlan[<*VLAN ID*>] : maximum number which can be used is exceeded.	No more entries can be generated because the number of VLANs exceeds the maximum number of entries. No more VLANs can be registered because the number of registered `mac-address` items exceeds the maximum number of entries. No more entries can be registered because the number of registered `mac-address-table` items exceeds the maximum number of entries. <*VLAN ID*>: VLAN ID
vlan[<*VLAN ID*>] : Protocol {ethertype|llc|snap-ethertype} <*HEX*> duplicate at ChGr[<*Channel group#*>].	Only one VLAN can be set per port channel/protocol value combination. <*VLAN ID*>: VLAN ID <*HEX*>: Protocol value <*Channel group#*>: Channel group number
vlan[<*VLAN ID*>] : Protocol {ethertype|llc|snap-ethertype} <*HEX*> duplicate at port[<*IF#*>].	Only one VLAN to be specified by the same protocol value can be set on the same port. <*VLAN ID*>: VLAN ID <*HEX*>: Protocol value <*IF#*>: Ethernet port number
vlan-protocol : Cannot delete protocol referred by VLAN configuration.	The protocol cannot be deleted because `protocol` uses it.
vlan-protocol : maximum number which can be used is exceeded.	A maximum of 16 protocol values (`ethertype` value, `llc` value, and `snap-ethertype` value) are used in the entire Switch. No more than 16 protocol values can be set.

36.1.10 Spanning Tree information

Table 36-10 Spanning Tree error messages

Message	Description
Can not configure spanning-tree when Ring Protocol is configured.	The Spanning Tree Protocol cannot be set because the Ring Protocol functionality is set.
Cost is over 65535, please set up in 1 to 65535 or set pathcost method to long.	The value for `cost` is equal to or greater than 65535. Set the `cost` value from 1 to 65535 or set `long` for `pathcost method`.
Maximum number of entries are already defined. *<STP_VLAN>*	You are trying to add more than the allowable maximum number of entries. Delete entries that are no longer needed, and then add the entries.
Maximum number of MST instance are already defined.	The number of MST instances has already reached the maximum number. The maximum number of MST instances that can be set is 16.
Pathcost method is short, please set up in 1 to 65535 or set pathcost method to long.	`short` is set for `pathcost method`. Set the `cost` value from 1 to 65535 or set `long` for `pathcost method`.
Relations between l2protocol-tunnel stp and spanning-tree configuration are inconsistent.	The relations between the BPDU forwarding configuration and the Spanning Tree configuration are inconsistent. When a BPDU forwarding configuration is set, the Spanning Tree Protocol must be stopped.
Relations between PVST+ and the protocol-vlan or mac-vlan configuration are inconsistent.	PVST+ and a protocol VLAN or a MAC VLAN cannot be set concurrently.
Too many parameters (VLAN-range of MST Instance *<MSTI ID>*).	The number of input parameters exceeds the maximum number (200). Set a value equal to or smaller than the maximum number. *<MSTI ID>*: MST instance ID

36.1.11 Ring Protocol information

Table 36-11 Ring Protocol error messages

Message	Description
axrp-*<Ring ID>*: cannot configure this command to channel-group port.	A ring port cannot be set for an interface that is participating in a port channel. *<Ring ID>*: Ring ID
axrp-*<Ring ID>*: Can't delete axrp configuration referred by other.	The specified ring ID cannot be deleted because it is being used by the `axrp-ring-port` command. *<Ring ID>*: Ring ID
axrp-*<Ring ID>*: maximum number of ring-id are already defined.	The maximum number of ring IDs that can be used in a Switch is 4. No more than 4 ring IDs can be set. To add a ring ID, you must first delete a registered ring ID. *<Ring ID>*: Ring ID

Message	Description
axrp-*<Ring ID>*: maximum number of ring-port are already defined.	Set two ring ports for each ring ID. To set another port as a ring port, first delete a ring port that has already been set. *<Ring ID>*: Ring ID
axrp-*<Ring ID>*: Relations between uplink redundant and ring protocol are inconsistent.	The uplink redundancy functionality has already been set for the specified interface. Delete the uplink redundancy functionality or specify another interface. *<Ring ID>*: Ring ID
axrp-*<Ring ID>*: this interface is already defined as a ring port of other ring configured the same vlan-mapping.	The specified interface has already been set as a ring port of another ring to which the same VLAN mapping as the ring set by using this command is applied. Set the applicable interface as a shared link or specify another interface. *<Ring ID>*: Ring ID
axrp-*<Ring ID>*: vlan *<VLAN ID>* is already configured in control-vlan.	The specified VLAN has already been set in the control VLAN. Either delete the applicable VLAN from the control VLAN or use another VLAN. *<Ring ID>*: Ring ID *<VLAN ID>*: VLAN ID
axrp-*<Ring ID>*: vlan *<VLAN ID>* is already configured in control-vlan of other ring.	The specified VLAN has already been set in the control VLAN of another ring. Either delete the applicable VLAN from the other ring's control VLAN or use another VLAN. *<Ring ID>*: Ring ID *<VLAN ID>*: VLAN ID
axrp-*<Ring ID>*: vlan *<VLAN ID>* is already configured in multi-fault-detection-vlan.	The specified VLAN has already been set in the multi-fault monitoring VLAN. Either delete the applicable VLAN from the multi-fault monitoring VLAN or use another VLAN. *<Ring ID>*: Ring ID *<VLAN ID>*: VLAN ID
axrp-*<Ring ID>*: vlan *<VLAN ID>* is already configured in multi-fault-detection-vlan of other ring.	The specified VLAN has already been set in the multi-fault monitoring VLAN of another ring. Either delete the applicable VLAN from the other ring's multi-fault monitoring VLAN or use another VLAN. *<Ring ID>*: Ring ID *<VLAN ID>*: VLAN ID
axrp-*<Ring ID>*: vlan *<VLAN ID>* is already configured in vlan-mapping.	The specified VLAN has already been set for VLAN mapping. Either delete the applicable VLAN from the VLAN mapping or use another VLAN.

