AX3660S Software Manual

Configuration Command Reference Vol. 2

For Version 12.1 Rev.11

AX38S-S014X-C0

Alaxala

■ Relevant products

This manual applies to the models in the AX3660S series of switches. It also describes the function of OS-L3M version 12.1 of the software.

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■ Reading and storing this manual

Before you use the device, 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.

■ Note

Information in this document is subject to change without notice.

■ Editions history

December 2023 (Edition 1) AX38S-S014X-C0

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Preface

■ Applicable products and software versions

This manual applies to the models in the AX3660S series of switches. It also describes the function of OS-L3M version 12.1 of the software. The described function is that supported by the software licenses and by optional licenses.

Before you operate the Switch, 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 common to both the SL-L3A and SL-L3L software licenses. Functions that are not common are indicated as follows.

[SL-L3A]:

The description applies to the SL-L3A software 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:

https://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.

● **To learn how to unpack the switch and the basic settings for initial installation**

Quick Start Guide (AX36S-Q002X)

● **To check the hardware equipment conditions and how to handle the hardware**

Hardware Instruction Manual (AX36S-H002X)

Transceiver Hardware Instruction Manual (AX-COM-H001X)

● **To learn the software functions, configuration settings, and use of operation commands**

Configuration Guide Vol.1 (AX38S-S010X)
Vol.2 (AX38S-S011X)
Vol.3 (AX38S-S012X)

● **To learn the entry syntax of configuration commands and the details of command parameters**

Configuration Command Reference Vol.1 (AX38S-S013X)
Vol.2 (AX38S-S014X)

● **To learn the entry syntax of operation commands and the details of command parameters**

Operation Command Reference Vol.1 (AX38S-S015X)
Vol.2 (AX38S-S016X)

● **To check messages and logs**

Message Log Reference (AX38S-S017X)

● **To learn how to troubleshoot a problem**

Troubleshooting Guide (AX36S-T002X)

■ Conventions: The terms "Switch" and "switch"

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

- AX3660S 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.

■ Abbreviations used in the manual

AC	Alternating Current

ACK	ACKnowledge
ADSL	Asymmetric Digital Subscriber Line
AES	Advanced Encryption Standard
ALG	Application Level Gateway
ANSI	American National Standards Institute
ARP	Address Resolution Protocol
AS	Autonomous System
BFD	Bidirectional Forwarding Detection
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
CA	Certificate Authority
CBC	Cipher Block Chaining
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
DES	Data Encryption Standard
DHCP	Dynamic Host Configuration Protocol
DIS	Draft International Standard/Designated Intermediate System
DNS	Domain Name System
DNSSL	Domain Name System Search List
DR	Designated Router
DSA	Digital Signature Algorithm
DSAP	Destination Service Access Point
DSCP	Differentiated Services Code Point
DSS	Digital Signature Standard
DTE	Data Terminal Equipment
DVMRP	Distance Vector Multicast Routing Protocol
E-Mail	Electronic Mail
EAP	Extensible Authentication Protocol
EAPOL	EAP Over LAN
ECDHE	Elliptic Curve Diffie-Hellman key exchange, Ephemeral
ECDSA	Elliptic Curve Digital Signature Algorithm
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
GCM	Galois/Counter Mode
GSRP	Gigabit Switch Redundancy Protocol
HMAC	Keyed-Hashing for Message Authentication
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure
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
MLD	Multicast Listener Discovery
MRU	Maximum Receive Unit
MSTI	Multiple Spanning Tree Instance
MSTP	Multiple Spanning Tree Protocol
MTU	Maximum Transmission 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
PGP	Pretty Good Privacy
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
PMTU	Path Maximum Transmission Unit
PRI	Primary Rate Interface
PS	Power Supply
PSNP	Partial Sequence Numbers PDU

PTP	Precision Time Protocol
QoS	Quality of Service
QSFP+	Quad Small Form factor Pluggable Plus
QSFP28	28Gbps Quad Small Form factor Pluggable
RA	Router Advertisement
RADIUS	Remote Authentication Dial In User Service
RDI	Remote Defect Indication
RDNSS	Recursive Domain Name System Server
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
RSA	Rivest, Shamir, Adleman
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
SFP+	enhanced Small Form-factor Pluggable
SHA	Secure Hash Algorithm
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
SSH	Secure Shell
SSL	Secure Socket Layer
STP	Spanning Tree Protocol
Sync-E	Synchronous Ethernet
TA	Terminal Adapter
TACACS+	Terminal Access Controller Access Control System Plus
TCP/IP	Transmission Control Protocol/Internet Protocol
TLA ID	Top-Level Aggregation Identifier
TLS	Transport Layer Security
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
UPC	Usage Parameter Control
UPC-RED	Usage Parameter Control - Random Early Detection
VLAN	Virtual LAN
VNI	VXLAN Network Identifier
VPN	Virtual Private Network
VRF	Virtual Routing and Forwarding/Virtual Routing and Forwarding Instance
VRRP	Virtual Router Redundancy Protocol
VTEP	VXLAN Tunnel End Point
VXLAN	Virtual eXtensible Local Area Network
WAN	Wide Area Network
WDM	Wavelength Division Multiplexing
WFQ	Weighted Fair Queueing
WRED	Weighted Random Early Detection
WS	Work Station
WWW	World-Wide Web

■ 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.

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1 Reading the Manual

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 on the parameter input format, see "Specifiable values for parameters".

Input mode

Indicates the mode required to enter the command. The name of a sub-mode of a configuration command mode corresponds to the name displayed on the command 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 whether changes to values for configuration information in memory are immediately effective, or whether they take effect only after temporarily stopping operation, such as by restarting the device.

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: List of configuration commands

No.	Prompt displayed for the command mode	Description of command mode	Mode transition command
1	(config)	Global configuration mode	# enable # configure
2	(config-line)	Configuring remote login and console settings	(config)# line vty (config)# line console
3	(config-if)	Configuring the management port	(config)# interface mgmt
		Configuring an Ethernet interface	(config)# interface gigabitethernet (config)# interface tengigabitethernet (config)# interface fortygigabitethernet (config)# interface hundredgigabitethernet
		Configuring a port channel interface	(config)# interface port-channel
		Configuring a VLAN interface	(config)# interface vlan
		Configuring a VXLAN interface [SL-L3A]	(config)# interface vxlan
		Configuring a loopback interface	(config)# interface loopback
		Configuring the null interface	(config)# interface null
4	(config-if-range)	Configuring multiple Ethernet interfaces	(config)# interface range gigabitethernet (config)# interface range tengigabitethernet (config)# interface range fortygigabitethernet (config)# interface range hundredgigabitethernet
		Configuring multiple port channel interfaces	(config)# interface range port-channel
		Configuring multiple VLAN interfaces	(config)# interface range vlan
5	(config-subif)	Configuring an Ethernet subinterface [SL-L3A]	(config)# interface gigabitethernet (config)# interface tengigabitethernet (config)# interface fortygigabitethernet (config)# interface hundredgigabitethernet (When the subinterface index is specified)
		Configuring a port channel subinterface [SL-L3A]	(config)# interface port-channel (When the subinterface index is specified)
6	(config-vlan)	Configuring a VLAN	(config)# vlan
7	(config-mst)	Configuring Multiple Spanning Tree	(config)# spanning-tree mst configuration

No.	Prompt displayed for the command mode	Description of command mode	Mode transition command
8	(config-axrp)	Configuring the Ring Protocol	(config)# axrp
9	(config-gsrp)	Configuring GSRP	(config)# gsrp
10	(config-ext-nacl)	Configuring an IPv4 packet filter	(config)# ip access-list extended
11	(config-std-nacl)	Configuring an IPv4 address filter	(config)# ip access-list standard
12	(config-ipv6-acl)	Configuring an IPv6 filter	(config)# ipv6 access-list
13	(config-ext-macl)	Configuring a MAC filter	(config)# mac access-list extended
14	(config-ip-qos)	Configuring IPv4 QoS	(config)# ip qos-flow-list
15	(config-ipv6-qos)	Configuring IPv6 QoS	(config)# ipv6 qos-flow-list
16	(config-mac-qos)	Configuring MAC QoS	(config)# mac qos-flow-list
17	(dhcp-config)	Configuring DHCP	(config)# ip dhcp pool
18	(config-dhcp)	Configuring IPv6 DHCP (PD)	(config)# ipv6 dhcp pool
19	(config-route-map)	Configuring a route map	(config)# route-map
20	(config-rtr-rip)	Configuring RIPng	(config)# ipv6 router rip
21	(config-router)	Configuring RIP	(config)# router rip
		Configuring OSPF	(config)# router ospf
		Configuring BGP4/BGP4+	(config)# router bgp
22	(config-rtr)	Configuring OSPFv3	(config)# ipv6 router ospf
23	(config-router-af)	Configuring RIP for each VRF	(config)# router rip (config-router)# address-family ipv4 vrf
		Configuring BGP4 for each VRF (config-router-af) (ipv4 vrf) mode	(config)# router bgp (config-router)# address-family ipv4 vrf
		Configuring BGP4+ global network (config-router-af) (ipv6) mode	(config)# router bgp (config-router)# address-family ipv6
		Configuring BGP4+ for each VRF (config-router-af) (ipv6 vrf) mode	(config)# router bgp (config-router)# address-family ipv6 vrf
24	(config-auto-cf)	Configuring auto-config	(config)# auto-config
25	(config-netconf)	Configuring netconf	(config)# netconf
26	(config-view)	Configuring view	(config)# parser view
27	(config-ether-cfm)	Configuring the domain name and MA	(config)# ethernet cfm domain
28	(config-track-object)	Configuring the policy-based routing tracking function	(config)# track-object

No.	Prompt displayed for the command mode	Description of command mode	Mode transition command
29	(config-pol)	Configuring policy-based routing list information	(config)# policy-list
30	(config-dest-mirror)	Configuring mirror ports for policy-based mirroring	(config)# destination-interface-list
31	(config-bfd)	Configuring BFD	(config)# bfd name
32	(config-applet)	Configuring the applet functions	(config)# event manager applet <applet name>

Specifiable values for parameters

The following table describes the values that can be specified for parameters.

Table 1-2: Specifiable values for parameters

Parameter type	Description	Input example
Name	Alphabetic characters can be used for the first character, and alphanumeric characters, hyphens (-), underscores (_), and periods (.) can be used for the second and subsequent characters.	ip access-list standard inbound1
Host name	For a host name, alphabetic characters can be used for the first character, and alphanumeric characters, hyphens (-), and periods (.) can be used for the second and subsequent characters.	ip host telnet-host 192.168.1.1
IPv4 address, subnet mask	Specify these 4-byte items in decimal format, separating 1-byte decimal values by a period (.).	192.168.0.14 255.255.255.0
Wildcard mask	The same input format as IPv4 addresses. The set bits in an IPv4 address represent an arbitrary value.	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
add/remove specification	Add to or delete from the information when multiple items have been specified. The add specification adds information to the current information. The remove specification deletes information from the current information.	switchport trunk allowed vlan add 100,200-210 switchport trunk allowed vlan remove 100,200-210 switchport isolation interface add gigabitethernet 1/0/1-3, tengigabitethernet 1/0/25-26 switchport isolation interface remove gigabitethernet 1/0/1-3, tengigabitethernet 1/0/25-26

■ Arbitrary character string

Alphanumeric characters and special characters can be specified for parameters. Some special characters, however, cannot be used. Character codes are listed in the following table. Characters other than alphanumeric characters in the following list of character codes are special characters.

Table 1-3: List of character codes

Character	Code	Character	Code	Character	Code	Character	Code	Character	Code	Character	Code
Space	0x20	0	0x30	@	0x40	P	0x50	`	0x60	p	0x70
!	0x21	1	0x31	A	0x41	Q	0x51	a	0x61	q	0x71
"	0x22	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

Character	Code	Character	Code	Character	Code	Character	Code	Character	Code	Character	Code
%	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	O	0x4F	_	0x5F	o	0x6F	---	---

Notes

- To enter a question mark (?, or 0x3F), press Ctrl + V, and then type a question mark. You cannot copy and paste any specification string that includes a question mark.

Special characters that cannot be specified

Table 1-4: Special characters that cannot be specified

Character name	Character	Code
Double quotation mark	"	0x22
Dollar sign	$	0x24
Single quotation mark	'	0x27
Semicolon	;	0x3B
Backslash	\	0x5C
Grave accent mark	`	0x60
Left curly bracket	{	0x7B
Right curly bracket	}	0x7D

Example of specification string

access-list 10 remark "mail:xx@xx %tokyo"

■ Range of <switch no.>, <nif no.>, and <port no.> values

The following table lists the range of parameter <switch no.>, <nif no.>, and <port no.> values.

Table 1-5: Range of <switch no.>, <nif no.> and <port no.> values for AX3660S models

Model	Range of values		
	<switch no.>	<nif no.>	<port no.>
AX3660S-24T4X	1 to 2	0	1 to 30
AX3660S-24T4XW			1 to 30
AX3660S-48T4XW			1 to 54
AX3660S-16S4XW			1 to 46
AX3660S-24S8XW			1 to 46
AX3660S-48XT4QW			1 to 52
AX3660S-24X4QW			1 to 52
AX3660S-48X4QW			1 to 52

■ How to specify <interface id list>

For <interface id list>, you can use hyphens (-) and commas (,) to specify the following multiple Ethernet interfaces. You can also specify a single interface by omitting the content enclosed with brackets ([]). The range of permitted values is the same as the range of <switch no.>, <nif no.>, and <port no.> values in the above tables.

- For Gigabit Ethernet interfaces

  gigabitethernet <switch no.>/<nif no.>/<port no.>[-<port no.>]
- For 10 Gigabit Ethernet interfaces

  tengigabitethernet <switch no.>/<nif no.>/<port no.>[-<port no.>]
- For 40 Gigabit Ethernet interfaces

  fortygigabitethernet <switch no.>/<nif no.>/<port no.>[-<port no.>]
- For 100 Gigabit Ethernet interfaces

  hundredgigabitethernet <switch no.>/<nif no.>/<port no.>[-<port no.>]

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

gigabitethernet 1/0/1-2, gigabitethernet 1/0/5, tengigabitethernet 1/0/25-26

■ Range of <channel group number> values

The following table lists the range of <channel group number> values.

Table 1-6: Range of <channel group number> values

No.	Model	Range of values
1	All models (When a stack configuration is used)	1 to 96
2	All models (When a standalone configuration is used)	1 to 48

■ Range of <subinterface index> values [SL-L3A]

The range of <subinterface index> values is 1 to 65535.

■ Range of <vlan id> values

The range of <vlan id> values is 1 to 4094.

■ How to specify <vlan id list>

For <vlan id list>, you can use hyphens (-) and commas (,) to specify multiple VLAN IDs. You can also specify one VLAN ID. The range of values that can be specified is the same as the range of <vlan id> values above. If there are large amounts of information set for <vlan id list>, the configuration information might be displayed over multiple lines. Conversely, if the information set in <vlan id list> is reduced by edits made to VLANs using add/remove, multiple lines of configuration information might be consolidated into one line.

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

1-3,5,10

Example of a specification displayed in multiple lines

switchport trunk allowed vlan 100,200,300...

switchport trunk allowed vlan add 400,500...

■ Range of <vni> values [SL-L3A]

The range of <vni> values is 1 to 16777215.

■ How to specify <vni list> [SL-L3A]

For <vni list>, you can use hyphens (-) and commas (,) to specify multiple VNIs. You can also specify one VNI. The range of values that can be specified is the same as the range of <vni> values above. If there are large amounts of information set for <vni list>, the configuration information might be displayed over multiple lines. Conversely, if the information set in <vni list> is reduced by edits made to VNIs using add/remove, multiple lines of configuration information might be consolidated into one line.

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

1-3,5,10

Example of a specification displayed in multiple lines

member vni 100,200,300...

member vni add 400,500...

■ Range of <vtep id> values [SL-L3A]

The range of <vtep id> values is 1 to 255.

■ Range of <loopback id> values [SL-L3A]

The range of <loopback id> values is 1 to 256.

■ How to specify the interface

The following table lists the specification methods for parameters <interface type> and <interface number> that correspond to interface type groups.

Table 1-7: How to specify an interface

Interface type group	Interface name to be specified in <interface type>	Interface number to be specified in <interface number>
Ethernet interface	gigabitethernet	<switch no.>/<nif no.>/<port no.>
	tengigabitethernet	<switch no.>/<nif no.>/<port no.>
	fortygigabitethernet	<switch no.>/<nif no.>/<port no.>
	hundredgigabitethernet	<switch no.>/<nif no.>/<port no.>
Ethernet subinterface [SL-L3A]	gigabitethernet	<switch no.>/<nif no.>/<port no.>.<subinterface index>
	tengigabitethernet	<switch no.>/<nif no.>/<port no.>.<subinterface index>
	hundredgigabitethernet	<switch no.>/<nif no.>/<port no.>.<subinterface index>
Port channel interface	port-channel	<channel group number>
Port channel subinterface [SL-L3A]	port-channel	<channel group number>.<subinterface index>
VLAN interface	vlan	<vlan id>
VXLAN interface [SL-L3A]	vxlan	<vtep id>
Loopback interface	loopback	0
		<loopback id> [SL-L3A]
Null interface	null	0
Management port	mgmt	0

■ Specification of multiple interfaces

This specification method is used to collectively set the same information for multiple interfaces. You can specify the interface names and interface numbers that correspond to the following interface type groups among the groups listed in "Table 1-7: How to specify an interface".

- Ethernet interface
- Port channel interface
- VLAN interface

When multiple interfaces are to be specified, interfaces included in the same interface type group can be mixed, but interfaces in different interface type groups cannot be mixed.

Syntax

```
interface range <interface type> <interface number>
```

You can specify no more than 8 of the input formats, separating each by a comma (,).

Input example

```
interface range gigabitethernet 1/0/1-3
interface range gigabitethernet 1/0/1-3, gigabitethernet 1/0/11-13
interface range vlan 1-100
```

■ Range of <vrf id> values [SL-L3A]

The range of <vrf id> values is 2 to 256.

■ Specifiable values for the message type

The following table lists the values that can be specified for parameters <message type> and <event kind> that specify the message type.