Message	Description
	<Ring ID>: Ring ID *<VLAN ID>*: VLAN ID
axrp-*<Ring ID>*: vlan-mapping *<Mapping ID>* is already configured in vlan-group of other ring.	The specified VLAN mapping has already been set for a VLAN group in another ring. Either delete the VLAN mapping from the other VLAN group or use other VLAN groups. *<Ring ID>*: Ring ID *<Mapping ID>*: VLAN mapping ID
axrp-*<Ring ID>*-*<Group ID>*: vlan-mapping *<Mapping ID>* is already configured in another vlan-group.	The specified VLAN mapping has already been set for a VLAN group in the same ring. Either delete the VLAN mapping from another VLAN group or use another VLAN mapping. *<Ring ID>*: Ring ID *<Group ID>*: VLAN group ID *<Mapping ID>*: VLAN mapping ID
axrp-vlan-mapping-*<Mapping ID>*: vlan *<VLAN ID>* is already configured in control-vlan.	The specified VLAN has already been set in the control VLAN. Either delete the applicable VLAN from the control VLAN or use another VLAN.
	<Mapping ID>: VLAN mapping ID *<VLAN ID>*: VLAN ID
axrp-vlan-mapping-*<Mapping ID>*: vlan *<VLAN ID>* is already configured in multi-fault-detection-vlan.	The specified VLAN has already been set in the multi-fault monitoring VLAN. Either delete the applicable VLAN from the multi-fault monitoring VLAN or use another VLAN. *<Mapping ID>*: VLAN mapping ID *<VLAN ID>*: VLAN ID
axrp-vlan-mapping-*<Mapping ID>*: vlan *<VLAN ID>* is already configured in other vlan-mapping.	The specified VLAN has already been set for another mapping. Either delete the applicable VLAN from the other VLAN mapping or use another VLAN. *<Mapping ID>*: VLAN mapping ID *<VLAN ID>*: VLAN ID
Cannot configure Ring Protocol when spanning-tree is configured.	The Ring Protocol functionality cannot be set because a Spanning Tree Protocol is set.

36.1.12 DHCP snooping information

Table 36-12 DHCP snooping error messages

Message	Description
Can't delete it because data is not corresponding.	Deletion is not possible because DHCP snooping for the specified VLAN is not enabled or the specified configuration does not exist.

Message	Description
Can't delete it vlan configuration referred by other configuration.	Deletion is not possible because the `ip source binding` setting uses the VLAN. First, delete the `ip source binding` setting that specifies the VLAN you want to delete.
Can't set it because snooping is disable.	The specified VLAN cannot be set because DHCP snooping for the VLAN is not enabled. Specify a VLAN for which DHCP snooping is enabled.
Can't set it because vlan doesn't exist.	The VLAN specified by using `no ip dhcp snooping vlan` cannot be deleted because it does not exist.
	The VLAN specified by using `no ip arp inspection vlan` cannot be deleted because it does not exist.
Duplicate entry.	The setting is not possible because the setting duplicates another setting. Delete the duplicated setting, and then set this again.
Maximum number of entries are already defined.	The number of VLAN settings specified by using `ip dhcp snooping vlan` exceeds the maximum number of specifiable items.
	The setting is not possible because the total number of configuration settings and dynamic learning items for `ip source binding` exceeds the maximum number of binding database entries. Delete unnecessary configuration settings or dynamic learning items, and then set this again.
	The number of VLANs set by using `ip arp inspection vlan` exceeds the maximum number of specifiable VLANs.
Relations between ip dhcp snooping configuration and channel-group configuration are inconsistent.	The applicable port cannot be set because it belongs to a channel group. Set the port as a port channel interface.
Relations between ip source binding configuration and channel-group configuration are inconsistent.	The specified port cannot be set because it either belongs to a channel group or the specified port channel does not exist.
Relations between ip source binding configuration and switchport configuration are inconsistent.	The specified interface cannot be set because it does not belong to the VLAN.
Relations between ip verify source configuration and channel-group configuration are inconsistent.	The applicable port cannot be set because it belongs to a channel group. Set the port as a port channel interface.
system function isn't set.	The setting is not possible because the `system function` command has not been set. Use the `system function` command to set DHCP snooping.

36.1.13 IGMP snooping information

Table 36-13 IGMP snooping error messages

Message	Description
Maximum number of VLAN are already defined, *<VLAN ID>* igmp snooping can not enable.	A maximum of 32 VLANs can be set for IGMP snooping and MLD snooping. No more than 32 VLANs can be set. *<VLAN ID>* : VLAN ID
system function isn't set.	The setting is not possible because the `system function` command has not been set. Use the `system function` command to set IGMP snooping.

36.1.14 MLD snooping information

Table 36-14 MLD snooping error messages

Message	Description
Duplicate mld query message source address.	The setting is not possible because the source IP address of the same MLD query message has already been defined.
Maximum number of VLAN are already defined, *<VLAN ID>* mld snooping can not enable.	A maximum of 32 VLANs can be set for IGMP snooping and MLD snooping. No more than 32 VLANs can be set. *<VLAN ID>* : VLAN ID
system function isn't set.	The setting is not possible because the `system function` command has not been set. Use the system function to set MLD snooping.

36.1.15 IPv4, ARP, and ICMP information

Table 36-15 IPv4, ARP, and ICMP error messages

Message	Description
ip : Inconsistency has occurred in a setting of IP address and route.	There is an inconsistency between an address set by using IP information and a next-hop network address set by using route information. Set the next hop correctly.
ip : IP address is duplicate between interface and nexthop.	An address set by using IP information and a next-hop address set by using route information are the same. Set the addresses that do not duplicate one another.
ip : maximum number of route are already defined.	No more route information can be set. Review the network configuration.
ip[*<VLAN ID>*] : Can't delete IP configuration with route configuration.	Route information exists. Delete the route information, and then delete the IP information. *<VLAN ID>* : VLAN ID

Message	Description
ip[*<VLAN ID>*] : Duplicate network address.	An IP address of the same network address is defined for another VLAN. Set the IP address so that all network addresses are unique. *<VLAN ID>* : VLAN ID
	An IP address for the same network address is set for the Web authentication IP address. Set the IP address so that it does not duplicate the network address for the Web authentication IP address. *<VLAN ID>* : VLAN ID
ip[*<VLAN ID>*] : maximum number of IP configuration are already defined.	No more IP addresses can be set. Review the network configuration. *<VLAN ID>* : VLAN ID

36.1.16 Flow detection mode information

Table 36-16 Flow mode error messages

Message	Description
Cannot change the flow detection mode.	The flow detection mode cannot be changed because an access list or a QoS flow list is applied to the interface. To change the flow detection mode, delete all uses of the applied lists.

36.1.17 Access list information

Table 36-17 Access list error messages

Message	Description
Cannot attach this list because flow detection mode Layer2-1.	If the flow detection mode is Layer 2-1, this access list cannot be applied. If the flow detection mode is Layer 2-1, a MAC access list can be applied. To do so, you can use the following command: `mac access-group` command
Cannot attach this list because flow detection mode Layer2-2.	If the flow detection mode is Layer 2-2, this access list cannot be applied. If the flow detection mode is Layer 2-2, an IPv4 access list can be applied. To do so, you can use the following command: `ip access-group` command
Maximum number of entries are already defined. *<value1>*	You are trying to add more than the allowable maximum number of entries. Delete entries that are no longer needed, and then add the entries.
Over two entry as an address family cannot be set.	Another access list has already been applied. If you want to apply an access list, first delete the existing access list that has already been applied.

Message	Description
system function isn't set.	The setting is not possible because the `system function` command has not been set. Use the `system function` command to specify `filter`.
The sequence number exceeded the maximum value. Try "resequence" Command.	The automatic sequence number exceeds the maximum value. Execute the `resequence` command.
This list cannot be set to this port.	This access list cannot be applied to this Ethernet interface. When an access list is applied to an Ethernet interface, the VLAN ID of a flow detection condition in the access list must be included in the settings of the Ethernet interface to which you want to apply the access list.
This list cannot be set to VLAN.	This access list cannot be applied to VLAN interfaces. If the VLAN ID is set as a flow detection condition in an access list, the access list cannot be applied to the VLAN interface. Apply it to an Ethernet interface or delete the VLAN ID from the detection condition.
This list name is being used as other protocol type by other definition.	The identifier cannot be set because it is a name that has already been used for another access list. Specify a name that is not being used for another access list.
The maximum number of entries are exceeded.	The number of specifiable entries was exceeded. Delete unnecessary entries before executing the command.

36.1.18 QoS information

Table 36-18 QoS error messages

Message	Description
Can not set command, because limit-queue-length command is set.	A scheduling mode other than PQ cannot be set because the `limit-queue-length` command is set.
Can not set command, because scheduling modes is not PQ.	The `limit-queue-length` command cannot be set because a scheduling mode other than PQ is set.
Can not set half duplex because traffic-shape rate is specified for the port.	Duplex mode cannot be set because port bandwidth control is set for the line.
Can not set half duplex because WFQ min-rate is specified for the port.	Duplex mode cannot be set because the minimum guaranteed bandwidth of WFQ mode is set for the line.
Can not set traffic-shape rate because of the port is half duplex.	Port bandwidth control cannot be set because the line is half duplex.
Can not set WFQ min-rate because of the port is half duplex.	The minimum guaranteed bandwidth of WFQ mode cannot be set because the line is half duplex.

Message	Description
Cannot attach this list because flow detection mode Layer2-1.	If the flow detection mode is Layer 2-1, this QoS flow list cannot be applied. If the flow detection mode is Layer 2-1, a MAC QoS flow list can be applied. To do so, you can use the following command: `mac qos-flow-group` command
Cannot attach this list because flow detection mode Layer2-2.	If the flow detection mode is Layer 2-2, this QoS flow list cannot be applied. If the flow detection mode is Layer 2-2, an IPv4 QoS flow list can be applied. To do so, you can use the following command: `ip qos-flow-group` command
Maximum number of entries are already defined. *<value1>*	You are trying to add more than the allowable maximum number of entries. Delete entries that are no longer needed, and then add the entries.
Over two entry as an address family cannot be set.	Another QoS flow list has already been applied. If you want to apply a QoS flow list, first delete the existing QoS flow list that has already been applied.
system function isn't set.	The setting is not possible because the `system function` command has not been set. Use the `system function` command to specify `qos`.
The different name is already defined.	An entry cannot be added to an interface for which `queue-group` has already been set.
The Maximum number of entries are already defined. *<QOSFLOW_GROUP>*	The maximum number of QoS flow lists that can be applied to an interface has been exceeded.
The Maximum number of entries are already defined. *<QOSFLOW_LIST>*	The maximum number of QoS flow list remark settings has been exceeded.
The Maximum number of entries are already defined. *<QOSFLOW_MAC>*	The number of entries for a MAC-QoS flow list exceeds the capacity limit.
The maximum number of entries are exceeded.	The number of QoS entries exceeds the capacity limit. The number of used entries and available entries in the configuration can be checked by using the `show system` command.
The sequence number exceeded the maximum value. Try "resequence" Command.	The automatic sequence number has exceeded the maximum value. Execute the `resequence` command.
The total of min-rate exceeded bandwidth of port.	The total of the specified minimum guaranteed bandwidths exceeds the bandwidth. Set the value to be equal to or smaller than the bandwidth.
This list cannot be set to this port.	This QoS flow list cannot be applied to this Ethernet interface. To apply a QoS flow list to an Ethernet interface, the VLAN ID of a flow detection condition in the QoS flow list must be included in the settings of the Ethernet interface to which you want to apply the list.