Table 1-8: Specifiable values for the message type

No.	Specifiable value
1	key
2	rsp
3	sky
4	srs
5	err
6	evt
7	aut
8	dsn
9	tro [SL-L3A]
10	rtm
11	mrp
12	mr6
13	bfd

2 IPv4, ARP, ICMP

arp

This command creates a static ARP table. If a product that does not support ARP is connected, conversion is not possible between an IPv4 address and a physical address. You need to create a static ARP table in advance.

Syntax

To set or change information:

arp <ip address> interface vlan <vlan id> <mac address>

To delete information:

no arp <ip address> [interface vlan <vlan id>]

Input mode

```
(config)
```

Parameters

<ip address>

Specifies a next-hop IPv4 address.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

interface vlan <vlan id>

Specifies a VLAN ID.

1. Default value when this parameter is omitted:

   To set or change information:

   This parameter cannot be omitted.

   To delete information:

   This parameter cannot be omitted if there are multiple static ARP entries that have the same next-hop IPv4 address.

2. Range of values:

   For <vlan id>, specify the VLAN ID set by the "interface vlan" command.

<mac address>

Specifies the destination MAC address (in a canonical format).

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0000.0000.0000 to ffff.ffff.ffff

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 static ARP is to be set, the destination MAC addresses must be set at the same time using static MAC addresses. If the destination MAC addresses are not set, IP forwarding might be performed by software processing.
2. When static ARP entries that have the same next-hop IPv4 address are configured for different VRFs, the interface vlan parameter is used to identify the VRFs. Therefore, you cannot omit the interface vlan parameter when deleting information for multiple static ARP entries that have the same next-hop IPv4 address. [SL-L3A]

Related commands

None

arp discard-unresolved-packets

This command reduces the CPU load by using the hardware to discard IPv4 forwarding packets with unresolved addresses.

Syntax

To set or change information:

arp discard-unresolved-packets [<seconds>]

To delete information:

no arp discard-unresolved-packets

Input mode

(config-if)

VLAN interface

Parameters

<seconds>

Specifies the period of time during which hardware discards IPv4 forwarding packets with unresolved addresses.

1. Default value when this parameter is omitted:

   5

2. Range of values:

   1 to 32767 (seconds)

Default behavior

If this command is not specified, IPv4 forwarding packets with unresolved addresses are sent to the CPU and the CPU software discards them.

Impact on communication

During the specified period of time, the hardware discards IPv4 packets forwarded or spontaneously sent to a route that uses the relevant ARP.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. Use this command to reduce high CPU loads caused by communication in which ARP attempts continue in communication with non-existent terminals or communication via non-existent routers for network configuration reasons.
2. If the first address resolution attempt fails, this command registers the relevant ARP entry in the hardware as an entry to be discarded. No more than 50 ARP entries can be registered per second as hardware-discard entries. The 51st and subsequent ARP entries are not discarded by the hardware, and are processed by the CPU as normal entries.

3. When the load balancing function is enabled and the output interface for which this command is set is in a multipath configuration, forwarding packets are not discarded by the hardware, and are processed by the CPU as normal entries even if one of the paths is selected and the address cannot be resolved.

Related commands

None

arp max-send-count

This command specifies the maximum number of times an ARP request packet is sent.

Syntax

To set or change information:

arp max-send-count <count>

To delete information:

no arp max-send-count

Input mode

(config-if)

VLAN interface

Parameters

<count>

Specifies the maximum number of times an ARP request packet is sent.

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 times an ARP request frame is sent is set to 1.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

arp send-interval

This command specifies the retry interval for sending an ARP request packet.

Syntax

To set or change information:

arp send-interval <seconds>

To delete information:

no arp send-interval

Input mode

(config-if)

VLAN interface

Parameters

<seconds>

Specifies the retry interval for sending an ARP request packet.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 10 (seconds)

Default behavior

The retry interval for sending an ARP request packet is set to 2 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

arp timeout

This command specifies the aging time for an ARP cache table.

Syntax

To set or change information:

arp timeout <seconds>

To delete information:

no arp timeout

Input mode

(config-if)

VLAN interface

Parameters

<seconds>

Specifies the aging time for an ARP cache table.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   60 to 86400 (seconds)

Default behavior

14400 seconds (4 hours) is set as the aging time for an ARP cache table.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

arp-limit [SL-L3A]

This command specifies the maximum number of ARP entries for each VRF.

Syntax

To set or change information:

arp-limit <count>

To delete information:

no arp-limit

Input mode

```
(config-vrf)
```

Parameters

<count>

Specifies the maximum number of ARP entries for each VRF.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 30720

Default behavior

The number of ARP entries for each VRF is not limited. It must not exceed the capacity limit of the entire device.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If the number of ARP entries exceeds the maximum value set by this command, a warning operation message is output the next time an ARP entry is being registered. The new ARP entry is registered after an old ARP entry in the VRF is deleted.
2. If the number of ARP entries has not reached the maximum value set by this command but the capacity limit of the entire device has been exceeded, a warning operation message is also output. Then, the new ARP entry is registered after an old ARP entry is deleted.
3. Static ARP entries have priority over dynamically-learned ARP entries, and can be registered beyond the maximum value specified by this command. If you register more static ARP entries than the maximum value specified by the command, dynamically-learned ARP entries cannot be registered for the VRF. Such registration cannot be recommended because a warning operation message also remains.

4. Even if you use this command to re-specify a maximum value smaller than the current setting, the ARP entries that have been registered based on the previous maximum value are not deleted. For example, if the VRF has 50 ARP entries and you use the command to set the maximum value to 30, the difference of 20 entries will not be deleted. If you re-specify a smaller value, we recommend that you use the "clear arp-cache" operation command to delete the ARP entries.

Related commands

arp

ip address

This command specifies the local IPv4 address.

Syntax

To set or change information:

ip address <ip address> <subnet mask> [directed-broadcast] [secondary]

To delete information:

no ip address <ip address>

Input mode

```
(config-if)
```

VLAN interface, management port

Parameters

<ip address>

Specifies the local IPv4 address.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

<subnet mask>

Specifies 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 255.255.255.255 (Bits must be contiguous)

directed-broadcast

Enables forwarding of subnet broadcast IPv4 packets.

Set this parameter for each local IPv4 address to specify whether broadcast IPv4 packets directed to a subnet can be forwarded to the local IPv4 address.

Use this parameter to determine whether to permit the forwarding of packets for each subnet.

If you set no ip subnet-broadcast for the input side of packet forwarding to prohibit the forwarding of subnet broadcast IPv4 packets, subnet broadcast IPv4 packets are not forwarded.

This parameter cannot be set for the management ports.

1. Default value when this parameter is omitted:

   Subnet broadcast IPv4 packets are not forwarded.

2. Range of values:

   None

secondary

Specifies the secondary setting for a multihomed interface.

This parameter cannot be set for the management ports.

1. Default value when this parameter is omitted:

The primary setting is specified. Even if a multihomed interface is used, you need to specify one primary setting.

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. To change the IPv4 address, delete the already set IPv4 address and then set a new IPv4 address.

Related commands

ip subnet-broadcast

ip icmp rate-limit unreachable

This command specifies the sending interval of an ICMP error message. You can separately specify the df parameter to set the sending interval of code 4 ICMP error messages (code 4 means that fragmentation is impossible because the DF flag has been set). You can also use this parameter to separately specify the sending interval of ICMP error messages for any other code.

Syntax

To set or change information:

ip icmp rate-limit unreachable [df] <milli seconds>

To delete information:

no ip icmp rate-limit unreachable [df]

Input mode

```
(config)
```

Parameters

df

Sets the sending interval of an ICMP error message for code 4.

1. Default value when this parameter is omitted:

   The sending interval of ICMP error messages for codes other than code 4 is set.

2. Range of values:

   None

<milli seconds>

Sets the minimum time between ICMP error messages. If you specify 0, the interval between the sending of ICMP error packets is not limited to the specified or default interval for sending error messages.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 4294967295 (milliseconds)

Default behavior

The default interval for sending any type of ICMP error message is set to 500 milliseconds.

However, keep the following in mind:

- If you set ip icmp rate-limit unreachable without setting ip icmp rate-limit unreachable df, the sending interval of an ICMP error message for code 4 is the same as the sending interval of error messages for other codes.
- If you set only ip icmp rate-limit unreachable df, the sending interval of an ICMP error message for codes other than code 4 is set to 500 milliseconds.

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 local-proxy-arp

This command specifies whether a local proxy ARP reply can be returned.

Syntax

To set information:

ip local-proxy-arp

To delete information:

no ip local-proxy-arp

Input mode

`(config-if)`

VLAN interface

Parameters

None

Default behavior

A local proxy ARP reply is not returned.

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 only interfaces in special environments described below. If you use the command in an ordinary network environment, multiple responses are generated for an ARP request, which might cause the network to run incorrectly.
   - Terminals in a subnet cannot directly communicate with each other.
   - Broadcast is prohibited.
2. When you set this command, communication between terminals in the same subnet is also forwarded via the Switch. In this case, ICMP redirection messages are frequently sent. We therefore recommend that you use the "no ip redirects" command to disable the ICMP redirection function.

Related commands

ip redirects (global)

ip redirects (interface)

ip mtu

This command specifies the MTU length of IP packets sent on the interface.

Syntax

To set or change information:

ip mtu <length>

To delete information:

no ip mtu

Input mode

(config-if)

VLAN interface

Parameters

<length>

Specifies the MTU length of IP packets sent on the 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 "Configuration Command Reference Vol. 1, mtu".

Use the "show ip interface", "show ipv6 interface", or "show ip-dual interface" command to check the IP MTU length being used.

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.
2. This setting also takes effect for IPv6. For IPv6, the protocol specification defines that the MTU length must be 1280 or larger. Therefore, to use IPv6, do not specify a value smaller than 1280 for the MTU length.

3. When packets sent from this Switch and IPv4 packets with options are forwarded, the smallest of the following values is used as the MTU value of the VLAN interface: the MTU value of the Ethernet interface that belongs to the VLAN, the MTU value specified in the system MTU information, or the MTU value set by this command.

Related commands

mtu

ip proxy-arp

This command specifies whether a proxy ARP reply is possible.

Syntax

To set information:

no ip proxy-arp

To delete information:

ip proxy-arp

Input mode

`(config-if)`

VLAN interface

Parameters

None

Default behavior

Proxy ARP replies are enabled.

Specify no ip proxy-arp to suppress a proxy ARP reply.

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 redirects (global)

This command specifies whether ICMP/ICMPv6 redirect messages can be sent for the entire device.

Syntax

To set information:

```
no ip redirects
```

To delete information:

```
ip redirects
```

Input mode

```
(config)
```

Parameters

None

Default behavior

The sending of ICMP/ICMPv6 redirect messages is enabled. Note, however, before ICMP/ICMPv6 redirect messages can be sent, the relevant interface must also be set to allow the sending of these messages.

Impact on communication

None

When the change is applied after the function is configured

The change is applied immediately after setting values are changed.

Notes

1. This command determines whether to enable the sending function of ICMP/ICMPv6 redirect messages throughout the device. If you use this command to disable the sending of ICMP/ICMPv6 redirect messages, interface-based settings specified by using the "ip redirects" or "ipv6 redirects" command have no effect.
2. If you use this command to disable the sending function of ICMP/ICMPv6 redirect messages, the hardware does not determine whether these messages can be sent. If you use this command to enable the sending of ICMP/ICMPv6 redirect messages, packets to be redirected are forwarded through the hardware, and at the same time, the CPU receives copies of those packets. The CPU then determines whether to send the messages by using the "ip redirects" or "ipv6 redirects" command for each interface. If redirection occurs frequently, we recommend that you use this command to disable the sending function of ICMP/ICMPv6 redirect messages throughout the device in order to reduce the load on the CPU.

Related commands

ip redirects (interface)

ipv6 redirects

ip redirects (interface)

This command specifies whether ICMP redirect messages can be sent.

If a virtual interface of the VRRP is configured for the same interface and in the Master status, ICMP redirect messages are not sent irrespective of the specification of this command.

Syntax

To set information:

no ip redirects

To delete information:

ip redirects

Input mode

`(config-if)`

VLAN interface

Parameters

None

Default behavior

ICMP redirect messages are sent.

Specify no ip redirects to suppress the sending of ICMP redirect messages.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. Before ICMP redirect messages can be sent, the "ip redirects" command must be executed in global configuration mode to enable the sending function of ICMP/ICMPv6 redirect messages throughout the device.
2. Packets are passed to the CPU even if this command is used to locally disable the sending function of ICMP redirect messages. If the CPU is under a heavy load when ICMP redirect messages occur frequently, we recommend that you execute the "ip redirects" command in global configuration mode to disable the sending function of ICMP/ICMPv6 redirect messages throughout the device.

Related commands

None

ip source-route

This command specifies whether an IPv4 packet with the Source Route option can be forwarded.

Syntax

To set information:

no ip source-route

To delete information:

ip source-route

Input mode

`(config-if)`

VLAN interface

Parameters

None

Default behavior

IPv4 packets with the Source Route option are forwarded.

Specify no ip source-route to suppress the forwarding of IPv4 packets with the Source Route option.

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 subnet-broadcast

This command specifies whether a subnet broadcast IPv4 packet can be forwarded.

Use this command to determine whether broadcast IPv4 packets destined to a subnetwork can be forwarded from the interface that received the packets to the network managed by the device. There is no dependence on the broadcast address. Forwarding of subnet broadcast IPv4 packets is disabled if the directed-broadcast parameter of the "ip address" command is not set for the output-side IP address for packet forwarding.

Syntax

To set information:

no ip subnet-broadcast

To delete information:

ip subnet-broadcast

Input mode

`(config-if)`

VLAN interface

Parameters

None

Default behavior

Forwarding of subnet broadcast IPv4 packets is enabled.

Specify no ip subnet-broadcast to suppress the forwarding of subnet broadcast IPv4 packets.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

ip address

vrf forwarding [SL-L3A]

This command specifies the VRF for an interface.

Syntax

To set or change information:

vrf forwarding <vrf id>

To delete information:

no vrf forwarding

Input mode

(config-if)

VLAN interface

Parameters

<vrf id>

Specifies a VRF ID.

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 interface belongs to the global network.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. You cannot change or delete the VRF ID for an interface for which an IPv4 address or IPv6 address has been set. You need to first delete the IPv4 address or IPv6 address, and then change or delete the VRF ID. This precaution also applies when you specify a VRF for an interface that does not have a VRF specification, which requires you to change the VRF from the global network. To delete the IPv6 address, you need to delete both the "ipv6 enable" command and the "ipv6 address" command.

Related commands

ip address

ipv6 address

ipv6 enable

3 Loopback Interface (IPv4)

interface loopback

This command moves to the loopback interface level.

Syntax

To set information:

interface loopback 0

interface loopback <loopback id>

To delete information:

no interface loopback 0

no interface loopback <loopback id>

Input mode

```
(config)
```

Parameters

0

Specifies a loopback interface for the global network.

In this case, you cannot specify a VRF ID by using the "vrf forwarding" command. [SL-L3A]

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

<loopback id> [SL-L3A]

Specifies the ID for a loopback interface.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 256

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 address

ipv6 address

vrf forwarding (loopback)

ip address (loopback)

This command specifies a loopback interface IP address.

Syntax

To set information:

ip address <ip address>

To delete information:

no ip address

Input mode

`(config-if)`

Loopback interface

Parameters

<ip address>

Specifies an IPv4 address for a loopback interface. You can specify only one IPv4 address. Even if you specify multiple addresses, only the last specified address is applied.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

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 value other than 0 is specified for the "interface loopback" command, you need to specify a VRF ID by using the "vrf forwarding (loopback)" command before you specify an IP address in this command. [SL-L3A]

Related commands

None

vrf forwarding (loopback) [SL-L3A]

This command specifies the VRF for the loopback interface.

Syntax

To set or change information:

vrf forwarding <vrf id>

To delete information:

no vrf forwarding

Input mode

`(config-if)`

Loopback interface

Parameters

<vrf id>

Specifies a VRF ID.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   See "Specifiable values for parameters".

Default behavior

If a value other than 0 is specified for the loopback interface ID, then this command must be specified.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If you specify 0 in the "interface loopback" command, then you cannot specify a VRF ID by using this command. If you specify a value other than 0, you need to specify a VRF ID in this command.
2. You cannot change or delete the VRF ID for a loopback interface for which an IPv4 address or IPv6 address has been set. You need to first delete the IPv4 address or IPv6 address, and then change or delete the VRF ID.
3. Only one loopback interface can belong to a VRF. Therefore, a VRF ID that has already been specified for another loopback interface cannot be specified in this command.

Related commands

None

4 Null Interface (IPv4)

interface null

Set this command for enabling the null interface.

Syntax

To set information:

interface null 0

To delete information:

no interface null 0

Input mode

(config)

Parameters

None

Default behavior

The null interface is disabled.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. Configuring (enabling) the null interface does not count towards the capacity limit (maximum number of interfaces). For the maximum number of interfaces, see "Configuration Guide Vol. 1, 3. Capacity limit".

Related commands

ip route

ipv6 route

5 Policy-based Routing

[SL-L3A]

default

The "default" command specifies the default policy-based routing behavior. The default behavior here refers to how policy-based routing treats packets if all routes are unable to forward them.

You can specify only one default behavior setting per policy-based routing list information item.

Syntax

To set or change information:

default {permit | deny}

To delete information:

no default

Input mode

```
(config-pol)
```

Parameters

{permit | deny}

Sets the default policy-based routing behavior.

permit

Forwards packets based on the normal routing information.

deny

Discards packets.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

Default behavior

The packets are discarded.

Impact on communication

If you change the setting of the default policy-based routing behavior for policy-based routing list information that has already been set as an access list, the affected packets might temporarily be discarded.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

default-state

The "default-state" command sets the default status for a track.

Syntax

To set or change information:

default-state {up | down}

To delete information:

no default-state

Input mode

```
(config-track-object)
```

Parameters

{up | down}

Sets the default status for a track.

up

Sets the default status for a track to Up.

down

Sets the default status for a track to Down.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

Default behavior

The default status for a track is set to Down.

Impact on communication

None

When the change is applied

The change is applied when the command is set.

Notes

None

Related commands

track-object default-init-interval

disable

disable

The "disable" command stops the track behavior. Inactive tracks are placed in the state set by the "default-state" command.

Syntax

To set information:

disable

To delete information:

no disable

Input mode

```
(config-track-object)
```

Default behavior

The monitoring of tracks is not disabled.

Impact on communication

None

When the change is applied

The change is applied when the command is set.