Message	Description
This list cannot be set to VLAN.	This QoS flow list cannot be applied to VLAN interfaces. If the VLAN ID is set as a flow detection condition in a QoS flow list, the QoS flow list cannot be applied to the VLAN interface. Apply it to an Ethernet interface or delete the VLAN ID from the detection condition.
This list name is being used as other protocol type by other definition.	The name has already been used for another QoS flow list. Specify a name that is not being used for another QoS flow list or specify the correct name of an applicable QoS flow list.

36.1.19 Layer 2 authentication common information

Table 36-19 Error messages common to Layer 2 authentication

Message	Description
interface : Invalid access-list ID for authentication.	The specified access list is different from the one that was already applied by using `authentication ip access-group` (only one list name can be applied). Set an access list that has already been set. Alternatively, delete all access lists that have already been applied to another interface, and then set this again.
interface : Invalid authentication arp-relay configuration.	`authentication arp-relay` cannot be set because none of the following commands are set for the applicable port: ● dot1x port-control ● web-authentication port ● mac-authentication port Set any of the above commands for the applicable port, and then set this again.
interface : Invalid authentication ip access-group configuration.	`authentication arp-relay` cannot be set because none of the following commands are set for the applicable port: ● dot1x port-control ● web-authentication port ● mac-authentication port Set any of the above commands for the applicable port, and then set this again.
interface : Over two entry as an address family cannot be set.	Another access list has already been applied. Delete an existing access list, and then set this again.
interface : Relations between the switchport mac vlan and authentication force-authorized vlan are inconsistent.	`authentication force-authorized vlan` cannot be set because the specified VLAN is not a MAC VLAN.
interface : Relations between individual force-authorized and common force-authorized are inconsistent.	The `authentication force-authorized vlan` command cannot be set for the specified port because force authentication is set for each type of authentication functionality. Delete the following: ● dot1x force-authorized ● dot1x force-authorized vlan ● web-authentication force-authorized vlan ● web-authentication static-vlan force-authorized ● mac-authentication force-authorized vlan ● mac-authentication static-vlan force-authorized

Message	Description
Relations between individual force-authorized and common force-authorized are inconsistent.	The `authentication force-authorized enable` command cannot be set because force authentication is set for each type of authentication functionality. Delete the following: ● dot1x force-authorized ● dot1x force-authorized vlan ● web-authentication force-authorized vlan ● web-authentication static-vlan force-authorized ● mac-authentication force-authorized vlan ● mac-authentication static-vlan force-authorized

36.1.20 IEEE 802.1X information

Table 36-20 IEEE 802.1X error messages

Message	Description
dot1x(*xxxxx*): Cannot set "dot1x port-control" because monitor session mode is set now.	Port-based authentication cannot be set because port mirroring of the *xxxxx* interface is enabled. *xxxxx*: `ethernet` <*IF#*>: Ethernet interface port number
dot1x(*xxxxx*): Cannot set " dot1x authentication " command because user-group or legacy mode configuration(s) is set now.	The `dot1x authentication` command cannot be set because the authentication method for each user ID or legacy mode is enabled on the *xxxxx* interface. Delete the following: ● dot1x vlan dynamic enable ● dot1x vlan dynamic radius-vlan ● web-authentication user-group ● web-authentication vlan ● mac-authentication interface ● mac-authentication vlan
dot1x(link-aggregation): Cannot set the configuration because the ethernet <*IF#*> belongs to the port-channel	IEEE 802.1X cannot be set because the specified `ethernet` <*IF#*> belongs to a port channel. <*IF#*>: Interface port number
dot1x(vlan dynamic): Cannot set "dot1x vlan dynamic ignore-eapol-start" because supplicant-detection is disable-method.	The functionality for suppressing the re-authentication of requests from a terminal cannot be set because `disable` is set as terminal detection mode for VLAN-based authentication (dynamic).
dot1x(vlan dynamic): Cannot set "dot1x vlan dynamic ignore-eapol-start" because reauthentication mode is invalid.	The functionality for suppressing the re-authentication of requests from a terminal cannot be set because the re-authentication request functionality of VLAN-based authentication (dynamic) is not enabled.
dot1x(vlan dynamic): Cannot set "dot1x vlan dynamic radius-vlan" because the specified vlan <*VLAN ID*> is not found.	The specified `VLAN` <*VLAN ID*> cannot be registered as the radius VLAN because the `VLAN` <*VLAN ID*> is not registered on the Switch. <*VLAN ID*> : VLAN ID
dot1x(vlan dynamic): Cannot set "dot1x vlan dynamic radius-vlan" because the specified vlan <*VLAN ID*> is not mac-vlan.	The specified `VLAN` <*VLAN ID*> cannot be registered as a radius VLAN because `VLAN` <*VLAN ID*> is not a MAC VLAN. <*VLAN ID*> : VLAN ID