Notes

None

Related commands

default-state

failure detection

The "failure detection" command specifies the settings that are used during failure verification for IPv4 ICMP polling monitoring.

Syntax

To set or change information:

failure detection <failure count> trial <count> interval <seconds>

To delete information:

no failure detection

Input mode

```
(config-track-object)
```

Parameters

<failure count>

Sets the number of times polling must fail for the track status to be judged as Down.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 255

trial <count>

Sets the number of polling retries during failure verification. Make sure that this value is equal to or greater than the <failure count> value.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 255

interval <seconds>

Specifies the interval (in seconds) for polling attempts to be performed during failure verification. Make sure that this value is equal to or greater than the timeout value for the polling reply wait set by the "timeout" command.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 3600

Default behavior

<failure count>: 4

trial <count>: 5

interval <seconds>: 2

Impact on communication

None

When the change is applied

The change is applied when the command is set.

Notes

1. This command can be specified only if the tracking type is IPv4 ICMP polling monitoring.
2. If the value of the interval parameter is smaller than the timeout value for polling reply waiting, the behavior will be determined assuming that the value of the interval parameter is set to the same as the timeout value for polling reply waiting.

Related commands

type icmp

recovery detection

interval

The "interval" command sets the interval of IPv4 ICMP polling monitoring.

Syntax

To set or change information:

interval <seconds>

To delete information:

no interval

Input mode

```
(config-track-object)
```

Parameters

<seconds>

Specifies the polling interval (seconds). Make sure that this value is equal to or greater than the timeout value for the polling reply wait set by the "timeout" command.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 3600

Default behavior

Polling is performed every six seconds.

Impact on communication

None

When the change is applied

The change is applied when the command is set.

Notes

1. This command can be specified only if the tracking type is IPv4 ICMP polling monitoring.
2. If the polling interval value is smaller than the timeout value for polling reply waiting, the polling interval value is automatically changed to the timeout value for polling reply waiting.

Related commands

type icmp

timeout

policy-interface

The "policy-interface" command sets routing information for policy-based routing.

Routes are selected in ascending order of the application sequence values set in the policy-based routing list information.

A maximum of eight routes can be set per policy-based routing list information item.

Syntax

To set or change information:

[<sequence>] policy-interface vlan <vlan id> next-hop <next hop ipv4> [track-object < track object id >]

To delete information:

no <sequence>

Input mode

```
(config-pol)
```

Parameters

<sequence>

Specifies the value that controls the sequence in which policy-based routing routes are applied.

1. Default value when this parameter is omitted:

   If there is no routing information for policy-based routing, 10 is set as the initial value.

   If routing information has been set, the initial value is the maximum value for the priority that has been set plus 10.

   Note, however, that if the maximum value for the application sequence is greater than 4294967284, the value cannot be omitted.

2. Range of values:

   Specify 1 to 4294967294 in decimal.

vlan <vlan id>

Specifies the ID of the packet-destination VLAN.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify an output VLAN ID.

   For VLAN IDs, see "Specifiable values for parameters".

next-hop <next hop ipv4>

Specifies a next-hop IPv4 address for the packet destination.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a next-hop IPv4 address.

Specify an address in the network that connects to the specified destination interface. However, you cannot specify the direct broadcast address of the network connected to the specified destination interface or an address that has been set on the specified destination interface.

track-object <track object id>

Specifies the ID of the track for which communication of routing information is monitored.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   A decimal number from 1 to 1024 can be specified as the track ID.

Default behavior

None

Impact on communication

If you change the routing information in policy-based routing list information that has already been set as an access list, the affected packets might temporarily be discarded.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. Before using this command, set a VLAN interface.
2. Before you specify the track-object parameter in this command, enable the tracking function for policy-based routing.
3. Before you change the VLAN interface or IP address for the VLAN ID set as a parameter of this command, clear the command settings.

Related commands

interface vlan

policy-list resequence

track-object

policy-list

The "policy-list" command specifies settings related to policy-based routing.

Entering this command switches to config-pol mode, in which policy-based routing list information for the list number can be set.

A maximum of 256 policy-based routing list information items can be set per device.

Syntax

To set or change information:

policy-list <policy list no.>

To delete information:

no policy-list <policy list no.>

Input mode

```
(config)
```

Parameters

<policy list no.>

Specifies the list number for policy-based routing list information.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 256 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. Policy-based routing list information that is used as an access list cannot be deleted.

Related commands

permit (ip access-list extended)

policy-interface

default

recover

policy-list resequence

policy-list default-aging-interval

Use this command for setting the interval during which the following monitoring is stopped: the monitoring of whether the forwarding of policy-based routing (for example, when the master switch is changed over in a stack configuration) is possible. For the forwarding destination route of policy-based routing during this period, the state before switching the master switch is applied.

Syntax

To set or change information:

policy-list default-aging-interval <seconds>

To delete information:

no policy-list default-aging-interval

Input mode

```
(config)
```

Parameters

<seconds>

Specifies, in seconds, the interval over which the monitoring of the forward ability is stopped.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 3600

Default behavior

The interval over which the monitoring of the forward ability is stopped is 200 seconds.

Impact on communication

None

When the change is applied

The change is applied when the command is set.

Notes

1. For the interval over which the monitoring of the forward ability is stopped, set a value larger than the value set by the "track-object default-aging-interval" command for the tracking function of policy-based routing.
2. While the monitoring of forward ability is stopped, if you use this command to change the interval, the monitoring of forward ability restarts when the new period minus the elapsed time has passed.
3. This setting is enabled only when stack configuration is used.

Related commands

policy-list

policy-list default-init-interval

The "policy-list default-init-interval" command sets the interval over which the monitoring of the forward ability of policy-based routing while, for example, the device is starting is temporarily stopped. During the interval set by this command, packets that are subject to policy-based routing are discarded.

Syntax

To set or change information:

policy-list default-init-interval <seconds>

To delete information:

no policy-list default-init-interval

Input mode

```
(config)
```

Parameters

<seconds>

Specifies, in seconds, the interval over which the monitoring of the forward ability is stopped.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 3600

Default behavior

The interval over which the monitoring of the forward ability is stopped is 200 seconds.

Impact on communication

None

When the change is applied

The change is applied when the command is set.

Notes

1. For the interval over which the monitoring of the forward ability is stopped, set a value larger than the value set by the "track-object default-init-interval" command for the tracking function of policy-based routing.
2. While the monitoring of forward ability is stopped, if you use this command to change the interval, the monitoring of forward ability restarts when the new period minus the elapsed time has passed.

Related commands

policy-list

policy-list resequence

The "policy-list resequence" command resets the sequence in which policy-based routing routes are applied.

Syntax

To set or change information:

policy-list resequence <policy list no.> [<starting sequence> [<increment sequence>]]

Input mode

```
(config)
```

Parameters

<policy list no.>

Specifies the list number for policy-based routing list information.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 256 in decimal.

<starting sequence>

Specifies the starting number of the sequence value.

1. Default value when this parameter is omitted:

   The initial value is 10.

2. Range of values:

   Specify 1 to 4294966494 in decimal.

<increment sequence>

Specifies the sequence-value increment.

1. Default value when this parameter is omitted:

   The initial value is 10.

2. Range of values:

   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

policy-list

policy-interface

recover

Specifies the switchback behavior of policy-based routing routes.

You can specify only one switchback behavior setting per policy-based routing list information item.

Syntax

To set or change information:

recover {on | off}

To delete information:

no recover

Input mode

```
(config-pol)
```

Parameters

{on | off}

Specifies the switchback behavior of policy-based routing routes.

on

Executes switchbacks.

off

Does not execute switchbacks.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

Default behavior

Switchback is executed.

Impact on communication

1. If you change the routes in policy-based routing list information after setting the off parameter for the list, you need to confirm that the parameter has already been applied to the list before changing the routes. You can confirm this by using the "show ip cache policy" operation command.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

recovery detection

The "recovery detection" command specifies the settings that are used during failure recovery verification for IPv4 ICMP polling monitoring.

Syntax

To set or change information:

recovery detection <success count> trial <count> interval <seconds>

To delete information:

no recovery detection

Input mode

```
(config-track-object)
```

Parameters

<success count>

Specifies the number of times polling must succeed for the track status to be judged as Up.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 255

trial <count>

Specifies the number of polling retries during failure recovery verification. Make sure that this value is equal to or greater than the <success count> value.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 255

interval <seconds>

Specifies the polling retry interval (in seconds) during failure recovery verification. Make sure that this value is equal to or greater than the timeout value for the polling reply wait set by the "timeout" command.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 3600

Default behavior

<success count>: 4

trial <count>: 5

interval <seconds>: 2

Impact on communication

None

When the change is applied

The change is applied when the command is set.

Notes

1. This command can be specified only if the tracking type is IPv4 ICMP polling monitoring.
2. If the value of the interval parameter is smaller than the timeout value for polling reply waiting, the value of the interval parameter is automatically changed to the timeout value for polling reply waiting.

Related commands

type icmp

failure detection

timeout

The "timeout" command sets the reply wait time for IPv4 ICMP polling monitoring track.

Syntax

To set or change information:

timeout <seconds>

To delete information:

no timeout

Input mode

```
(config-track-object)
```

Parameters

<seconds>

Specifies the wait time for polling in seconds. Make sure that this value is equal to or less than the value set by the "polling interval (interval)" command.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 255

Default behavior

2 seconds is used as the time to wait for polling.

Impact on communication

None

When the change is applied

The change is applied when the command is set.

Notes

1. This command can be specified only if the tracking type is IPv4 ICMP polling monitoring.

Related commands

type icmp

interval

track-object

The "track-object" command sets tracks to be monitored by the tracking function of policy-based routing. After this command is entered, the mode changes to config-track-object mode.

Syntax

To set information:

track-object <track object id>

To delete information:

no track-object <track object id>

Input mode

```
(config)
```

Parameters

<track object id>

Specifies a track ID.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 1024

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied when the command is set.

Notes

None

Related commands

type icmp

disable

default-state

interval

failure detection

recovery detection

track-object default-aging-interval

The "track-object default-aging-interval" command sets the period during which the monitoring via the policy-based routing tracking function is temporarily suspended when the master switch is switched over in a stack configuration. The state before switching of the master switch is applied to the track target during this period.

Syntax

To set or change information:

track-object default-aging-interval <seconds>

To delete information:

no track-object default-aging-interval

Input mode

```
(config)
```

Parameters

<seconds>

Specifies, in seconds, the interval over which the monitoring is stopped.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 3600

Default behavior

The interval over which the monitoring is stopped is 180 seconds.

Impact on communication

None

When the change is applied

The change is applied when the command is set.

Notes

None

Related commands

track-object default-init-interval

default-state

track-object default-init-interval

The "track-object default-init-interval" command sets the interval over which monitoring is started by the tracking function of policy-based routing when, for example, the device is being started. During the period, the objects to be tracked are placed in the state set by the "default-state" command.

Syntax

To set or change information:

track-object default-init-interval <seconds>

To delete information:

no track-object default-init-interval

Input mode

```
(config)
```

Parameters

<seconds>

Specifies, in seconds, the interval over which monitoring is started.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 3600

Default behavior

The interval over which monitoring is started is 180 seconds.

Impact on communication

None

When the change is applied

The change is applied when the command is set.

Notes

1. While the track running status is Up, if you use this command to change the interval (seconds) after performing any of the following operations, monitoring starts after the new time set for the interval ends, which starts the moment the following operation is performed:
   - Executing the "restart track-object" operation command
   - Using the "no disable" command to cancel the stopping of monitoring
   - Using the "type icmp" command to add new tracking function

Related commands

default-state

type icmp

The "type icmp" command specifies IPv4 ICMP polling monitoring as the tracking type.

Syntax

To set or change information:

type icmp [vrf <vrf id>] <destination ip address> [source <ip address>] [nexthop <ip address>] [tos <tos>] [precedence <precedence>]

To delete information:

no type

Input mode

```
(config-track-object)
```

Parameters

vrf <vrf id>

Specifies the VRF.

1. Default value when this parameter is omitted:

   The global network is to be monitored.

2. Range of values:

   Specify a VRF ID.

   For details, see "Specifiable values for parameters".

<destination ip address>

Specifies the monitoring-target address.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify an IPv4 address. Note, however, that you cannot specify a class-D address, class-E address, or 127.x.x.x.

source <ip address>

Specifies the sender address for ICMP Echo packets.

1. Default value when this parameter is omitted:

   The IPv4 address of the interface that is used to send ICMP Echo packets is used.

2. Range of values:

   Specify an IPv4 address. Note, however, that you cannot specify a class-D address, class-E address, or 127.x.x.x.

nexthop <ip address>

Specifies a next hop address that is used for sending ICMP Echo packets. The next hop that you specify must exist in a network directly connected to the Switch.

1. Default value when this parameter is omitted:

   The next hop is determined according to the routing information.

2. Range of values:

   Specify an IPv4 address. Note, however, that you cannot specify a class-D address, class-E address, or 127.x.x.x.

tos <tos>

Specifies four bits (bits 3 to 6) in the ToS field for ICMP Echo packets.

1. Default value when this parameter is omitted:

   normal(0)

2. Range of values:

   Specify 0 to 15 (in decimal) or a tos name. For tos names that can be specified, see "Configuration Command Reference Vol. 1, Table 25-6 tos names that can be specified".

precedence <precedence>

Specifies the precedence value, which is the first three bits in the ToS field of ICMP Echo packets.

1. Default value when this parameter is omitted:

   routine(0)

2. Range of values:

   Specify 0 to 7 (in decimal) or the precedence name. For precedence names that can be specified, see "Configuration Command Reference Vol. 1, Table 25-7 precedence names that can be specified".

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied when the command is set.

Notes

1. This command overwrites the existing tracking type setting.
2. The objects to be tracked are not placed in the up state if you set a broadcast address for the destination ip address parameter.

Related commands

interval

failure detection

recovery detection

6 DHCP Relay Function

ip bootp-hops

The "ip bootp-hops" command sets the threshold for the number of hops.

Syntax

To set or change information:

ip bootp-hops <Bootp Hops>

To delete information:

no ip bootp-hops

Input mode

```
(config-if)
```

VLAN interface

Parameters

<Bootp Hops>

Specifies the threshold for the number of hops (as a decimal number).

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 16

Default behavior

The threshold for the number of hops is set to 4.

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 helper-address

The "ip helper-address" command sets the address of the destination to which the DHCP relay agent forwards packets.

Syntax

To set or change information:

ip helper-address <IP Address> [<IP Address>...]

To delete information:

no ip helper-address

Input mode

`(config-if)`

VLAN interface

Parameters

<IP Address> [<IP Address>...]

Specifies one or more destination addresses to which a DHCP relay agent forwards packets.

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
   - Addresses that do not belong to class A, B, or C

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 receive IPv4 DHCP broadcast packets destined for the subnet on your IPv4 network and permit the packets to be forwarded ("ip address <ip address> <subnet mask> directedbroadcast [secondary]" configuration command), both Layer 3 forwarding and the DHCP relay agent perform forwarding.

Related commands

None

ip relay-agent-address

The "ip relay-agent-address" command sets the relay agent address (giaddr) of a DHCP/BOOTP client connection interface.

Syntax

To set or change information:

ip relay-agent-address <IP Address>

To delete information:

no ip relay-agent-address

Input mode

`(config-if)`

VLAN interface

Parameters

<IP Address>

Sets the relay agent address (giaddr) of a DHCP/BOOTP client connection interface.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   The value must match the IP address set in the interface.

Default behavior

The primary address is used.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. Use this setting to specify an address other than the primary address for the relay agent in a multihomed environment.

Related commands

None

7 DHCP Server Function

client-name

The "client-name" command specifies the host name option for a client. The host name specified by this command is used by the client when the DHCP server distributes a static IP address to the client.

Syntax

To set or change information:

client-name <Host Name>

To delete information:

no client-name

Input mode

```
(dhcp-config)
```

Parameters

<Host Name>

Specifies the name of a client. For the restrictions of characters, see RFC 1035.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   A host name that contains a maximum of 14 characters

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

default-router

The "default-router" command specifies the router option for a client. This option is a list of IP addresses that can be used by clients as the router IP address (default router) on the subnet.

Syntax

To set or change information:

default-router <IP Address> [<IP Address>...]

To delete information:

no default-router

Input mode

```
(dhcp-config)
```

Parameters

<IP Address> [<IP Address>...]

Specifies one or more router IP addresses for the subnet of a client (default router). The routers are specified according to the priority, starting from the higher ones on the left.

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
   - Addresses that do not belong to class A, B, or C

Default behavior

None (The Switches do not distribute a list of router IP addresses to the client when the client requests a router IP address. However, the Switches insert the IP address set for the client in the router IP address field and distribute the information to the client.)

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 configured for the server is 16 per DHCP address pool.

Related commands

None

dns-server

The "dns-server" command specifies the DNS server options for a client. This DNS server option is a list of DNS server IP addresses that can be used by clients.

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> [<IP Address>...]

Specifies the IP address of a DNS server that a client can use. The server addresses are specified according to the priority, starting from the higher ones on the left.

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
   - Addresses that do not belong to class A, B, or C

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 maximum number of IP addresses that can be configured for the server is 16 per DHCP address pool.

Related commands

None

domain-name

The "domain-name" command specifies the domain name option for a client. The domain name specified by using this command is used by the client as the preferred domain name and DNS resolves it to the IP address distributed to the client.

Syntax

To set or change information:

domain-name <Domain Name>

To delete information:

no domain-name

Input mode

```
(dhcp-config)
```

Parameters

<Domain Name>

Specifies the domain name to be used by the client when DNS is used to resolve the host name for the distributed IP address.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   A domain name that contains a maximum of 253 characters

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

hardware-address

The "hardware-address" command specifies the MAC address of a client when a static IP address is distributed to the client. This command is used together with the "host" command.

Syntax

To set or change information:

hardware-address <MAC Address> <protocol>

To delete information:

no hardware-address

Input mode

```
(dhcp-config)
```

Parameters

<MAC Address>

Specifies the MAC addresses corresponding to the DHCP address pool information.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify the address in hexadecimal format, separating 2-byte hexadecimal values by periods (.).

   Example: 0211.2233.4455

<protocol>

Specifies the protocol for the DHCP address pool information. To specify the protocol, you can use a symbol or numeric value.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Only ethernet (as a numeric value, only 1)

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 entered together with the "network" command.

Related commands

None

host

The "host" command specifies the static IP address to be assigned to a client when a static IP address is distributed to the client. This command is used together with the "hardware-address" command.

Syntax

To set or change information:

host <IP Address> [{<Mask> | /<Masklen>}]

To delete information:

no host

Input mode

```
(dhcp-config)
```

Parameters

<IP Address> [{<Mask> | /<Masklen>}]

Sets the IP address for the DHCP address pool information. If the mask is omitted, a mask corresponding to class A, B, or C is set.

Table 7-1: IP address range for each class

Class	IP address
Class A (/8)	1.x.x.x to 127.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 that do not belong to class A, B, or C

{<Mask> | /<Masklen>}

1. Default value when this parameter is omitted:

   A mask corresponding to class A, B, or C

2. Range of values:

   For <Mask>, specify a value in the range from 255.0.0.0 to 255.255.255.255.

   For <Masklen>, specify a value in the range from 8 to 32.

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 used together with the "network" command in the same DHCP address pool setting.
2. If there are no network or host settings for the same subnet when the "host" command is set, that subnet is included in the number of network settings. Therefore, for subnets that are beyond the maximum number of managed subnets, a static DHCP address pool cannot be provided.
3. When the "host" command is set, the optional information (set by the "client-name", "default-router", "dns-server", "domain-name", "netbios-name-server", and "netbios-node-type" commands) that will be distributed to clients is inherited from a DHCP address pool. This pool must contain the network settings for the same subnet as the specified IP address.

Related commands

None

ip dhcp dynamic-dns-update

The "ip dhcp dynamic-dns-update" command specifies whether to link dynamic DNS when distributing IP addresses.

Syntax

To set information:

ip dhcp dynamic-dns-update

To delete information:

no ip dhcp dynamic-dns-update

Input mode

```
(config)
```

Parameters

None

Default behavior

DNS is not updated.

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 dhcp excluded-address

The "ip dhcp excluded-address" command specifies the range of IP addresses in the DHCP address pool specified by using the "network" command that are to be excluded from distribution.

Syntax

To set 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>]

Specifies an IP address, or a range of IP addresses, that cannot be assigned to a DHCP client by a DHCP server.

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
   - Addresses that do not belong to class A, B, or C

Default behavior

All IP addresses in the range specified 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. If the number of DHCP address pools exceeds the maximum number when the setting for excluded addresses is deleted, you cannot delete the setting.

Related commands

None

ip dhcp key

The "ip dhcp key" command sets the authentication key to be used for authentication on the DNS server when dynamic DNS is used.

Syntax

To set or change information:

ip dhcp key <Key Name> [secret-hmac-md5 <Key>]

To delete information:

no ip dhcp key <Key Name>

Input mode

```
(config)
```

Parameters

<Key Name>

Sets the key name required for authentication on the dynamic DNS server. This name must be the same as the key name set on the dynamic DNS server.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   A name that contains a maximum of 63 characters

secret-hmac-md5 <Key>

Specifies the shared key created on the dynamic DNS server side. Use double quotation marks to enclose the key. The Switch supports only the keys generated by HMAC-MD5.

1. Default value when this parameter is omitted:

   None

2. Range of values:

   A string consisting of a maximum of 90 characters, including double quotation marks (") (the string cannot contain a space)

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 key parameter is set for the "ip dhcp zone" command, you cannot delete the ip dhcp key setting. You need to first delete the ip dhcp zone setting, and then delete the ip dhcp key setting.

Related commands

None

ip dhcp pool

The "ip dhcp pool" command sets DHCP address pool information.

Syntax

To set information:

ip dhcp pool <Pool Name>

To delete information:

no ip dhcp pool <Pool Name>

Input mode

```
(config)
```

Parameters

<Pool Name>

Specifies the name of the DHCP address pool information.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   A name that contains a maximum of 14 characters

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 can set this command to the sum of the maximum number of managed subnets and the maximum number of static IP addresses.

Related commands

None

ip dhcp zone

The "ip dhcp zone" command sets the information about the zone where DNS updating is performed when a dynamic DNS server is linked.

Syntax

To set or change information:

ip dhcp zone <Zone Name> [primary <IP Address>] [key <Key Name>]

To delete information:

no ip dhcp zone <Zone Name>

Input mode

```
(config)
```

Parameters

<Zone Name>

Specifies a DNS zone name for the domain for normal or reverse lookup. Here, the zone name must end with a dot (.).

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   A zone name that contains a maximum of 254 characters

primary <IP Address>

Specifies the IP address of the dynamic DNS server that is to be set automatically.

1. Default value when this parameter is omitted:

   None

2. Range of values:

   The following addresses cannot be set:

   - 127.0.0.0 to 127.255.255.255
   - Addresses that do not belong to class A, B, or C

key <Key Name>

Specifies the key name set in the DHCP dynamic DNS key information.

1. Default value when this parameter is omitted:

   None

2. Range of values:

   A name that contains a maximum of 63 characters

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. Before you attempt to specify the key parameter in the "ip dhcp zone" command, you need to use the "ip dhcp key" command to set the key.

Related commands

ip dhcp key

lease

The "lease" command specifies the default lease time for the IP address distributed to a client.

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}

Sets the lease time.

<time day> [<time hour> [<time min> [<time sec>]]]

Specify the lease time in days, hours, minutes, and seconds. Note that values smaller than 10 seconds cannot be set. Specify a value in the range from 10 seconds to 365 days.

infinite

Specifies an unlimited lease time.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <time day>, specify a value in the range from 0 to 365. The remaining items can be omitted.

   For <time hour>, specify a value in the range from 0 to 23. The remaining items can be omitted.

   For <time min>, specify a value in the range from 0 to 59. The remaining items can be omitted.

   For <time sec>, specify a value in the range from 0 to 59.

Default behavior

The lease time is set to one day.

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 priority.
2. If you set a static IP address, a client has a lease time of 24 hours by default. (However, if a static IP

address is assigned to the client, the lease limit is not displayed by the "show ip dhcp binding" command.) In addition, if there is a DHCP address pool that contains the network setting for the same subnet as the static IP address, the lease time for that DHCP address pool has priority.

3. The "lease" command is ignored for a DHCP address pool in which a static IP address has been set.
4. 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 very limited cases such as temporary IP addresses that will be used only for a short period of time. Also, make sure that the client can work reliably if a short lease time is set.

Related commands

None

max-lease

The "max-lease" command specifies the maximum lease time allowed when a client requests an IP address with a specific lease time.

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}

Specifies the maximum lease time when a client specifies a time.

<time day> [<time hour> [<time min> [<time sec>]]]

Specifies the maximum lease time in days, hours, minutes, and seconds. Note that values smaller than 10 seconds cannot be set. Specify a value in the range from 10 seconds to 365 days.

infinite

Specifies the maximum lease time as unlimited.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <time day>, specify a value in the range from 0 to 365. The remaining items can be omitted.

   For <time hour>, specify a value in the range from 0 to 23. The remaining items can be omitted.

   For <time min>, specify a value in the range from 0 to 59. The remaining items can be omitted.

   For <time sec>, specify a value in the range from 0 to 59.

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. If you set a static IP address, a client has a maximum lease time of 24 hours by default. In addition, if there is a DHCP address pool that contains the network setting for the same subnet as the static IP ad-

dress, the maximum lease time for that DHCP address pool has priority.

2. The "max-lease" command is ignored for a DHCP address pool in which a static IP address has been set.
3. 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 very limited cases such as temporary IP addresses that will be used only for a short period of time. Also, make sure that the client can work reliably if a short lease time is set.

Related commands

None

netbios-name-server

The "netbios-name-server" command specifies the NetBIOS name server options (NBNS/WINS servers) for a client. The NetBIOS name server option is a list of IP addresses of NetBIOS name servers (NBNS/WINS servers) that can be used by clients.

Syntax

To set or change information:

netbios-name-server <IP Address> [<IP Address>...]

To delete information:

no netbios-name-server

Input mode

```
(dhcp-config)
```

Parameters

<IP Address> [<IP Address>...]

Specifies the IP address of a NetBIOS name server (NBNS/WINS server). The server addresses are specified according to the priority, starting from the higher ones on the left.

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
   - Addresses that do not belong to class A, B, or C

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 maximum number of IP addresses that can be configured for the server is 16 per DHCP address pool.

Related commands

None

netbios-node-type

The "netbios-node-type" command specifies the NetBIOS node type option for a client. A NetBIOS node type indicates the name resolution method used by the client when NetBIOS over TCP/IP is used.

Syntax

To set or change information:

netbios-node-type {b-node | p-node | m-node | h-node}

To delete information:

no netbios-node-type

Input mode

```
(dhcp-config)
```

Parameters

{b-node | p-node | m-node | h-node}

Specifies the node type of the NetBIOS over TCP/IP client (NetBIOS name resolution method). The meaning of each node type is as follows:

- b-node: Broadcast node
- p-node: Peer to peer node (WINS only)
- m-node: Mixed node (WINS is used when the IP address is not found by a broadcast)
- h-node: Hybrid node (broadcasting is used when the IP address is not found by WINS)

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

network

The "network" command specifies the subnet of the network to which an IP address is dynamically distributed by DHCP. IP addresses whose host name portion is set to all 0s or all 1s are not included in the DHCP address pool.

Syntax

To set or change information:

network <IP Address> [{<Mask> | /<Masklen>}]

To delete information:

no network

Input mode

```
(dhcp-config)
```

Parameters

<IP Address> [{<Mask> | /<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 7-2: IP address range for each class

Class	IP address
Class A (/8)	1.x.x.x to 127.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 not 0
   - Addresses that do not belong to class A, B, or C

{<Mask> | /<Masklen>}

1. Default value when this parameter is omitted:

   A mask corresponding to class A, B, or C

2. Range of values:

   For <Mask>, specify a value in the range from 255.0.0.0 to 255.255.255.255.

   For <Masklen>, specify a value in the range from 8 to 32.

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 IP addresses ensured for the DHCP address pool are IP addresses that exclude those where the bits in the host part of the target subnet are all 1s or all 0s. Therefore, use the "ip dhcp excluded-address" command in advance to designate IP addresses that should not be distributed.
2. This command cannot be set together with the "host" and "hardware-address" commands in the same DHCP address pool setting.
3. DHCP address pools that contain network settings can be created up to the maximum number of managed subnets. If there are no network or host settings that have the same subnet when the "host" command is set, that new subnet is counted towards the maximum number of network settings (managed subnets).

Related commands

None

service dhcp

The "service dhcp" command specifies the interface on which a DHCP server is enabled. Only the interface with this configuration receives DHCP packets.

Syntax

To set information:

service dhcp vlan <vlan id>

To delete information:

no service dhcp vlan <vlan id>

Input mode

```
(config)
```

Parameters

vlan <vlan id>

Specifies 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:

   For <vlan id>, specify the VLAN ID set by the "interface vlan" command.

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

8 UDP Broadcast Relays

ip udp forward helper-address

The "ip udp forward helper-address" command specifies the forwarding destination IPv4 address of UDP packets by UDP broadcast relay.

Syntax

To set or change information:

ip udp forward helper-address <ip address> [<ip address>...]

To delete information:

no ip udp forward helper-address

Input mode

```
(config-if)
```

VLAN interface

Parameters

<ip address> [<ip address>...]

Specifies the forwarding destination IPv4 address of UDP packets to be relayed.

A maximum of 16 addresses can be specified.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   The following addresses cannot be set:

   - 0.0.0.0 to 0.255.255.255
   - 127.0.0.0 to 127.255.255.255
   - Addresses that do not belong to class A, B, or C

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 subnet-broadcast

ip address

ip udp forward port

The "ip udp forward port" command specifies the destination port number of UDP packets to be forwarded by UDP broadcast relay.

Syntax

To set or change information:

ip udp forward port <port> [<port>...]

To delete information:

no ip udp forward port

Input mode

`(config-if)`

VLAN interface

Parameters

<port> [<port>...]

Specifies the destination port number of the UDP packet to be forwarded.

A maximum of 16 port numbers can be specified.

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

ip udp forward subnet-broadcast

The "ip udp forward subnet-broadcast" command specifies whether to forward UDP packets if their destination IPv4 address is the subnet broadcast address.

Syntax

To set information:

ip udp forward subnet-broadcast

To delete information:

no ip udp forward subnet-broadcast

Input mode

```
(config-if)
```

VLAN interface

Parameters

None

Default behavior

UDP packets are forwarded only if the destination IPv4 address is a restricted broadcast address (255.255.255.255 or 0.0.0.0). If the destination IPv4 address is a subnet broadcast address, UDP packets are not forwarded.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

9 Routing Options (IPv4)

ip auto-class-route

The "ip auto-class-route" command specifies the automatic generation of natural routes for a subnetted broadcast type interface.

A natural route is a directly connected route that has a mask length corresponding to an IP address class (8 bits for class A, 16 bits for class B, or 24 bits for class C). This route is not installed in the forwarding table, but can be distributed by using a routing protocol.

Syntax

To set information:

ip auto-class-route

To delete information:

no ip auto-class-route

Input mode

```
(config)
```

Parameters

None

Default behavior

Natural routes are not generated automatically.

Impact on communication

None

When the change is applied

The setting takes effect immediately.

Notes

None

Related commands

None

routing options delete-delay

The "routing options delete-delay" command specifies the value of the route deletion delay timer.

Syntax

To set or change information:

routing options delete-delay <Seconds>

To delete information:

no routing options delete-delay

Input mode

```
(config)
```

Parameters

<Seconds>

Specifies the value of the route deletion delay timer in seconds.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 0 to disable the route deletion delay function, or specify a value from 5 to 4294967295 in decimal (seconds).

Default behavior

The route deletion delay function is disabled.

Impact on communication

None

When the change is applied

The setting takes effect immediately.

Notes

None

Related commands

None

routing options graceful-restart time-limit [SL-L3A]

The "routing options graceful-restart time-limit" command specifies the maximum length of time during which the Switch will initiate a graceful restart and retain the route.

Syntax

To set or change information:

routing options graceful-restart time-limit <Seconds>

To delete information:

no routing options graceful-restart time-limit

Input mode

```
(config)
```

Parameters

<Seconds>

Specifies the maximum length of time for which to retain routes (in seconds).

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 3600 in decimal.

Default behavior

The initial value is 300 seconds.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

graceful-restart mode (OSPF) (OSPFv3)

graceful-restart restart-time (OSPF) (OSPFv3)

bgp graceful-restart mode

bgp graceful-restart restart-time

10 Route Summary (IPv4)

ip summary-address

The "ip summary-address" command generates an IPv4 summarized route.

Syntax

To set or change information:

ip summary-address [vrf <vrf id>] <IPv4-Prefix> <Mask> [<Distance>] [as-set] [noinstall] [summary-only]

To delete information:

no ip summary-address [vrf <vrf id>] <IPv4-Prefix > <Mask>

Input mode

```
(config)
```

Parameters

vrf <vrf id> [SL-L3A]

Specifies the VRF to which the route belongs.

1. Default value when this parameter is omitted:

   The route belongs to the global network.

2. Range of values:

   For <vrf id>, specify a VRF ID.

   For details, see "Specifiable values for parameters".

<IPv4-Prefix>

Specifies an aggregated address.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify an IPv4 address.

   Note: For <IPv4-Prefix>, set 0 to the bits outside the range of <Mask>.

<Mask>

Specifies an aggregated address mask.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify an IPv4 address mask.

   Note: Specify the address mask so that when it is converted to a binary number, all bits after the first bit that is 0 are set to 0.

<Distance>

Specifies the distance value of the summarized route.

1. Default value when this parameter is omitted:

   130

2. Range of values:

   Specify 2 to 255 in decimal. 2 indicates the highest priority, and 255 indicates the lowest priority.

as-set

Specifies that AS_SET is generated when the AS_PATH attribute for a summarized route is generated.

1. Default value when this parameter is omitted:

   AS_SET is not generated when the AS_PATH attribute for a summarized route is generated.

2. Range of values:

   None

noinstall

Specifies that summarized routes will not be registered in the forwarding table. However, summarized routes can be distributed by using a routing protocol. Specify this parameter if you want to advertise summarized routes to an external destination by using another routing protocol, but do not want to discard packets via the summarized route.

1. Default value when this parameter is omitted:

   Summarized routes are registered in the forwarding table.

2. Range of values:

   None

summary-only

Suppresses advertisement of summarization source routes when summarized routes are advertised. When routes are summarized, use the summary-only parameter if you want to advertise only summarized routes while suppressing advertisement of summarization source routes.

1. Default value when this parameter is omitted:

   Advertisement of summarization source routes is not suppressed.

2. Range of values:

   None

Default behavior

Summarized routes are not generated.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. Routes for which a loopback interface or null interface is set as the next hop cannot be used as summarization source routes.

Related commands

distribute-list out (RIP) (OSPF) (BGP4)

redistribute (RIP) (OSPF) (BGP4)

neighbor out (BGP4)

11 Static Routing (IPv4)

ip route

The "ip route" command generates an IPv4 static route.

Syntax

To set or change information:

ip route [vrf <vrf id>] <IPv4-Prefix> <Mask> <Nexthop-Address> [<Distance>] [weight <Weight>] [tag <Tag>] [{noinstall | reject}] [poll] [noresolve]

ip route [vrf <vrf id>] <IPv4-Prefix> <Mask> <Nexthop-Address> <interface type> <interface number> [<Distance>] [weight <Weight>] [tag <Tag>] [{noinstall | reject}] [poll] [noresolve]

ip route [vrf <vrf id>] <IPv4-Prefix> <Mask> <Nexthop-Address> {vrf <nexthop vrf id> | global} [<Distance>] [weight <Weight>] [tag <Tag>] [{noinstall | reject}] [poll] [noresolve]

ip route [vrf <vrf id>] <IPv4-Prefix> <Mask> <interface type> <interface number> [<Distance>] [weight <Weight>] [tag <Tag>]

To delete information:

no ip route [vrf <vrf id>] <IPv4-Prefix> <Mask> <Nexthop-Address>

no ip route [vrf <vrf id>] <IPv4-Prefix> <Mask> <Nexthop-Address> <interface type> <interface number>

no ip route [vrf <vrf id>] <IPv4-Prefix> <Mask> <Nexthop-Address> {vrf <nexthop vrf id> | global}

no ip route [vrf <vrf id>] <IPv4-Prefix> <Mask> <interface type> <interface number>

Input mode

```
(config)
```

Parameters

vrf <vrf id> [SL-L3A]

Specifies the VRF to which the route belongs.