Message	Description
dot1x(vlan dynamic): Cannot set "dot1x vlan dynamic supplicant-detection disable" because ignore-eapol-start is set now.	The terminal detection mode cannot be disabled because the functionality for suppressing the re-authentication of requests from a terminal for VLAN-based authentication (dynamic) is set.
dot1x(vlan dynamic): Cannot set "no dot1x vlan dynamic reauthentication" because ignore-eapol-start is set now.	The re-authentication request functionality cannot be disabled because the functionality for suppressing the re-authentication of requests from a terminal for VLAN-based authentication (dynamic) is set.
dot1x(*xxxx*): Cannot delete "dot1x port-control" because authentication ip access-group/arp-relay is set.	`dot1x port-control` cannot be deleted because `authentication arp-relay` and `authentication ip access-group` are set for the *xxxxx* interface. *xxxxx*: `ethernet` <*IF#*>: Ethernet interface port number `port-channel` <*Channel group#*>: Port channel number
dot1x(*xxxx*): Cannot delete "dot1x port-control" because dot1x force-authorized is set.	`dot1x port-control` cannot be deleted because the `dot1x force-authorized` command is set for the *xxxxx* interface. *xxxxx*: `ethernet` <*IF#*>: Ethernet interface port number `port-channel` <*Channel group#*>: Port channel number
dot1x(*xxxx*): Cannot set "dot1x force-authorized" because authentication force-authorized is set.	The `dot1x force-authorized` command cannot be set because the `authentication force-authorized` command is set for the *xxxxx* interface. `ethernet` <*IF#*>: Ethernet interface port number `port-channel` <*Channel group#*>: Port channel number
dot1x(*xxxx*): Cannot set "dot1x force-authorized" because 802.1X auth mode is unmatch.	The `dot1x force-authorized` command cannot be set because authentication mode of the *xxxxx* interface is different. *xxxxx*: `ethernet` <*IF#*>: Ethernet interface port number `port-channel` <*Channel group#*>: Port channel number
dot1x(*xxxxx*): Cannot set "dot1x ignore-eapol-start" because reauthentication mode is invalid.	The functionality for suppressing the re-authentication of requests from a terminal cannot be set because the re-authentication request functionality of the *xxxxx* interface is not enabled. *xxxxx*: `ethernet` <*IF#*>: Ethernet interface port number `port-channel` <*Channel group#*>: Port channel number
dot1x(*xxxxx*): Cannot set "dot1x ignore-eapol-start" because supplicant-detection is disable-method.	The functionality for suppressing the re-authentication of requests from a terminal cannot be set because the terminal detection mode of the *xxxxx* interface is disabled. *xxxxx*: `ethernet` <*IF#*>: Ethernet interface port number `port-channel` <*Channel group#*>: Port channel number
dot1x: Cannot set "aaa authentication dot1x" because the maximum number is already set.	No more entries can be registered because the maximum number of entries are already registered in the authentication method list.
dot1x(*xxxxx*): Cannot set "dot1x multiple-authentication" because force-mode is set now.	Terminal authentication mode cannot be set because the *xxxxx* interface is in force-unauthorized mode or force-authorized mode. *xxxxx*: `ethernet` <*IF#*>: Ethernet interface port number

Message	Description
	`port-channel` <*Channel group#*>: Port channel number
dot1x(*xxxxx*): Cannot set "dot1x port-control force" command because sub-mode is multiple-authentication.	`force-unauthorized` or `force-authorized` mode cannot be set because the *xxxxx* interface is in terminal authentication mode. *xxxxx*: `ethernet` <*IF#*>: Ethernet interface port number `port-channel` <*Channel group#*>: Port channel number
dot1x(*xxxxx*): Cannot set "dot1x port-control" because switchport mode is not access-mode.	Port-based authentication cannot be set because the switch port mode of the *xxxxx* interface is not access mode. *xxxxx*: `ethernet` <*IF#*>: Ethernet interface port number `port-channel` <*Channel group#*>: Port channel number
dot1x(*xxxxx*):Cannot set "dot1x port-control force" because switchport mode is mac-vlan mode.	Force-unauthorized or force-authorized mode cannot be set because the switch port mode of the *xxxxx* interface (`ethernet` <*IF#*> or `port-channel` <*Channel group#*>) is mac-vlan mode. *xxxxx*: `ethernet` <*IF#*>: Ethernet interface port number `port-channel` <*Channel group#*>: Port channel number
dot1x(*xxxxx*): Cannot set "dot1x supplicant-detection disable" because ignore-eapol-start is set now.	Terminal detection mode cannot be disabled because the functionality for suppressing the re-authentication of requests from a terminal on the *xxxxx* interface is set. *xxxxx*: `ethernet` <*IF#*>: Ethernet interface port number `port-channel` <*Channel group#*>: Port channel number
dot1x(*xxxxx*): Cannot set "no dot1x reauthentication" because ignore-eapol-start is set now.	The re-authentication request functionality cannot be disabled because the functionality for suppressing the re-authentication of requests from a terminal on the *xxxxx* interface is set. *xxxxx*: `ethernet` <*IF#*>: Ethernet interface port number `port-channel` <*Channel group#*>: Port channel number
dot1x(vlan dynamic): Cannot set "dot1x vlan dynamic enable" because authentication list or user-group is set.	The `dot1x vlan dynamic enable` command cannot be set because the authentication method for each user ID or the port-based authentication method is set. Delete the following: ● dot1x authentication ● mac-authentication authentication ● web-authentication authentication ● web-authentication user-group
dot1x(vlan dynamic): Cannot set "dot1x vlan dynamic enable" because authentication multi-step is set.	The `dot1x vlan dynamic enable` command cannot be set because multistep authentication is set. Delete the settings of the `authentication multi-step` command.

Message	Description
dot1x(vlan dynamic): Cannot set "dot1x vlan dynamic radius-vlan" because authentication list or user-group is set.	The `dot1x vlan dynamic radius-vlan` command cannot be set because the authentication method for each user ID or the port-based authentication method is set. Delete the following: ● dot1x authentication ● mac-authentication authentication ● web-authentication authentication ● web-authentication user-group
dot1x(vlan dynamic): Cannot set "dot1x vlan dynamic radius-vlan" because the authentication multi-step is set.	The `dot1x vlan dynamic radius-vlan` command cannot be set because multistep authentication is set. Delete the settings of the `authentication multi-step` command.
dot1x: Cannot set "dot1x system-auth-control" because l2protocol-tunnel eap configuration is valid now.	IEEE 802.1X cannot be set because the EAPOL forwarding functionality is enabled.
l2protocol-tunnel: Cannot set "l2protocol-tunnel eap" because 802.1X configuration is valid now.	The EAPOL forwarding functionality cannot be set because IEEE 802.1X is enabled.
radius-server: Cannot add new radius-server host because the maximum number is already set.	No more entries can be registered because maximum number of entries are registered.
radius-server: Port Number is duplicate between auth port and acct port.	The port numbers for `auth-port` and `acct-port` are the same.
system function isn't set.	The following commands cannot be set because the `system function` command is not set: ● dot1x port-control auto ● authentication arp-relay ● authentication ip access-group
xxxxx: Cannot set the command because of internal error. (code=*y*)	The command could not be set because an internal error has occurred. *xxxxx* : dot1x / radius-server / l2protocol-tunnel / multi-step , y : 1, 2, 3, 4

36.1.21 Web authentication information (including DHCP server information)

Table 36-21 Web authentication error messages

Message	Description
Conflicting port number.	The same Web authentication port number is used more than once. Eliminate duplication of Web authentication port numbers.
Duplicate network address.	An IP address of the same network address is defined for another VLAN. Set the Web authentication IP address so that it does not duplicate a VLAN network address.