1. Default value when this parameter is omitted:

   The route belongs to the global network.

2. Range of values:

   For <vrf id>, specify a VRF ID.

   For details, see "Specifiable values for parameters".

<IPv4-Prefix>

Specifies the destination IPv4 address.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify an IPv4 address.

   Note: For <IPv4-Prefix>, set 0 to the bits outside the range of <Mask>.

<Mask>

Specifies the destination IP address mask.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify an IP address mask.

   Note: Specify the address mask so that when it is converted to a binary number, all bits after the first bit that is 0 are set to 0.

<Nexthop-Address>

Specifies the next hop address of the route.

1. Default value when this parameter is omitted:

   The next hop is not specified.

2. Range of values:

   Specify an IPv4 address.

<interface type> <interface number>

Specifies the interface used for resolving the next hop. If the route that resolves the next hop is different from the specified interface, that route is not enabled.

1. Default value when this parameter is omitted:

   When <Nexthop-Address> is specified:

   The interface used for resolving the next hop is not specified.

   When <Nexthop-Address> is not specified:

   This parameter cannot be omitted.

2. Range of values:

   For <interface type> <interface number>, you can specify the interface name and interface number corresponding to the following interface type groups. For details, see "■How to specify the interface" in "Specifiable values for parameters".

   When <Nexthop-Address> is specified:

   - VLAN interface

   When <Nexthop-Address> is not specified:

   - Null interface

{vrf <nexthop vrf id> | global} [SL-L3A]

Specifies that either the VRF to which the next hop belongs, or the next hop, belongs to the global network.

<nexthop vrf id>

Specifies the VRF to which the next hop belongs.

global

Specifies that the next hop belongs to the global network.

1. Default value when this parameter is omitted:

   The next hop belongs to the same VRF as the route.

2. Range of values:

   For <nexthop vrf id>, specify a VRF ID that is in the same range of values as <vrf id>.

   For the setting range of <vrf id>, see "Specifiable values for parameters".

<Distance>

Specifies the distance value of the route.

1. Default value when this parameter is omitted:

   2

2. Range of values:

   Specify 2 to 255 in decimal. 2 indicates the highest priority, and 255 indicates the lowest priority.

weight <Weight>

Specifies the priority of the route. This parameter is used for determining the priority of the different routes to a destination.

1. Default value when this parameter is omitted:

   0

2. Range of values:

   For <Weight>, specify 0 to 255 in decimal. 255 indicates the highest priority, and 0 indicates the lowest priority.

tag <Tag>

Specifies the tag value to be added to the route.

1. Default value when this parameter is omitted:

   0

2. Range of values:

   For <Tag>, specify 0 to 4294967295 in decimal.

{noinstall | reject}

noinstall

Specifies that static routes will not be registered in the forwarding table. However, static routes can be distributed by using a routing protocol. Specify this parameter if you want to advertise a static route to an external destination by using another routing protocol, but do not want to use it for forwarding packets on the Switch.

reject

Specify this parameter to generate static routes as rejected routes. Specify this parameter if you want to discard packets that match the static route.

1. Default value when this parameter is omitted:

   The static route is generated as a non-reject route, and registered in the forwarding table.

2. Range of values:

   None

poll

Specifies that polling for checking reachability is enabled for the next hop. You can specify polling only when a next hop address is specified.

1. Default value when this parameter is omitted:

   Polling is disabled.

2. Range of values:

   None

noresolve

Uses only directly connected routes to resolve the next hop on static routes.

1. Default value when this parameter is omitted:

   All routes# including directly connected routes are used to resolve the next hop on static routes.

   #: A static route without a noresolve specification cannot be used as a next-hop resolution route.

2. Range of values:

   None

Default behavior

IPv4 static routes are not generated.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. You cannot configure a multipath route between next hops in different VRFs.

   The next hops that configure a multipath route are selected from among the next hops in the same VRF as the next hop with the highest weight value (that is enabled).

   In the following example, the two next hops that configure a multipath route are 172.16.1.1 and 172.16.3.1:

   ip route vrf 10 10.1.1.0 255.255.255.0 172.16.1.1 vrf 20 weight 30

   ip route vrf 10 10.1.1.0 255.255.255.0 172.16.2.1 vrf 10 weight 20

   ip route vrf 10 10.1.1.0 255.255.255.0 172.16.3.1 vrf 20 weight 10

Related commands

ip route static poll-interval

ip route static poll-multiplier

ip route static maximum-paths

ip route static maximum-paths

The "ip route static maximum-paths" command specifies the maximum number of paths (maximum number of next hops) to be generated for static routing information.

The maximum number of paths that can be generated as a multipath static route is the value specified in this command or the upper limit of the Switch, whichever is smaller.

Syntax

To set or change information:

ip route static maximum-paths <Number>

To delete information:

no ip route static maximum-paths

Input mode

```
(config)
```

Parameters

<Number>

Specifies the maximum number of paths (maximum number of next hops).

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 16 in decimal.

Default behavior

The initial value is set to 6.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

If a warning-level operation message is output, then the change is applied by restarting the device.

Notes

None

Related commands

ip route

ip route static poll-interval

The "ip route static poll-interval" command specifies the polling interval for a next hop.

Syntax

To set or change information:

ip route static poll-interval <Seconds>

To delete information:

no ip route static poll-interval

Input mode

```
(config)
```

Parameters

<Seconds>

Specifies the polling interval (seconds).

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 0 to 180 (seconds) in decimal.

   If you specify 0, polling stops.

Default behavior

The initial value is set to 5 second.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

ip route

ip route static poll-multiplier

ip route static poll-multiplier

The "ip route static poll-multiplier" command specifies the number of times polling is performed for a next hop, and the number of consecutive responses.

Syntax

To set or change information:

ip route static poll-multiplier <Invalid-Count> <Restore-Count>

To delete information:

no ip route static poll-multiplier

Input mode

```
(config)
```

Parameters

<Invalid-Count>

Specifies the number of times polling is performed. The static route for which polling is specified is disabled if no response is received within the specified number of consecutive polls.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 65535 in decimal.

<Restore-Count>

Specifies the number of consecutive responses required to restore a route. A static route that was disabled due to no response to polling will be re-enabled (restored) if responses to the specified number of consecutive polls are received from the next hop of that static route.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 65535 in decimal.

Default behavior

The following initial values are set.

- Number of times polling is performed: 3
- Number of consecutive responses: 1

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

ip route

ip route static poll-interval

12 RIP

address-family ipv4 [SL-L3A]

The "address-family ipv4" command switches to config-router-af mode to configure the settings for each VRF.

Syntax

To set information:

address-family ipv4 vrf <vrf id>

To delete information:

no address-family ipv4 vrf <vrf id>

Input mode

```
(config-router)
```

Parameters

vrf <vrf id>

Specifies the VRF.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <vrf id>, specify a VRF ID.

   For details, see "Specifiable values for parameters".

Default behavior

RIP is not running on the specified VRF.

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 information set by this command, all information set by the commands in the relevant config-router-af mode is deleted.
2. The information set by this command is deleted if you delete all information set by the commands in config-router-af mode.

Related commands

None

auto-summary

The "auto-summary" command enables automatic summary for RIP advertised routes.

This function automatically summarizes multiple subnet routes as a single natural mask route, and advertises it to neighboring routers.

This function is supported in both RIP-1 and RIP-2.

If you set the command in config-router mode, the setting applies to the global network.

If you set the command in config-router-af mode, the setting applies to the specified VRF.

Syntax

To set information:

auto-summary

To delete information:

no auto-summary

Input mode

```
(config-router)
(config-router-af)
```

Parameters

None

Default behavior

Automatic summary for RIP advertised routes is disabled.

Impact on communication

None

When the change is applied

The change is applied the next time the routes are advertised.

Notes

1. If you specify this configuration when RIP-1 is used, subnet routes that were not advertised before this configuration was set are summarized as a natural mask route and advertised to neighboring routers.

Related commands

None

default-metric

The "default-metric" command specifies the metric value to be used when routing information learned by another protocol is advertised by RIP. Metric values set by the "redistribute" or "distribute-list out" command have priority over the metric information specified by this command. This command is valid on static routes, OSPF routes, BGP4 routes, and routes imported from VRFs or global networks.

If you set the command in config-router mode, the setting applies to the global network.

If you set the command in config-router-af mode, the setting applies to the specified VRF.

Syntax

To set or change information:

default-metric <Metric>

To delete information:

no default-metric

Input mode

```
(config-router)
(config-router-af)
```

Parameters

<Metric>

Specifies a metric value.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 16 in decimal.

Default behavior

The following initial values are set.

- Static routes: Metric 1
- Routes other than static routes: Metric 16

Impact on communication

None

When the change is applied

The change is applied the next time the routes are advertised.

Notes

None

Related commands

inherit-metric

distribute-list out

redistribute

metric-offset

disable

The "disable" command disables RIPs.

If you set the command in config-router mode, the setting applies to the global network.

If you set the command in config-router-af mode, the setting applies to the specified VRF.

Syntax

To set information:

disable

To delete information:

no disable

Input mode

```
(config-router)
(config-router-af)
```

Parameters

None

Default behavior

RIP is 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

distance

The "distance" command specifies the distance value for routing information learned by RIP. A distance value specified by the "distribute-list in" command has priority over that specified by the "distance" command.

If you set the command in config-router mode, the setting applies to the global network.

If you set the command in config-router-af mode, the setting applies to the specified VRF.

Syntax

To set or change information:

distance <Distance>

To delete information:

no distance

Input mode

```
(config-router)
(config-router-af)
```

Parameters

<Distance>

Specifies the distance value for RIP.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 2 to 255 in decimal. 2 indicates the highest priority, and 255 indicates the lowest priority.

Default behavior

The initial value is set to 120.

Impact on communication

None

When the change is applied

The change is applied the next time the routes are learned.

Notes

None

Related commands

None

exit-address-family [SL-L3A]

The "exit-address-family" command exits config-router-af mode, and returns to config-router mode.

Syntax

To set information:

exit-address-family

Input mode

```
(config-router-af)
```

Parameters

None

Default behavior

This command is automatically set when a configuration is set in config-router-af mode.

Impact on communication

None

When the change is applied

None

Notes

1. Use this command to copy and paste configuration entries that have already been set. To set a configuration on a command line, use the "exit" command.

Related commands

address-family ipv4

generate-secondary-route

The "generate-secondary-route" command registers a secondary route in the routing table.

If you set the command in config-router mode, the setting applies to the global network.

If you set the command in config-router-af mode, the setting applies to the specified VRF.

Syntax

To set information:

generate-secondary-route

To delete information:

no generate-secondary-route

Input mode

```
(config-router)
(config-router-af)
```

Parameters

None

Default behavior

A secondary route is not registered in the routing table.

Impact on communication

None

When the change is applied

The change is applied the next time the routes are learned.

Notes

None

Related commands

None

inherit-metric

The "inherit-metric" command specifies that the metric value is to be inherited when routing information learned by another routing protocol is advertised by RIP.

If you set the command in config-router mode, the setting applies to the global network.

If you set the command in config-router-af mode, the setting applies to the specified VRF.

Syntax

To set information:

inherit-metric

To delete information:

no inherit-metric

Input mode

```
(config-router)
(config-router-af)
```

Parameters

None

Default behavior

The metric value is not inherited.

Impact on communication

None

When the change is applied

The change is applied the next time the routes are advertised.

Notes

None

Related commands

default-metric

distribute-list out

redistribute

metric-offset

ip rip authentication key

The "ip rip authentication key" command specifies the authentication method and authentication key for RIP-2 packets. This command is valid when ip rip version 2 is specified in config-if mode, or when version 2 is specified in config-router mode or config-router-af mode. In other cases, the command is invalid.

Syntax

To set or change information:

ip rip authentication key <key id> {text | md5} <key>

To delete information:

no ip rip authentication key <key id>

Input mode

(config-if)

VLAN interface

Parameters

<key id>

Specifies the key identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 0 to 255 in decimal.

{text | md5}

Specifies the authentication method.

text

Plain-text password authentication is specified.

md5

Encrypted authentication (Keyed-MD5) is specified.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

<key>

Specifies the authentication key.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a string consisting of 1 to 16 characters.

   However, you cannot use the following characters:

Exclamation mark (!), double quotation mark ("), hash mark (#), dollar sign ($), semicolon (;), grave accent mark (`), left curly bracket ({), right curly bracket (}), space character, left angle bracket (<), right angle bracket (>), backslash character (\), quotation mark ('), left parenthesis ((), right parenthesis ()), vertical bar (|), and ampersand (&)

Default behavior

Authentication is disabled.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. Use the same authentication key for all routers in the same network. Generally, make sure that only one authentication key exists in the setting except when the setting is being changed for transition to a new authentication key.

Related commands

ip rip version

version

ip rip v2-broadcast

The "ip rip v2-broadcast" command specifies that packets are to be broadcast. This command is valid when ip rip version 2 is specified in config-if mode, or when version 2 is specified in config-router mode. In other cases, the command is invalid.

Syntax

To set information:

ip rip v2-broadcast

To delete information:

no ip rip v2-broadcast

Input mode

(config-if)

VLAN interface

Parameters

None

Default behavior

The sending type is determined based on the version information specified in config-if or config-router mode.

Impact on communication

None

When the change is applied

The change is applied the next time the routes are advertised.

Notes

1. This command is used to broadcast advertisements of the routes in RIP-2 message format that match the conditions for RIP-2 route advertisement.

Related commands

ip rip version

version

ip rip version

The "ip rip version" command specifies the RIP version and the type of message destination IP address used for the interface. The specified value has priority over the version specified in config-router mode.

The following table lists the RIP version and the type of destination IP address that are used depending on the value set by the command.

Table 12-1: RIP version and type of destination IP address

No.	Setting value	Version	Type of destination IP address
1	When this command is omitted	1#	Broadcast#
2	ip rip version 1	1	Broadcast
3	ip rip version 2	2	Multicast

#

If there is a version specified in config-router mode, that version is applied.

Syntax

To set or change information:

ip rip version { 1 | 2 }

To delete information:

no ip rip version

Input mode

(config-if)

VLAN interface

Parameters

{ 1 | 2 }

Specifies the version.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

Default behavior

The initial value is set to 1.

Impact on communication

None

When the change is applied

The change is applied the next time the routes are learned or advertised.

Notes

None

Related commands

ip rip v2-broadcast

version

metric-offset

The "metric-offset" command specifies the metric value increment when RIP packets are sent or received via the interface.

If you set the command in config-router mode, the setting applies to the global network.

If you set the command in config-router-af mode, the setting applies to the specified VRF.

Syntax

To set or change information:

metric-offset <Metric> vlan <vlan id> { in | out }

To delete information:

no metric-offset [<Metric>] vlan <vlan id> { in | out }

Input mode

```
(config-router)
(config-router-af)
```

Parameters

<Metric>

Specifies a metric value increment.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 0 to 16 in decimal.

vlan <vlan id>

Specifies the interface to which the metric value will be added.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <vlan id>, specify the VLAN ID set by the "interface vlan" command.

{ in | out }

in

Specify this to add the metric when packets are received.

out

Specify this to add the metric when packets are sent.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

Default behavior

- The metric value increment when packets are received is set to 1.
- The metric value increment when packets are sent is set to 0.

Impact on communication

None

When the change is applied

The change is applied the next time the routes are learned or advertised.

Notes

None

Related commands

default-metric

inherit-metric

distribute-list in

distribute-list out

neighbor

The "neighbor" command specifies the neighboring router to which RIP packets are sent.

If you set the command in config-router mode, the setting applies to the global network.

If you set the command in config-router-af mode, the setting applies to the specified VRF.

Syntax

To set information:

neighbor <IPv4-Address>

To delete information:

no neighbor <IPv4-Address>

Input mode

```
(config-router)
(config-router-af)
```

Parameters

<IPv4-Address>

Specifies the destination neighboring router.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify an IPv4 address.

Default behavior

The destination neighboring router is not specified.

Impact on communication

None

When the change is applied

The change is applied the next time the routes are advertised.

Notes

1. The following table describes the packet sending operations (broadcast type interface) for the "neighbor" command.

Table 12-2: Packet sending conditions (broadcast type interface) for the neighbor command

No.	Condition	Behavior
1	No network setting exists, or the neighbor setting is beyond the specifiable range of the network setting.	RIP packets are not sent to the router specified by the "neighbor" command.

No.	Condition	Behavior
2	The neighbor setting is within the specifiable range of the network setting, and the "passive-interface" command does not explicitly suppress the interface connected to the network of the router specified by the "neighbor" command.	RIP packets are sent by unicast to the neighboring router specified in the neighbor setting, and are sent by broadcast (multicast) to the interface specified in the network setting.
3	The neighbor setting is within the specifiable range of the network setting, and the "passive-interface" command explicitly suppresses the interface connected to the network of the router specified by the "neighbor" command.	RIP packets are sent by unicast only to the neighboring router specified in the neighbor setting.

Related commands

network

passive-interface

distribute-list out

network

The "network" command specifies the destination network for RIP transmission. RIP packets are sent and received on interfaces within the specified network range. RIP packets are not sent or received on interfaces outside the range.

If you set the command in config-router mode, the setting applies to the global network.

If you set the command in config-router-af mode, the setting applies to the specified VRF.

Syntax

To set information:

network <IPv4-Prefix> [<Wildcard-Mask>]

To delete information:

no network <IPv4-Prefix> [<Wildcard-Mask>]

Input mode

```
(config-router)
(config-router-af)
```

Parameters

<IPv4-Prefix>

Specifies the destination network for RIP transmission.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify an IPv4 address.

   Note: Set all the bits specified for <Wildcard-Mask> of <IPv4-Prefix> to 0.

<Wildcard-Mask>

Specifies a wildcard mask.

1. Default value when this parameter is omitted:

   A wildcard mask is automatically calculated based on the destination network address.

   The following table lists the wildcard masks that are automatically generated.

   Table 12-3: Wildcard masks that are automatically generated

No.	Destination network address	Wildcard mask
1	0.0.0.0	255.255.255.255
2	class-A address	0.255.255.255
3	class-B address	0.0.255.255
4	class-C address	0.0.0.255

2. Range of values:

   Specify in IPv4 address format.

   Note: Specify the wildcard mask so that when it is converted to a binary number, all bits after the

first 1 bit are set to 1.

Default behavior

RIP packets are not sent.