Message	Description
interface : Invalid web-authentication html-fileset configuration.	The `web-authentication html-fileset` command cannot be set because the `web-authentication port` command is not set on the applicable port.
interface : Invalid web-authentication port configuration.	The `web-authentication port` command cannot be deleted because the following commands are set on the applicable port: ● authentication ip access-group ● authentication arp-relay ● web-authentication html-fileset
interface : Relations between the web-authentication configuration and the channel-group configuration within same port.	Participation in the port channel is not possible because the specified port is being used by the Web authentication setting.
interface : Relations between the web-authentication configuration and the vlan mode configuration are inconsistent.	Web authentication cannot be set because the specified port has been set as a protocol port.
interface : Relations between the web-authentication configuration and the mirror configuration are inconsistent.	Web authentication cannot be set because the specified port has been set as a mirror port.
interface : Relations between user-group or legacy mode configuration(s) and authentication list configuration(s) are inconsistent.	The `web-authentication authentication` command cannot be set because the authentication method for each user ID or legacy mode is set. Delete the following: ● dot1x vlan dynamic enable ● dot1x vlan dynamic radius-vlan ● web-authentication user-group ● web-authentication vlan ● mac-authentication interface ● mac-authentication vlan
interface : Cannot set the command because the specified vlan *<VLAN ID>* is not found.	The specified VLAN cannot be set because it is not a MAC VLAN. *<VLAN ID>*: `VLAN ID`
interface : Relations between individual force-authorized and common force-authorized are inconsistent.	The following commands cannot be set for the specified port because force authentication common across the types of authentication functionality is set: ● web-authentication force-authorized vlan ● web-authentication static-vlan force-authorized Delete the following: ● authentication force-authorized enable ● authentication force-authorized vlan
radius-server: Cannot add new radius-server host because the maximum number is already set.	No more entries can be registered because maximum number of entries are registered.
radius-server: Port Number is duplicate between auth port and acct port.	The port numbers for `auth-port` and `acct-port` are the same.

Message	Description
system function isn't set.	The following commands cannot be set because the `system function` command is not set: ● web-authentication ip address ● web-authentication port Use the `system function` command to set `extended-authentication`.
web-auth : Cannot set the command because the specified vlan *<VLAN ID>* is not found.	The specified VLAN cannot be set because it is not a MAC VLAN. *<VLAN ID>* : VLAN ID
web-auth : Cannot set the command because of internal error. (code=*x*)	The command could not be set because an internal error has occurred.
web-auth : Maximum number of entries are already defined. *<LIST-NAME>*	The maximum number of entries for the authentication method list has been exceeded.
web-auth : Relations between multi-step configuration and web-authentication vlan configuration are inconsistent.	The `web-authentication vlan` command cannot be set because multistep authentication is set. Delete the settings of the `authentication multi-step` command.
web-auth : Relations between authentication list or legacy mode configuration(s) and user-group configuration are inconsistent.	The `web-authentication user-group` command cannot be set because the port-based authentication method or legacy mode is set. Delete the following: ● dot1x authentication ● dot1x vlan dynamic enable ● dot1x vlan dynamic radius-vlan ● web-authentication authentication ● web-authentication vlan ● mac-authentication authentication ● mac-authentication interface ● mac-authentication vlan
web-auth : Relations between user-group or authentication list configuration(s) and legacy mode configuration(s) are inconsistent.	The `web-authentication vlan` command cannot be set because the authentication method for each user ID or the port-based authentication method is set. Delete the following: ● dot1x authentication ● web-authentication authentication ● web-authentication user-group ● mac-authentication authentication

Table 36-22 Web authentication error messages (internal DHCP server setting)

Message	Description
Can not delete it because data is not corresponding.	The specified setting cannot be deleted because it does not exist.
Interface not found.	No VLANs or IP addresses are set. Revise the VLAN and IP settings.
Invalid network.	The network configuration is invalid.

Message	Description
ip [*<VLAN ID>*]: Can't delete IP configuration with dhcp configuration.	The IP cannot be deleted or changed because it is being used by the DHCP server configuration. *<VLAN ID>* : VLAN ID
It exceeded maximum number of IP-address pool.	The maximum number of IP address pools has been exceeded. Revise the network configuration and excluded address settings.
Maximum number of entries are already defined. *<DHCP-EXCLUDED-ADDRESS>*	The maximum number of specifiable excluded addresses has been exceeded.
Maximum number of entries are already defined. *<DHCP-IF>*	The maximum number of specifiable interfaces has been exceeded.
Maximum number of entries are already defined. *<DHCP-POOL>*	The maximum number of specifiable pools has been exceeded.
network conflicts.	Network settings have been duplicated.
vlan [*<VLAN ID>*]: Can't delete vlan configuration referred by other configuration.	The VLAN cannot be deleted because it is being used by the DHCP server configuration. *<VLAN ID>* : VLAN ID

36.1.22 MAC-based authentication information

Table 36-23 MAC-based authentication error messages

Message	Description
interface : Invalid mac-authentication port configuration.	Deletion is not possible because `authentication ip access-group` or `authentication arp-relay` is set for the applicable port.
interface : Relations between the mac-authentication configuration and the vlan mode configuration are inconsistent.	MAC-based authentication cannot be set because the specified port has been set as a protocol port.
interface : Relations between the mac-authentication configuration and the mirror configuration are inconsistent.	MAC-based authentication cannot be set because the specified port has been set as a mirror port.
interface : Relations between the mac-authentication configuration and the channel-group configuration within same port.	Participation in the port channel is not possible because the specified port is being used by the MAC-based authentication setting.
interface : Cannot set the command because the specified vlan *<VLAN ID>* is not found.	The specified VLAN cannot be set because it is not a MAC VLAN. *<VLAN ID>*: `VLAN ID`