Impact on communication

None

When the change is applied

The change is applied the next time the routes are learned or advertised.

Notes

1. Advertisement of direct routes applies only to direct routes within the range specified by the "network" command. Note that direct routes outside this range are not advertised.

Related commands

neighbor

passive-interface

distribute-list in

distribute-list out

passive-interface

The "passive-interface" command disables a specified interface from sending routing information in RIP packets. Use this command if you do not want to notify other routers of routing information (for example, when the remote router is using static routing). This command can control only the interfaces enabled for sending RIP packets in the network setting.

If you set the command in config-router mode, the setting applies to the global network.

If you set the command in config-router-af mode, the setting applies to the specified VRF.

Syntax

To set information:

passive-interface {default | vlan <vlan id>}

To delete information:

no passive-interface {default | vlan <vlan id>}

Input mode

```
(config-router)
(config-router-af)
```

Parameters

{default | vlan <vlan id>}

Specifies the interface to be prevented from sending RIP packets.

default

Prevents all interfaces from sending RIP packets.

vlan <vlan id>

Specifies the interface to be prevented from sending RIP packets.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <vlan id>, specify the VLAN ID set by the "interface vlan" command.

Default behavior

Routing information is sent in RIP packets.

Impact on communication

None

When the change is applied

The change is applied the next time the routes are advertised.

Notes

1. Specify the "passive-interface default" command to suppress all interfaces that can send RIP packets from sending the packets. In this state, if you specify the "no passive-interface vlan <vlan id>" command, the specified interface becomes available for sending the packets. A configuration example is shown below.

   Example 1

   (1) To suppress only vlan 2 from sending the packets, enter the following command:

   (config-router)# passive-interface vlan 2

   (2) To enable vlan 2 for sending the packets in the above state, enter the following command:

   (config-router)# no passive-interface vlan 2

   Note: Entering the above command deletes the setting.

   Example 2

   (1) To suppress all interfaces from sending the packets, enter the following command:

   (config-router)# passive-interface default

   (2) To enable only vlan 3 for sending the packets in the above state, enter the following command:

   (config-router)# no passive-interface vlan 3

   Note: The above command does not delete settings.

   (3) To enable all interfaces for sending the packets in the state (2) above, enter the following command:

   (config-router)# no passive-interface default

   Note: Entering the above command deletes the setting.

Related commands

network

neighbor

distribute-list out

router rip

The "router rip" command configures router settings related to the RIP routing protocol. After this command is entered, the mode changes to config-router mode.

Syntax

To set information:

router rip

To delete information:

no router rip

Input mode

```
(config)
```

Parameters

None

Default behavior

RIP is disabled.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. Sending and receiving RIP packets is not enabled simply by specifying this command. For sending and receiving RIP packets, see "network".

Related commands

network

timers basic

The "timers basic" command specifies the values of the various RIP timers.

If you set the command in config-router mode, the setting applies to the global network.

If you set the command in config-router-af mode, the setting applies to the specified VRF.

Syntax

To set or change information:

timers basic <Update> <Aging> <Garbage-Collection>

To delete information:

no timers basic

Input mode

```
(config-router)
(config-router-af)
```

Parameters

<Update>

Specifies the value of the periodic advertisement timer in seconds.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 60 in decimal.

<Aging>

Specifies the value of the aging timer in seconds.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 360 in decimal.

<Garbage-Collection>

Specifies the time (seconds) that can elapse after the route is disabled until it is deleted from the routing table. During the specified period of time, the route is advertised with Metric 16 to the RIP destination.

Notes

The timer value that is actually applied will be a multiple of the periodic advertisement timer value.

If the setting is not a multiple of the periodic advertisement timer value and is greater than that timer value, the multiple of the largest periodic advertisement timer value that does not exceed the setting is applied.

If the setting value is smaller than the periodic advertisement timer value, the periodic advertisement timer value is applied.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 480 in decimal.

Default behavior

The following initial values are set.

- <Update>: 30 seconds
- <Aging>: 180 seconds
- <Garbage-Collection>: 60 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

version

The "version" command specifies the RIP version and the type of message destination IP address. The version specified for a specific interface has priority over the information specified by this command.

If you set the command in config-router mode, the setting applies to the global network.

If you set the command in config-router-af mode, the setting applies to the specified VRF.

The following table lists the RIP version and the type of destination IP address that are used depending on the value set by the command.

Table 12-4: RIP version and type of destination IP address

No.	Setting value	Version	Type of destination IP address
1	When this command is omitted	1	Broadcast
2	version 1	1	Broadcast
3	version 2	2	Multicast

Syntax

To set or change information:

version { 1 | 2 }

To delete information:

no version

Input mode

```
(config-router)
(config-router-af)
```

Parameters

{ 1 | 2 }

Specifies the version.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

Default behavior

The initial value is set to 1.

Impact on communication

None

When the change is applied

The change is applied the next time the routes are learned or advertised.

Notes

None

Related commands

ip rip version

ip rip v2-broadcast

13 OSPF

[SL-L3A]

area authentication

The "area authentication" command selects plain-text password authentication or MD5 authentication as the authentication method at the area level.

You can also specify an authentication method on a specific interface (use the "ip ospf authentication" command in config-if mode). The authentication method set for a specific interface has priority over the information set by this command.

Syntax

To set or change information:

area <Area-ID> authentication [message-digest]

To delete information:

no area <Area-ID> authentication

To delete areas (all areas specified in the "authentication", "stub", "nssa", "virtual-link", and "range" commands are deleted):

no area <Area-ID>

Input mode

```
(config-router)
```

Parameters

<Area-ID>

Specifies the area to which the Switch belongs.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 0 to 4294967295 (in decimal) or an IPv4 address.

message-digest

Selects MD5 authentication.

1. Default value when this parameter is omitted:

   Plain-text password authentication is selected.

2. Range of values:

   None

Default behavior

Null authentication (only checksum verification is performed and no authentication is performed) is set as the authentication method at the area level.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

ip ospf authentication

ip ospf authentication-key

ip ospf message-digest-key

area default-cost

The "area default-cost" command specifies the cost value of the default route that an area boundary router advertises to a stub area or NSSA. In an NSSA, the LSA used for advertising the default route differs depending on the configuration settings. This command is valid for advertisements for inter-area routing information (Type3 LSA).

Syntax

To set or change information:

area <Area-ID> default-cost <Cost>

To delete information:

no area <Area-ID> default-cost

To delete areas (all areas specified in the "authentication", "stub", "nssa", "virtual-link", and "range" commands are deleted):

no area <Area-ID>

Input mode

```
(config-router)
```

Parameters

<Area-ID>

Specifies the area ID of a stub area or NSSA. If you specify any other area, this command is invalid.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 4294967295 (in decimal) or an IPv4 address (except 0.0.0.0).

<Cost>

Specifies the cost value.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 65535 in decimal.

Default behavior

The initial value is set to 1.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

area nssa

area stub

area nssa

The "area nssa" command allows areas other than area 0 to function as NSSAs. In an NSSA, external AS routes learned by other areas are suppressed from being advertised.

Syntax

To set or change information:

area <Area-ID> nssa [default-information-originate [<Metric> [<Metric-type>]]] [no-summary] [no-redistribution]

To delete information:

no area <Area-ID> nssa

To delete areas (all areas specified in the "authentication", "stub", "nssa", "virtual-link", and "range" commands are deleted):

no area <Area-ID>

Input mode

```
(config-router)
```

Parameters

<Area-ID>

Specifies the area to which the Switch belongs.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 4294967295 (in decimal) or an IPv4 address (except 0.0.0.0).

default-information-originate

Specifies that the area boundary router advertises the default route as information of external AS routes (Type 7 LSA) to the NSSA.

1. Default value when this parameter is omitted:

   External AS routes are not advertised. However, if the no-summary parameter is specified, the default route is advertised as inter-area routing information (Type 3 LSA).

2. Range of values:

   None

<Metric>

Specifies a metric value for the default route.

1. Default value when this parameter is omitted:

   1

2. Range of values:

   Specify 1 to 65535.

<Metric-type>

Specifies a metric type for the default route.

1. Default value when this parameter is omitted:

2

2. Range of values:

   Specify 1 or 2.

no-summary

The area boundary router suppresses advertisement of any routes from other areas, and instead advertises the default route as inter-area routing information (Type 3 LSA).

1. Default value when this parameter is omitted:

   Routes from other areas (inter-area routing information) are advertised to the NSSA.

2. Range of values:

   None

no-redistribution

Even if advertised route filtering has been configured (by using the "redistribute" command) for the area boundary filter, routes learned by other protocols are suppressed from being advertised.

1. Default value when this parameter is omitted:

   Routes learned by other protocols (information of external AS routes) are advertised to the NSSA.

2. Range of values:

   None

Default behavior

The areas do not work as NSSAs.

Impact on communication

Adjacency with neighboring routers within the area is briefly disconnected.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

area nssa translate

The "area nssa translate" command specifies that when external AS routes (Type 7 LSA) learned from an NSSA are translated to an area other than the NSSA, the routes are advertised with the forwarding address set to 0.0.0.0. This command is valid only for area border routers with an NSSA configured.

Syntax

To set information:

area <Area-ID> nssa translate type7 suppress-fa

To delete information:

no area <Area-ID> nssa translate

To delete areas (all areas specified in the "authentication", "stub, nssa", "virtual-link", and "range" commands are deleted):

no area <Area-ID>

Input mode

```
(config-router)
```

Parameters

<Area-ID>

Specifies the area ID of an NSSA.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 4294967295 (in decimal) or an IPv4 address (except 0.0.0.0).

type7 suppress-fa

Specifies that the forwarding destination address for external AS routes (Type 7 LSA) for the NSSA is not inherited.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

Default behavior

The forwarding destination address for Type 7 LSA learned from the NSSA is inherited and then set as the forwarding address.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

area nssa

area range

The "area range" command specifies networks in an area. A maximum of 1024 networks can be specified.

Use this command to configure route summary on an area boundary router. This command is useful for reducing the amount of routing information transmitted between areas.

Syntax

To set or change information:

area <Area-ID> range <IPv4-Prefix> <Mask> [{advertise | not-advertise}]

To delete information:

no area <Area-ID> range <IPv4-Prefix> <Mask>

To delete areas (all areas specified in the "authentication", "stub", "nssa", "virtual-link", and "range" commands are deleted):

no area <Area-ID>

Input mode

```
(config-router)
```

Parameters

<Area-ID>

Specifies the area to which the Switch belongs.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 0 to 4294967295 (in decimal) or an IPv4 address.

<IPv4-Prefix>

Specifies a network.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specifies an IP address. Set the bits within the range of <Mask> to a value other than 0, and set the bits outside the range of <Mask> to 0.

   Note: For <IPv4-Prefix>, set 0 to the bits outside the range of <Mask>.

<Mask>

Specifies a mask.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify an IP address mask (other than 0).

   Note: Specify the address mask so that when it is converted to a binary number, all bits after the first bit that is 0 are set to 0.

{advertise | not-advertise}

Specifies whether to advertise inter-area routes. The routing information that matches the specified network range is not advertised to other areas as inter-area routes. Instead, this command allows you to advertise only a specified range as inter-area routes to other areas. However, if you specify not-advertise, nothing will be advertised.

1. Default value when this parameter is omitted:

   advertise (Information is advertised as inter-area routes.)

2. Range of values:

   None

Default behavior

Individual routes connecting the areas are advertised without being summarized.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

area stub

The "area stub" command allows areas other than area 0 to function as stub areas.

In a stub area, external AS routes are suppressed from being advertised.

Syntax

To set or change information:

area <Area-ID> stub [no-default-summary] [no-summary]

To delete information:

no area <Area-ID> stub

To delete areas (all areas specified in the "authentication", "stub", "nssa", "virtual-link", and "range" commands are deleted):

no area <Area-ID>

Input mode

```
(config-router)
```

Parameters

<Area-ID>

Specifies the area to which the Switch belongs.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 4294967295 (in decimal) or an IPv4 address (except 0.0.0.0).

no-default-summary

Specifies that the area boundary router does not advertise the default route to the stub area.

1. Default value when this parameter is omitted:

   The default route is advertised to the stub area.

2. Range of values:

   None

no-summary

Suppresses routes from other areas from being advertised to the stub area.

1. Default value when this parameter is omitted:

   Routes from other areas (inter-area routing information) are advertised.

2. Range of values:

   None

Default behavior

Areas other than area 0 do not function as stub areas.

Impact on communication

Adjacency with neighboring routers within the area is briefly disconnected.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

area virtual-link

The "area virtual-link" command specifies a virtual link. The virtual link is used for connecting an area boundary router that is not directly connected to area 0 (backbone area) to area 0. A virtual link is identified by a transit area and the remote router ID.

Syntax

To set or change the timers and a plain-text password:

area <Area-ID> virtual-link <Router-ID> [hello-interval <Seconds>] [retransmit-interval <Seconds>] [transmit-delay <Seconds>] [dead-interval <Seconds>] [authentication-key <Key>]

To set or change a MD5 authentication key (more than one key with different <Key-id> values can be entered)

area <Area-ID> virtual-link <Router-ID> [message-digest-key <Key-id> md5 <Key>]

To delete virtual links

no area <Area-ID> virtual-link <Router-ID>

To delete areas (all areas specified in the "authentication", "stub", "nssa", "virtual-link", and "range" commands are deleted):

no area <Area-ID>

Input mode

```
(config-router)
```

Parameters

<Area-ID>

Specifies a transit area. You cannot specify a stub area or NSSA.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 4294967295 (in decimal) or an IPv4 address (except 0.0.0.0).

<Router-ID>

Specifies the ID of the remote router on the virtual link.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify an IPv4 address.

hello-interval <Seconds>

Specifies, in seconds, the sending interval for hello packets.

1. Default value when this parameter is omitted:

   10

2. Range of values:

   Specify 1 to 255 (seconds) in decimal.

retransmit-interval <Seconds>

Specifies the retransmission interval in seconds.

1. Default value when this parameter is omitted:

   5

2. Range of values:

   Specify 1 to 65535 (seconds) in decimal.

transmit-delay <Seconds>

Specifies the delay time in seconds.

1. Default value when this parameter is omitted:

   1

2. Range of values:

   Specify 1 to 65535 (seconds) in decimal.

dead-interval <Seconds>

Specifies the number of seconds that can elapse before the neighboring router is deemed to be down.

1. Default value when this parameter is omitted:

   Four times as large as the hello-interval value.

2. Range of values:

   Specify 1 to 65535 (seconds) in decimal.

authentication-key <Key>

Specifies a key that is used for authentication on a virtual link when plain-text password authentication is enabled for area 0 (using the "area authentication" command).

1. Default value when this parameter is omitted:

   Plain-text password authentication is disabled.

2. Range of values:

   Specify a string consisting of 1 to 8 characters.

   However, you cannot use the following characters:

   Exclamation mark (!), double quotation mark ("), hash mark (#), dollar sign ($), semicolon (;), grave accent mark (`), left curly bracket ({), right curly bracket (}), space character, left angle bracket (<), right angle bracket (>), backslash character (\), quotation mark ('), left parenthesis ((), right parenthesis ()), vertical bar (|), and ampersand (&)

message-digest-key <Key-id>

Specifies that message digests are used for authentication on a virtual link when MD5 authentication is enabled for area 0 (using the "area authentication" command). For details about MD5, see "ip ospf message-digest-key" command.

1. Default value when this parameter is omitted:

   MD5 authentication is not performed.

2. Range of values:

   Specify an identifier in the range from 0 to 255 in decimal.

md5 <Key>

Specifies a key used to generate message digests.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted if you set the message-digest-key parameter.

2. Range of values:

   Specify a string consisting of 1 to 16 characters.

   However, you cannot use the following characters:

   Exclamation mark (!), double quotation mark ("), hash mark (#), dollar sign ($), semicolon (;), grave accent mark (`), left curly bracket ({), right curly bracket (}), space character, left angle bracket (<), right angle bracket (>), backslash character (\), quotation mark ('), left parenthesis ((), right parenthesis ()), vertical bar (|), and ampersand (&)

Default behavior

There are no virtual links.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. A virtual link must be configured in both routers that serve as the endpoints. For each endpoint router, the router ID of the remote router must be set. Therefore, use a method such as setting the "router-id" command in config-router mode to define the router ID beforehand.
2. Use the same MD5 send key (specified for the message-digest-key parameter) for all routers connected to the same interface. Generally, make sure that only one key exists in the setting except when the setting is being changed for transition to a new key.

Related commands

area authentication

areaid-format

The "areaid-format" command specifies the display format of an area ID that is displayed by the "show ip ospf" operation command (displaying OSPF protocol information).

Syntax

To set or change information:

areaid-format {decimal | ipv4-address}

To delete information:

no areaid-format

Input mode

```
(config-router)
```

Parameters

{decimal | ipv4-address}

Specifies display format for an area ID.

Specify decimal to display the area ID as a decimal number. Specify ipv4-address to display it as an IPv4 address.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

Default behavior

The area ID is displayed as a decimal number.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

default-metric

The "default-metric" command specifies the metric value of a route to be advertised as an external AS route. This command does not apply to directly connected routes. Metric settings specified by the "redistribute" command have priority over the information specified by this command.

Syntax

To set or change information:

default-metric <Metric>

To delete information:

no default-metric

Input mode

```
(config-router)
```

Parameters

<Metric>

Specifies a metric value.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 0 to 65535 in decimal.

Default behavior

Metric 1 is set for a BGP route. Metric 20 is set for other routes.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

redistribute

disable

The "disable" command disables OSPF.

Syntax

To set information:

disable

To delete information:

no disable

Input mode

```
(config-router)
```

Parameters

None

Default behavior

OSPF is enabled.

Impact on communication

OSPF stops working.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

distance ospf

The "distance ospf" command sets the distance value for OSPF. You can specify different distance values for each route type.

Syntax

To set or change information:

You can use either of the following two formats. Whichever is used, the results are the same.

Individual setting

distance [ospf {external | inter-area | intra-area}] <distance>

Note: You cannot specify both settings without route type specifications (distance <distance>) and settings with route type specifications. (If specified, the settings are overwritten.)

Concurrent setting of multiple parameters

distance ospf [intra-area <distance>] [inter-area <distance>] [external <distance>]

To delete information (delete all):

no distance

Input mode

```
(config-router)
```

Parameters

{external | inter-area | intra-area}

Specifies the type of route to which the <distance> parameter setting applies.