Message	Description
interface : Relations between individual force-authorized and common force-authorized are inconsistent.	The following commands cannot be set for the specified port because force authentication common across the types of authentication functionality is set: ● mac-authentication force-authorized vlan ● mac-authentication static-vlan force-authorized Delete the following: ● authentication force-authorized enable ● authentication force-authorized vlan
interface : Relations between user-group or legacy mode configuration(s) and authentication list configuration(s) are inconsistent.	The `mac-authentication authentication` command cannot be set because the authentication method for each user ID or legacy mode has been set. Delete the following: ● dot1x vlan dynamic enable ● dot1x vlan dynamic radius-vlan ● web-authentication user-group ● web-authentication vlan ● mac-authentication interface ● mac-authentication vlan
mac-auth : Cannot set the command because the specified vlan *<VLAN ID>* is not found.	The specified VLAN cannot be set because it is not a MAC VLAN. *<VLAN ID>*: VLAN ID
mac-auth : Cannot set the command because of internal error. (code=*x*)	The command cannot be set because an internal error occurred.
mac-auth : Maximum number of entries are already defined. *<LIST-NAME>*	The maximum number of entries for the authentication method list has been exceeded.
mac-auth : Relations between multi-step configuration and mac-authentication interface configuration are inconsistent.	The `mac-authentication interface` command cannot be set because multistep authentication is set. Delete the settings of the `authentication multi-step` command.
mac-auth : Relations between multi-step configuration and mac-authentication vlan configuration are inconsistent.	The `mac-authentication vlan` command cannot be set because multistep authentication is set. Delete the settings of the `authentication multi-step` command.
mac-auth : Relations between user-group or authentication list configuration(s) and legacy mode configuration(s) are inconsistent.	The following commands cannot be set because the authentication method for each user ID or the port-based authentication method has been set: ● mac-authentication interface ● mac-authentication vlan Delete the following: ● dot1x authentication ● web-authentication authentication ● web-authentication user-group ● mac-authentication authentication
radius-server: Cannot add new radius-server host because the maximum number is already set.	No more entries can be registered because maximum number of entries are registered.
radius-server: Port Number is duplicate between auth port and acct port.	The port numbers for `auth-port` and `acct-port` are the same.

Message	Description
system function isn't set.	The `mac-authentication port` command cannot be set because the `system function` command is not set. Set `system function extended-authentication`.

36.1.23 Multistep authentication information

Table 36-24 Multistep authentication error messages

Message	Description
interface : Relations between multi-step configuration and legacy mode configuration(s) are inconsistent.	The `authentication multi-step` command cannot be set because legacy mode is enabled. Delete the following: ● dot1x vlan dynamic enable ● dot1x vlan dynamic radius-vlan ● mac-authentication interface ● mac-authentication vlan ● web-authentication vlan
multi-step: Cannot set the command because of internal error. (code=*x*)	The command could not be set because an internal error has occurred. *x* : 1, 2

36.1.24 Uplink redundancy information

Table 36-25 Uplink redundancy error messages

Message	Description
Can't set ethernet *<IF#>* because it is a channel-group port.	The interface configuration cannot be changed because the specified interface belongs to a channel group. *<IF#>*: Interface port number
Ethernet *<IF#>* is already an uplink redundant interface.	The uplink redundancy functionality has already been set for the specified interface. *<IF#>*: Interface port number
Ethernet *<IF#>* Relations between uplink redundant and ring protocol are inconsistent.	The Ring Protocol functionality has already been set for the specified interface. Either delete the Ring Protocol functionality or specify another interface. *<IF#>*: Interface port number
Port-channel *<Channel group#>* is already an uplink redundant interface.	The uplink redundancy functionality has already been set for the specified interface. *<Channel group#>*: Port channel number
Port-channel *<Channel group#>* Relations between uplink redundant and ring protocol are inconsistent.	The Ring Protocol functionality has already been set for the specified interface. Either delete the Ring Protocol functionality or specify another interface. *<Channel group#>*: Port channel number
Secondary interface is same as primary interface.	The primary interface and the secondary interface are configured on the same port.

Message	Description
this command is different from this one in channel-group port.	Participation in the port channel is not possible because the configuration is different.
Too many parameters (exclude-VLAN).	The number of input parameters exceeds the maximum number (200). Set a value equal to or smaller than the maximum number.

36.1.25 Storm control information

Table 36-26 Storm control error messages

Message	Description
Please lower the recovery threshold than the detection threshold.	A value that is greater than the storm detection threshold is specified for the recovery-from-storm threshold. For the recovery-from-storm threshold, set a value equal to or smaller than the storm detection threshold.

36.1.26 L2 loop detection information

Table 36-27 L2 loop detection error messages

Message	Description
L2LD : Can't setting port[*<IF#>*] because of channel-group port.	The `loop-detection` command configuration cannot be changed because the specified port number belongs to a channel group. *<IF#>*: Interface port number
this command is different from this one in channel-group port.	Participation in the channel group is not possible because the `loop-detection` setting is different.

36.1.27 CFM information

Table 36-28 CFM error messages

Message	Description
ethernet : Can not delete it because data is not corresponding.	Deletion is not possible because the specified configuration does not exist or duplicate data exists.
ethernet : Cannot change cfm domain direction.	The MEP direction that is set in a domain cannot be changed. Delete the applicable command, and then set this again.
ethernet : Can't delete this configuration referred by other configuration.	The configuration cannot be changed because it is referenced by another configuration. Delete the other configuration referencing this configuration, and then attempt the setting again.
ethernet : MA *<No.>* is already configured in cfm domain.	The specified MA identification number is already being used by another domain. *<No.>*: MA identification number
ethernet : MA name *<Name>* is already configured in cfm domain.	The specified MA name is already set in the same domain. *<Name>*: MA name

Message	Description
ethernet : Maximum number of entries are already defined. *<CFM_MA>*	An attempt is being made to set a configuration that is larger than the capacity limit or to change a configuration in an environment already at the maximum capacity limit. Delete configurations that are no longer used, and then set the configuration again.
ethernet : Not found *<Level>*.	The specified domain level cannot be found. Make sure the domain level has been set. *<Level>*: Domain level
ethernet : Not found *<No.>*.	The specified MA identification number cannot be found. Make sure the MA identification number has been set. *<No.>*: MA identification number
ethernet : Not found VLAN ID *<VLAN ID>* in MA.	The VLAN ID specified as the primary VLAN is not in the VLAN ID list. Specify a VLAN ID that has already been set in the MA. *<VLAN ID>*: VLAN ID
ethernet : Too many parameters (CFM_VLAN).	The number of input parameters exceeds the maximum number (256). Set a value equal to or smaller than the maximum number.
ethernet : VLAN ID *<VLAN ID>* is already configured in MA name.	The specified VLAN ID is already being used by another MA name. *<VLAN ID>*: VLAN ID
interface : Can not delete it because data is not corresponding.	Deletion is not possible because the specified configuration does not exist or duplicate data exists.
interface : Cannot change cfm mep direction.	The MEP direction cannot be changed. Delete the applicable command, and then set this again.
interface : Cannot configure cfm enable to channel-group port.	CFM of an interface participating in a port channel cannot be enabled.
interface : Cannot configure cfm mep to channel-group port.	A MEP cannot be set for an interface that is participating in a port channel.
interface : Cannot configure cfm mip to channel-group port.	A MIP cannot be set for an interface that is participating in a port channel.
interface : Domain level *<Level>* is set with a value less than cfm mep.	A value equal to or smaller than the value set for the MEP is specified for the specified domain level. *<Level>*: Domain level
interface : Domain level *<Level>* is set with values more than cfm mip.	A value equal to or greater than the value set for MIP is specified for the specified domain level. *<Level>*: Domain level
interface : Exceeded the number of the maximum port.	The number of ports exceeds the number for which MEP and MIP can be set.
interface : Maximum number of entries are already defined. *<CFM_MEP>*	An attempt is being made to set a configuration that is larger than the capacity limit or to change a configuration in an environment already at the maximum capacity limit. Delete configurations that are no longer used, and then set the configuration again.

Message	Description
interface : Maximum number of entries are already defined. *<CFM_MIP>*	An attempt is being made to set a configuration that is larger than the capacity limit or to change a configuration in an environment already at the maximum capacity limit. Delete configurations that are no longer used, and then set the configuration again.
interface : MEP ID *<MEPID>* is already configured in cfm mep.	The specified MEP ID has already been set for another MEP. *<MEPID>*: MEP ID
interface : Not found *<Level>*.	The specified domain level cannot be found. Make sure the domain level has been set. *<Level>*: Domain level
interface : Not found *<No.>*.	The specified MA identification number cannot be found. Make sure the MA identification number has been set. *<No.>*: MA identification number

36.1.28 SNMP information

Table 36-29 SNMP error messages

Message	Description
interface : Can not delete it because data is not corresponding.	An attempt has been made to delete a non-existent identification number. Check the identification number.
interface : Maximum number of entries are already defined. *<RMON_HISTRY_CTR>*	The maximum number that has been set has been exceeded. Delete unnecessary entries.
interface : This configuration has already been set.	When the `rmon collection history` command was being set, it was found that the identification number was already being used by another interface. Either specify another identification number, or delete the identification number being used by the other interface, and then set the command again.
rmon : Can not delete it because data is not corresponding.	An attempt has been made to delete a non-existent identification number. Check the identification number.
rmon : Can't delete this configuration referred by other configuration.	The specified event entry cannot be deleted because it is associated with an alarm entry.
rmon : Maximum number of entries are already defined. *<RMON_ALARM>*	The maximum number that has been set has been exceeded. Delete unnecessary entries.
rmon : Maximum number of entries are already defined. *<RMON_EVENT>*	The maximum number that has been set has been exceeded. Delete unnecessary entries.
rmon : Can not delete it because data is not corresponding.	An attempt has been made to delete a non-existent identification number. Check the identification number.
rmon : Not found *<event_no>*.	A non-existent event identification number has been specified for `rising-event-index` or `falling-event-index`. Check `rising-event-index` or `falling-event-index` again. Alternatively, set an event identification number after setting the applicable event identification number.

Message	Description
rmon : Not supported *<variable>*.	An object that is not supported or an instance number that is not in the specifiable range is set for `variable`. Check the object and the instance number again.
rmon : RMON alarm rising threshold is less than falling threshold.	The lower threshold is greater than the upper threshold. Set a value smaller than the upper threshold as the lower threshold.
snmp-server: Maximum number of entries are already defined. *<SNMP_TRAP>*	The number of registered SNMP trap destination information items exceeds the maximum number. Delete unnecessary trap destination information, and then add the new item.
snmp-server: Maximum number of entries are already defined. *<SNMP_VIEW>*	The number of registered SNMP community information items exceeds the maximum number. Delete the unnecessary community information, and then add the new item.

36.1.29 Port mirroring information

Table 36-30 Port mirroring error messages

Message	Description
Mirror port and dot1x are inconsistent.	The destination interface cannot be set as a mirror port because the destination interface is being used by `dot1x`.
Mirror port and mac-authentication are inconsistent.	The destination interface cannot be set as a mirror port because the destination interface is being used for MAC-based authentication.
Mirror port and web-authentication are inconsistent.	The destination interface cannot be set as a mirror port because the destination interface is being used for Web authentication.
Mirror port and mac-address-table are inconsistent.	The destination interface cannot be set as a mirror port because the destination interface is being used for `mac-address-table`.
Mirror port and port-channel are inconsistent.	The destination interface cannot be set as a mirror port because the destination interface is being used by the port channel.
Mirror port and switchport are inconsistent.	Both mirror port and switchport settings cannot be specified simultaneously.

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