Specify external (external AS route), inter-area (inter-area route), or intra-area (intra-area route). Note that an inter-area route refers to a route from another area that is not directly connected.

1. Default value when this parameter is omitted:

   The setting applies to all routes.

   If you set <distance> with this parameter omitted to change information, other settings (information set by this parameter) will be deleted.

2. Range of values:

   None

<distance>

Specifies a distance value.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 2 to 255 in decimal. 2 indicates the highest priority, and 255 indicates the lowest priority.

Default behavior

The initial value is set to 110 for all OSPF routes.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

distribute-list in

graceful-restart mode

The "graceful-restart mode" command specifies the use of graceful restart and the running mode of graceful restart.

Graceful restart has the restart function and helper function. To execute the restart function, the helper function must be executed by all neighboring routers.

Syntax

To set or change information:

graceful-restart mode { restart | helper | both }

To delete information:

no graceful-restart mode

Input mode

```
(config-router)
```

Parameters

{ restart | helper | both }

Specifies that the restart function or helper function is executed.

If "both" is specified, both the restart function and helper function are executed.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

Default behavior

The restart function and helper function are disabled.

Impact on communication

None

When the change is applied

The change is applied from the next graceful restart. The trigger of enabling the helper function is when the neighboring router executes a graceful restart.

Notes

1. When using the restart function, either set the "router-id" command to fix the router ID, or set an IPv4 address for the loopback interface. If these are not set, the router ID may change before and after the commencement of graceful restart. If the router ID changes, graceful restart will fail.

Related commands

graceful-restart restart-time

graceful-restart strict-lsa-checking

routing options graceful-restart time-limit

graceful-restart restart-time

The "graceful-restart restart-time" command specifies the allowable time for reconnection with the helper router after restart when the restart function of graceful restart is executed in the OSPF.

Syntax

To set or change information:

graceful-restart restart-time <Seconds>

To delete information:

no graceful-restart restart-time

Input mode

```
(config-router)
```

Parameters

<Seconds>

Specifies the allowable graceful restart time (in seconds).

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 3600 in decimal.

Default behavior

The initial value is 60 seconds.

Impact on communication

None

When the change is applied

The change is applied from the next graceful restart.

Notes

None

Related commands

graceful-restart mode

graceful-restart strict-lsa-checking

routing options graceful-restart time-limit

graceful-restart strict-lsa-checking

The "graceful-restart strict-lsa-checking" command allows the helper router to stop the helper process if the LSA database is no longer synchronized with that of the restart router.

If you set this command, the helper process stops when either of the following conditions exists:

- During LSA advertisement, a graceful-restart start notification is received from a neighboring router that has not completed its response.
- After the helper process has started, a new LSA other than periodic advertisement is generated or learned, and then advertised to the restart router.

Syntax

To set information:

graceful-restart strict-lsa-checking

To delete information:

no graceful-restart strict-lsa-checking

Input mode

```
(config-router)
```

Parameters

None

Default behavior

Graceful restart continues even if the LSA databases are not synchronized.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. Specify the same information in this command for all helper routers. This is because if at least one helper stops the graceful restart function, the restart router stops the graceful restart function with all helpers.

Related commands

graceful-restart mode

ip ospf area

The "ip ospf area" command enables OSPF. OSPF works on a specified domain.

If multihoming is specified (that is, multiple IP addresses are set) for the interface, OSPF is enabled for all IP addresses. If you want to specify an individual IP address, use the "network" command in config-router mode.

Syntax

To set or change information:

ip ospf <Domain-No> area <Area-ID>

To delete information:

no ip ospf [<Domain-No>] area

Input mode

`(config-if)`

VLAN interface, loopback interface

Parameters

<Domain-No>

Specifies a domain number. Set the same value as the domain number specified for the "router ospf" command. If you set a different value, the domain will work as a different domain.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 65535 in decimal.

<Area-ID>

Specifies the area to which the interface belongs.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 0 to 4294967295 (in decimal) or an IPv4 address.

Default behavior

OSPF is disabled if neither the "ip ospf area" command nor the "network" command in config-router mode is specified.

Impact on communication

If the domain number or area ID is changed, adjacency is briefly disconnected.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. You can configure only one domain. If the domain number is changed, adjacency is briefly disconnected.
2. This command is invalid if the same interface is specified for this command and the "network" command in config-router mode (the "network" command has priority).
3. Before setting this command, you need to set the "router-id" command. Even if OSPF has not been configured in config-router mode, the interface for which this command is set will run OSPF. In this case, the router ID is automatically selected. Therefore, if you manually set the router ID later, the router ID being used is changed.
4. When this command is set for the global network, if you use the "no router ospf" command with <Domain-No> specified to delete the domain that has the specified domain number, this command is also deleted. Also, when this command is set for the VRF, if you use the "no router ospf" command with <Domain-No> and <vrf id> specified to delete the domain whose VRF and domain number match the specification, this command is also deleted.

Related commands

network (router ospf)

ip address

ip ospf authentication

The "ip ospf authentication" command selects plain-text password authentication or MD5 authentication as the authentication method for OSPF packets. If you perform authentication on a specified interface, you need to set the authentication method at the area level or use this command. To set the authentication method at the area level, use the "area authentication" command in config-router mode.

Syntax

To set or change information:

ip ospf authentication [{message-digest | null}]

To delete information:

no ip ospf authentication

Input mode

(config-if)

VLAN interface

Parameters

{message-digest | null}

Specifies the authentication method.

Specify message-digest (MD5 authentication) or null (null authentication). If you specify null authentication, only checksum verification is performed and no authentication is performed.

1. Default value when this parameter is omitted:

   Plain-text password authentication is selected.

2. Range of values:

   None

Default behavior

The authentication method set for the area is used. If the authentication method is not set, null authentication is 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 this command, the authentication method at the area level (set by the "area authentication" command in config-router mode) does not apply to the interface.

Related commands

area authentication

ip ospf authentication-key

ip ospf message-digest-key

ip ospf authentication-key

The "ip ospf authentication-key" command specifies the authentication key. This key is used for authentication when plain-text password authentication is enabled (using the "area authentication" or "ip ospf authentication" command).

Syntax

To set or change information:

ip ospf authentication-key <Key>

To delete information:

no ip ospf authentication-key

Input mode

`(config-if)`

VLAN interface

Parameters

<Key>

This key is used for authentication.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a string consisting of 1 to 8 characters.

   However, you cannot use the following characters:

   Exclamation mark (!), double quotation mark ("), hash mark (#), dollar sign ($), semicolon (;), grave accent mark (`), left curly bracket ({), right curly bracket (}), space character, left angle bracket (<), right angle bracket (>), backslash character (\), quotation mark ('), left parenthesis ((), right parenthesis ()), vertical bar (|), and ampersand (&)

Default behavior

Plain-text password authentication is disabled for the interface.

Impact on communication

If a neighboring router on the same network uses a key that is different from the value set in this command, OSPF packets will be discarded.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

ip ospf authentication

area authentication

ip ospf cost

The "ip ospf cost" command specifies the cost value for an interface.

Syntax

To set or change information:

ip ospf cost <Cost>

To delete information:

no ip ospf cost

Input mode

`(config-if)`

VLAN interface, loopback interface

Parameters

<Cost>

Specifies the cost value.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 65535 in decimal.

Default behavior

The initial value is set to 1. However, 0 is set for the loopback interface.

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 ospf dead-interval

The "ip ospf dead-interval" command specifies the length of time that the router maintains adjacency after receiving no hello packets from a neighboring router. When the specified time has elapsed since the last hello packet was received, the neighboring router is deemed to be down.

Syntax

To set or change information:

ip ospf dead-interval <Seconds>

To delete information:

no ip ospf dead-interval

Input mode

```
(config-if)
```

VLAN interface

Parameters

<Seconds>

Specifies the length of time that adjacency is to be maintained.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 65535 (seconds) in decimal.

Default behavior

The initial value is set to be four times as large as the hello-interval value.

Impact on communication

None. However, if the value of dead-interval is different among the routers connected to the same network, adjacency will be disconnected after the time set for dead-interval has elapsed.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. The value set for dead-interval must be the same for the routers connected to the same network.

Related commands

ip ospf hello-interval

ip ospf hello-interval

The "ip ospf hello-interval" command specifies the sending interval for hello packets.

Syntax

To set or change information:

ip ospf hello-interval <Seconds>

To delete information:

no ip ospf hello-interval

Input mode

(config-if)

VLAN interface

Parameters

<Seconds>

Specifies the sending interval.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 255 (seconds) in decimal.

Default behavior

For an NBMA interface (non-broadcast is specified for the "ip ospf network" command), the initial value is set to 30 seconds. For other cases, the initial value is set to 10 seconds.

Impact on communication

None. However, if the value of hello-interval is different among the routers connected to the same network, adjacency will be disconnected after the time set for dead-interval has elapsed.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. The same sending interval must be set for the routers connected to the same network.

Related commands

ip ospf dead-interval

ip ospf network

ip ospf message-digest-key

The "ip ospf message-digest-key" command specifies a key used to generate message digests. Message digests are used for authentication when MD5 authentication is enabled (using the "area authentication" or "ip ospf authentication" command).

Generally, the Switch uses only one key for sending. Although you can set multiple authentication keys with different key IDs, the Switch uses only the key with the maximum key ID to send hello packets in the process of establishing adjacency.

Multiple keys are used for authentication in the following cases:

- Authentication of received packets
- After adjacency is established, if neighboring routers advertise different key IDs, the maximum key advertised by each neighboring router is also used to generate a message digest for packets to be sent. That is, a packet having the same contents is sent several times with only authentication information changed.

Syntax

To set or change information:

ip ospf message-digest-key <key-id> md5 <key>

To delete information:

no ip ospf message-digest-key <key-id>

Input mode

`(config-if)`

VLAN interface

Parameters

<key-id>

Specifies a key ID.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify an identifier (key ID) in the range from 0 to 255 in decimal.

md5 <Key>

Specifies the authentication key. In MD5 authentication, a received packet is authenticated by comparing the message digest of the received packet with a message digest generated from the authentication key that has the same key ID as the received packet.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a string consisting of 1 to 16 characters.

   However, you cannot use the following characters:

Exclamation mark (!), double quotation mark ("), hash mark (#), dollar sign ($), semicolon (;), grave accent mark (`), left curly bracket ({), right curly bracket (}), space character, left angle bracket (<), right angle bracket (>), backslash character (\), quotation mark ('), left parenthesis ((), right parenthesis ()), vertical bar (|), and ampersand (&)

Default behavior

MD5 authentication is disabled for the interface.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. Use the same key for sending for all routers in the same interface. Generally, make sure that settings for only one key exist except when the setting is being changed for transition to a new key.

Related commands

ip ospf authentication

area authentication

ip ospf network

The "ip ospf network" command specifies the OSPF network type.

The following describes the OSPF network types.

- Broadcast

  Multiple neighboring routers on an interface are managed in an integrated manner by using multicast packets.
- Non-broadcast multiple-access (NBMA)

  Multiple neighboring routers are managed in an integrated manner without using broadcast or multicast.
- Point-to-point

  A single neighboring router is managed per IPv4 interface.

Syntax

To set or change information:

ip ospf network {broadcast | non-broadcast | point-to-point}

To delete information:

no ip ospf network

Input mode

`(config-if)`

VLAN interface

Parameters

{broadcast | non-broadcast | point-to-point}

Specifies the network type for the OSPF interface.

broadcast

Broadcast is used.

non-broadcast

NBMA is used.

point-to-point

Point-to-point is used.

1. Default value when this parameter is omitted:

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

   None

Default behavior

Broadcast is used.

Impact on communication

Adjacency is briefly disconnected.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. Make sure that the specified network type matches that of the neighboring device.

Related commands

neighbor (router ospf)

ip ospf priority

The "ip ospf priority" command specifies the priority for determining a designated router. A router with the highest priority in the network will be the designated router, and a router with the second-highest priority will be the backup designated router. However, if the designated router and the backup designated router have already been determined, they are not changed even if a router that has a higher priority is started.

Note that when the network type is point-to-point, a designated router is not selected because only one neighboring router is used.

Syntax

To set or change information:

ip ospf priority <Priority>

To delete information:

no ip ospf priority

Input mode

`(config-if)`

VLAN interface

Parameters

<Priority>

Specifies the priority.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 0 to 255 in decimal. The value of 0 makes the router ineligible to become a designated router.

   The highest priority is 255, and the lowest priority is 1.

Default behavior

For broadcast and NBMA, the initial value is set to 1. For point-to-point, 0 is always set irrespective of the setting value.

Impact on communication

None. However, if you specify 0 when the local router is the designated router, adjacency is briefly disconnected.

When the change is applied

If you set 0, the setting takes effect immediately.

If you set 1 or a greater value, the setting takes effect from the next establishment of adjacency with the neighboring router.

Notes

None

Related commands

None

ip ospf retransmit-interval

The "ip ospf retransmit-interval" command specifies the retransmission interval for OSPF packets.

Syntax

To set or change information:

ip ospf retransmit-interval <Seconds>

To delete information:

no ip ospf retransmit-interval

Input mode

```
(config-if)
```

VLAN interface

Parameters

<Seconds>

Specifies the retransmission interval.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 65535 (seconds) in decimal.

Default behavior

The initial value is set to 5 second.

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 ospf transmit-delay

The "ip ospf transmit-delay" command specifies the delay time required to send an OSPF packet. Set this command if you want to perform OSPF aging precisely.

Syntax

To set or change information:

ip ospf transmit-delay <Seconds>

To delete information:

no ip ospf transmit-delay

Input mode

`(config-if)`

VLAN interface

Parameters

<Seconds>

Specifies a delay time.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 65535 (seconds) in decimal.

Default behavior

The initial value is set to 1 second.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

max-metric router-lsa

The "max-metric router-lsa" command specifies that the switch uses the maximum cost value for advertisements and works as a stub router.

Syntax

To set or change information:

max-metric router-lsa [on-startup <Seconds>]

To delete information:

no max-metric router-lsa

Input mode

```
(config-router)
```

Parameters

on-startup

The switch works as a stub router after startup or restart.

1. Default value when this parameter is omitted:

   The function is always enabled.

2. Range of values:

   None

<Seconds>

Specifies the length of time that the switch works as a stub router after startup or restart.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted if you specify the on-startup parameter.

2. Range of values:

   Specify 5 to 86400 (seconds) in decimal.

Default behavior

The switch does not work as a stub router.

Impact on communication

None

When the change is applied

- When the function is always enabled, the change is applied immediately after setting values are changed.
- If you specify the on-startup parameter, the change takes effect after the restart. Note that if the switch is always running as a stub router, adding the on-startup parameter immediately terminates the stub router.

Notes

1. If a stub router setting is added or deleted while the helper function for graceful restarts is working, the graceful restart fails.

Related commands

None

maximum-paths

The "maximum-paths" command specifies the maximum number of paths in the route when multiple paths (next hops) of equal cost exist for an OSPF-generated route.

The maximum number of paths that can be generated for a multipath OSPF route is equal to the value specified in this command or the upper limit of the Switch, whichever is smaller.

Syntax

To set or change information:

maximum-paths <Number>

To delete information:

no maximum-paths

Input mode

```
(config-router)
```

Parameters

<Number>

Specifies the maximum number of paths.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 16 in decimal.

Default behavior

The initial value is set to 4.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

If a warning-level operation message is output, then the change is applied by restarting the device.

Notes

None

Related commands

None

neighbor

The "neighbor" command specifies the interface address of the remote router to which OSPF packets are sent.

This command is valid for NBMA interfaces (a network for which non-broadcast is specified for the "ip ospf network" command).

Syntax

To set or change information:

neighbor <IP-Address> [priority <Number>] [poll-interval <Seconds>]

To delete information:

no neighbor <IP-Address>

Input mode

```
(config-router)
```

Parameters

<IP-Address>

Specifies the remote router.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify an IPv4 address.

priority <Number>

Specifies the priority of the designated router for the remote router.

This priority is used to determine the destination of hello packets. A router that is neither a designated router nor a backup designated router sends hello packets to a remote router with priority 1 or higher. This router does not send hello packets to a remote router with priority 0, which means that the router is ineligible to become a designated router.

1. Default value when this parameter is omitted:

   0

2. Range of values:

   Specify 0 to 255 in decimal.

   (If the router is eligible to become a designated router, specify a number equal to or greater than 1.)

poll-interval <Seconds>

Specifies the sending interval (in seconds) for sending hello packets when the router is deemed to be down. Set a value greater than the hello-interval value.

1. Default value when this parameter is omitted:

   120

2. Range of values:

   Specify 1 to 255 in decimal.

Default behavior

This parameter cannot be omitted when an NBMA interface 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

ip ospf network

ip ospf hello-interval

ip ospf priority

ip address

network

The "network" command specifies the network on which OSPF works. OSPF works on the interfaces that match the specified range. If <IPv4-Prefix> is set to 0.0.0.0 and <Wildcard- Mask> is set to 255.255.255.255, OSPF works on all networks.

Syntax

To set or change information:

network <IPv4-Prefix> <Wildcard-Mask> area <Area-ID>

To delete information:

no network <IPv4-Prefix> <Wildcard-Mask>

Input mode

```
(config-router)
```

Parameters

<IPv4-Prefix>

Specifies a network.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify an IPv4 address.

   Note: Set all the bits specified for <Wildcard-Mask> of <IPv4-Prefix> to 0.

<Wildcard-Mask>

Specifies a wildcard mask.

1. Default

   This parameter cannot be omitted.

2. Range of values:

   Specify this in IPv4 address format.

   Specify the wildcard mask (in decimal) so that when it is converted to bits, all bits after the first bit that is 1 are set to 1.

   Note: Specify the wildcard mask so that when it is converted to a binary number, all bits after the first 1 bit are set to 1.

area <Area-ID>

Specifies the area to which the interface belongs.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 0 to 4294967295 (in decimal) or an IPv4 address.

Default behavior

The information set by the "ip ospf area" command in config-if mode is applied.

Impact on communication

If you use this command to change the area or domain to which the interfaces belong while OSPF is working on the interfaces in the specified range, adjacency is briefly disconnected.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

ip ospf area

ip address

passive-interface

The "passive-interface" command specifies that the OSPF network (interface specified by the "network" command in config-router mode) will be used as a stub network, which does not send or receive OSPF packets.

Syntax

To set information:

passive-interface {default | vlan <vlan id>}

To delete information:

no passive-interface {default | vlan <vlan id>}

Note: Use the following procedure to specify default:

(1) Specify as follows to set default (set all interfaces as passive interfaces):

(config-router)# passive-interface default

(2) Specify as follows to configure an individual interface to not be set as a passive interface:

(config-router)# no passive-interface vlan <vlan id>

Input mode

```
(config-router)
```

Parameters

{default | vlan <vlan id>}

Sets all interfaces or the specified interface as a passive interface.

default

Sets all OSPF networks as a passive interface.

vlan <vlan id>

Specifies the interface in the OSPF network.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <vlan id>, specify the VLAN ID set by the "interface vlan" command.

3. Note on using this parameter:

   If you add or delete the default parameter, all other information set by the "passive-interface" command is deleted.

Default behavior

An interface that is not specified will not be used as a passive interface (stub network).

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

network (router ospf)

ip ospf area

router-id

The "router-id" command specifies a router ID (to identify a specific router).

Syntax

To set or change information:

router-id <IP Address>

To delete information:

no router-id

Input mode

```
(config-router)
```

Parameters

<IP-Address>

Specifies the router ID.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify an IPv4 address other than 0.0.0.0.

Default behavior

When OSPF starts working, the router ID is automatically selected in the following order from the VRF or global network to which OSPF belongs. However, after OSPF started, the automatically selected router ID is not changed.

1. IPv4 address assigned to the loopback interface
2. Largest IPv4 address in the IPv4 interface

Impact on communication

If the setting is changed while OSPF is working and a different value from the router ID being used is set, adjacency is briefly disconnected.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. Note the following if you omit this command to allow the router IDs to be automatically selected:
   - The largest IPv4 address might not be selected depending on the order in which configuration settings are made. For example, if you specify the "ip ospf area" command, OSPF starts working as soon as the command is specified. The router ID will not be changed even if an IPv4 address with higher priority is subsequently set.
   - After OSPF starts working, the router ID is not automatically changed when the information set by the "router-id" command is deleted or when the loopback address is changed.
   - The router ID might be changed because, for example, the device is restarted.

2. In OSPF, the router ID and network address of each router is used to learn the network configuration and perform route calculation. Therefore, if an invalid router ID is specified (that is, the same router ID is set for different routers), the network configuration cannot be learned correctly.

Related commands

ip address (interface loopback)

disable

router ospf

The "router ospf" command configures router settings related to the OSPF routing protocol. After this command is entered, the mode changes to config-router mode.

Syntax

To set information:

router ospf <Domain-No> [vrf <vrf id>]

To delete information:

no router ospf <Domain-No> [vrf <vrf id>]

Input mode

```
(config)
```

Parameters

<Domain-No>

Specify the OSPF domain number.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 65535 in decimal.

vrf <vrf id>

Specifies the VRF to which OSPF belongs.

1. Default value when this parameter is omitted:

   Belongs to the global network.

2. Range of values:

   For <vrf id>, specify a VRF ID.

   For details, see "Specifiable values for parameters".

Default behavior

The behavior specified by the "ip ospf area" command in config-if mode is performed.

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 information set by the "router ospf" command, the area setting in the domain (set by the "ip ospf area" command) is also deleted.

Related commands

ip ospf area

suppress-fa

The "suppress-fa" command specifies that an address used for the forwarding destination will not be set for the forwarding address for an external AS route. At this time, set the forwarding address to 0.0.0.0. This command is valid only for AS boundary routers. This command is invalid for routers that are not AS boundary routers.

Syntax

To set information:

suppress-fa

To delete information:

no suppress-fa

Input mode

```
(config-router)
```

Parameters

None

Default behavior

If OSPF is running in the network specified as the forwarding destination for the source route, the forwarding address 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

redistribute

timers spf

The "timers spf" command specifies the delay time for SPF calculations and the execution interval. The delay time is the time between when an SPF calculation is scheduled due to changes in the OSPF topology information and when it actually starts.

The execution interval is the period of time to suppress SPF calculations after the previous SPF calculations are performed.

Syntax

To set or change information:

timers spf <Delay> <Interval>

To delete information:

no timers spf

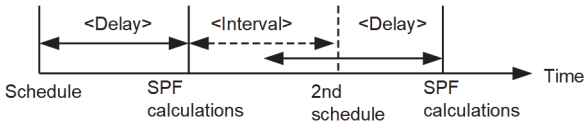
Input mode

```
(config-router)
```

Parameters

<Delay>

Specifies the delay time for SPF calculations. Second and subsequent SPF calculations are performed after the delay time or after the execution interval from the previous SPF calculations (<Interval>), whichever is later.



1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 10 (seconds) in decimal.

<Interval>

Specifies the minimum interval between consecutive SPF calculations.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 2 to 10 (seconds) in decimal.

Default behavior

The initial value is 2 seconds for <Delay> and 5 seconds for <Interval>.

Impact on communication

None

When the change is applied

The change is applied when the next set of SPF calculations is performed.

Notes

None

Related commands

None

14 BGP4

[SL-L3A]

address-family ipv4

The "address-family ipv4" command switches to config-router-af(ipv4 vrf) mode, which allows you to set information for each VRF.

Syntax

To set information:

address-family ipv4 vrf <vrf id>

To delete information:

no address-family ipv4 vrf <vrf id>

Input mode

```
(config-router)
```

Parameters

vrf <vrf id>

Specifies the VRF.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <vrf id>, specify a VRF ID.

   For details, see "Specifiable values for parameters".

Default behavior

A BGP4 route policy cannot be set for the specified VRF.

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 information set by this command, all information set by the commands for the relevant config-router-af(ipv4 vrf) mode is deleted.
2. The information set by this command is deleted if you delete all information set by the commands in config-router-af(ipv4 vrf) mode.

Related commands

None

address-family ipv6

The "address-family ipv6" command switches to config-router-af(ipv6) mode, which allows you to set BGP4+ information for the global network or to config-router-af(ipv6 vrf) mode, which allows you to set information for each VRF.

Syntax

To set information:

address-family ipv6 [vrf <vrf id>]

To delete information:

no address-family ipv6 [vrf <vrf id>]

Input mode

```
(config-router)
```

Parameters

vrf <vrf id>

Specifies the VRF.

1. Default value when this parameter is omitted:

   Switches to config-router-af(ipv6) mode, which allows you to set BGP4+ information for the global network.

2. Range of values:

   For <vrf id>, specify a VRF ID.

   For details, see "Specifiable values for parameters".

Default behavior

A BGP4+ route policy cannot be set.

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 information set by this command, all information set by the commands for the relevant config-router-af(ipv6) mode or config-router-af(ipv6 vrf) mode is deleted.
2. The information set by this command is deleted if you delete all information set by the commands in config-router-af(ipv6) mode or config-router-af(ipv6 vrf) mode.

Related commands

None

bgp always-compare-med

During route selection, the "bgp always-compare-med" command allows comparison of MED values of routes received from different ASs.

If settings are performed in config-router mode, the settings are applied to BGP4 routes of the global network.

If you set the command in config-router-af(ipv4 vrf) mode, the setting applies to the BGP4 routes of the specified VRF.

If settings are performed in config-router-af(ipv6) mode, the settings are applied to BGP4+ routes of the global network.

If you set the command in config-router-af(ipv6 vrf) mode, the setting applies to the BGP4+ routes of the specified VRF.

Syntax

To set information:

bgp always-compare-med

To delete information:

no bgp always-compare-med

Input mode

```
(config-router)
(config-router-af)(ipv4 vrf)
(config-router-af)(ipv6)
(config-router-af)(ipv6 vrf)
```

Parameters

None

Default behavior

During route selection, the MED values of routes received from the same neighboring AS are used for comparison, but the MED values of routes received from different neighboring ASs are not.

Impact on communication

None

When the change is applied

The change is applied when the command is set.

Notes

None

Related commands

maximum-paths

bgp bestpath compare-routerid

The "bgp bestpath compare-routerid" command specifies the use of peer BGP identifiers (router IDs) for route selection among routes learned from external peers.

If you set the command in config-router mode, the setting applies to BGP4 and BGP4+ of the global network.

If you set the command in config-router-af(ipv4 vrf) mode, the setting applies to BGP4 of the specified VRF.

If you set the command in config-router-af(ipv6 vrf) mode, the setting applies to BGP4+ of the specified VRF.

Syntax

To set information:

bgp bestpath compare-routerid

To delete information:

no bgp bestpath compare-routerid

Input mode

```
(config-router)
(config-router-af)(ipv4 vrf)
(config-router-af)(ipv6 vrf)
```

Parameters

None

Default behavior

Peer BGP identifiers (router IDs) are not used for route selection among routes learned from external peers.

Impact on communication

None

When the change is applied

The change is applied when the command is set.

Notes

1. For route selection among routes learned from internal peers or among routes learned from member AS peers, peer BGP identifiers (router IDs) are used regardless of the setting of this command.
2. If an item with higher comparison priority (for example, the number of ASs in the AS_PATH attribute) than the peer BGP identifier (router ID) determines route selection, the peer BGP identifier (router ID) is not used regardless of the command setting.

Related commands

None

bgp client-to-client reflection

The "bgp client-to-client reflection" command specifies that BGP routes are to be reflected between the peers specified for route reflector clients. This command is effective by default. Specify the command prefixed by no if you do not want the BGP routes reflected between the route reflector clients.

If settings are performed in config-router mode, the settings are applied to BGP4 routes of the global network.

If you set the command in config-router-af(ipv4 vrf) mode, the setting applies to the BGP4 routes of the specified VRF.

If settings are performed in config-router-af(ipv6) mode, the settings are applied to BGP4+ routes of the global network.

If you set the command in config-router-af(ipv6 vrf) mode, the setting applies to the BGP4+ routes of the specified VRF.

Syntax

To set information:

no bgp client-to-client reflection

To delete information:

bgp client-to-client reflection

Notes

If you set bgp client-to-client reflection, the information will not be displayed by the configuration display command.

Input mode

```
(config-router)
(config-router-af)(ipv4 vrf)
(config-router-af)(ipv6)
(config-router-af)(ipv6 vrf)
```

Parameters

None

Default behavior

The BGP routes are reflected between the route reflector clients.

Impact on communication

None

When the change is applied

The change is applied when the command is set.

Notes

None

Related commands

bgp cluster-id

neighbor route-reflector-client

bgp cluster-id

The "bgp cluster-id" command specifies the cluster ID to be used in route reflection. This command must be set when one cluster contains multiple route reflectors. Specify this command on the router that runs as a route reflector. The same cluster ID must be specified for each route reflector in the same cluster. Do not specify this command for a client.

If you set the command in config-router mode, the setting applies to BGP4 and BGP4+ of the global network.

If you set the command in config-router-af(ipv4 vrf) mode, the setting applies to BGP4 of the specified VRF.

If you set the command in config-router-af(ipv6 vrf) mode, the setting applies to BGP4+ of the specified VRF.

Syntax

To set or change information:

bgp cluster-id <IPv4-Address>

To delete information:

no bgp cluster-id

Input mode

```
(config-router)
(config-router-af)(ipv4 vrf)
(config-router-af)(ipv6 vrf)
```

Parameters

<IPv4-Address>

Specifies a cluster ID (IPv4 address format).

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify an IPv4 address other than 0.0.0.0.

Default behavior

The selected router ID is used as the cluster ID.

Impact on communication

If the route refresh function has not been negotiated with the client when this command changes the cluster ID, the BGP session with the client is temporarily disconnected. As a result, communication stops until the routes are relearned.

When the change is applied

The change is applied when the command is set.

Notes

1. If the route refresh function has not been negotiated with the client when this command changes the cluster ID, the BGP session with the client is temporarily disconnected.

Related commands

bgp router-id

bgp client-to-client reflection

neighbor route-reflector-client

bgp confederation identifier

The "bgp confederation identifier" command specifies the AS number of the local confederation in a confederation configuration.

This command is common to BGP4 (including VRF) and BGP4+ (including VRF).

Syntax

To set or change information:

bgp confederation identifier <As>

To delete information:

no bgp confederation identifier

Input mode

```
(config-router)
```

Parameters

<As>

Specifies the AS number of the confederation to which the local router belongs.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 65535 in decimal.

Default behavior

The AS number of the confederation is not set.

Impact on communication

If you use this command to change the AS number, BGP sessions with all peers are temporarily disconnected. As a result, communication stops until the routes are relearned.

When the change is applied

The change is applied when the command is set.

Notes

1. If you use this command to change the AS number, BGP sessions with all peers are temporarily disconnected.
2. If you use this command to set an AS number, the AS number set by the "router bgp" command becomes the member AS number of the local router.

Related commands

router bgp

bgp confederation peers

neighbor remote-as

bgp confederation peers

The "bgp confederation peers" command specifies the member AS numbers of the ASs connected to the local member AS in a confederation configuration. The member AS numbers are used for connecting BGP sessions with the member ASs in the confederation.

If you set the command in config-router mode, the setting applies to BGP4 and BGP4+ of the global network.

If you set the command in config-router-af(ipv4 vrf) mode, the setting applies to BGP4 of the specified VRF.

If you set the command in config-router-af(ipv6 vrf) mode, the setting applies to BGP4+ of the specified VRF.

Syntax

To set or change information:

bgp confederation peers <As> [...]

To delete information:

no bgp confederation peers [<As> [...]]

Notes

- This command can extend over multiple lines. You can specify a maximum of 25 <As> parameters per command execution, and a maximum of 256 <As> parameters in total for the global network and VRFs.
- If you specify no bgp confederation peers <As> [...], information for only the specified member ASs is deleted.

Input mode

```
(config-router)
(config-router-af)(ipv4 vrf)
(config-router-af)(ipv6 vrf)
```

Parameters

<As>

Specifies the member AS number of a connected peer.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 65535 in decimal.

Default behavior

Member ASs in the confederation are not connected.

Impact on communication

If you use this command to change the member ASs, the BGP session with the specified peer is temporarily disconnected. As a result, communication stops until the routes are relearned.

When the change is applied

The change is applied when the command is set.

Notes

1. If you use this command to change the member ASs, the BGP session with the specified peer is temporarily disconnected.
2. The member AS number specified for this command must be different from the local member AS number specified for the "router bgp" command and the AS number specified for the "bgp confederation identifier" command.

Related commands

bgp confederation identifier

neighbor remote-as

bgp dampening

The "bgp dampening" command specifies that the use of unstable (route-flapping) routes learned from an external peer or inter-AS peer is to be temporarily suppressed to reduce the effect of route-flapping.

If settings are performed in config-router mode, the settings are applied to BGP4 routes of the global network.

If settings are performed in config-router-af(ipv6) mode, the settings are applied to BGP4+ routes of the global network.

Syntax

To set or change information:

bgp dampening [<Half-life> [<Reuse> <Suppress> <Max-suppress-time>]]

To delete information:

no bgp dampening

Notes

- Using the command prefixed by no cannot delete information specified for a parameter.
- After a parameter has been set, if you set the command again without specifying the parameter, information set for that parameter will be deleted.

Input mode

```
(config-router)
(config-router-af)(ipv6)
```

Parameters

<Half-life>

Specifies the half-life time of the penalty. The half-life time means the time required for the penalty accumulated with route-flapping to be reduced to 50%.

1. Default value when this parameter is omitted:

   15 (minutes)

2. Range of values:

   Specify 1 to 45 (minutes) in decimal. Specify a value smaller than the <Max-suppress-time> value.

<Reuse>

Specifies the lower limit of the penalty for restarting the use of suppressed routes. When the penalty that has been decremented based on the <Half-life> value drops to the <Reuse> value, the use of suppressed routes is restarted.

1. Default value when this parameter is omitted:

   2

2. Range of values:

   Specify 1 to 15 in decimal. Specify a value smaller than the <Suppress> value.

<Suppress>

Specifies the upper limit of the penalty for suppressing the use of routes. The penalty is incremented by 1 every time a route becomes unreachable. The use of routes is suppressed when the penalty reaches or exceeds the <Suppress> value.

1. Default value when this parameter is omitted:

   3

2. Range of values:

   Specify 2 to 16 in decimal. Specify a value larger than the <Reuse> value.

<Max-suppress-time>

Specifies the maximum duration for the suppression of a route. This value indicates the time that can elapse before the penalty changes from the maximum to the <Reuse> value.

The maximum penalty is calculated as follows:

- Maximum penalty = <Reuse> x 2^(<Max-suppress-time> / <Half-life>)
  If the calculation result exceeds 240, 240 is set.

1. Default value when this parameter is omitted:

   Four times as large as the <Half-life> value.

2. Range of values:

   Specify 2 to 180 (minutes) in decimal. Specify a value larger than the <Half-life> value.

Default behavior

The route flap dampening function is disabled.

Impact on communication

None

When the change is applied

The change is applied when the command is set.

Notes

1. Even if flapping occurs frequently, the maximum penalty value is used as the upper limit of the penalty. If the calculation result exceeds 240 and the penalty has reached the maximum (240), the duration for which the use of routes is actually suppressed is shorter than the time specified for <Max-suppress-time>. Also note that if the maximum penalty is smaller than the <Suppress> value, the use of routes is not suppressed.
2. If you change the <Half-life>, <Reuse>, <Suppress>, or <Max-suppress-time> parameter during flapping, the flap history will be deleted.
3. The command does not apply to BGP4 or BGP4+ routes in a VRF.

Related commands

None

bgp default local-preference

The "bgp default local-preference" command specifies the default value of the LOCAL_PREF attribute of routes to be advertised to an internal peer.

The Local-Preference value set by the "neighbor route-map" or "redistribute" command has priority over the information set by this command.

If settings are performed in config-router mode, the settings are applied to BGP4 routes of the global network.

If you set the command in config-router-af(ipv4 vrf) mode, the setting applies to the BGP4 routes of the specified VRF.

If settings are performed in config-router-af(ipv6) mode, the settings are applied to BGP4+ routes of the global network.

If you set the command in config-router-af(ipv6 vrf) mode, the setting applies to the BGP4+ routes of the specified VRF.

Syntax

To set or change information:

bgp default local-preference <Localpref>

To delete information:

no bgp default local-preference

Input mode

```
(config-router)
(config-router-af)(ipv4 vrf)
(config-router-af)(ipv6)
(config-router-af)(ipv6 vrf)
```

Parameters

<Localpref>

Specifies the local-Preference value.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 0 to 65535 in decimal.

Default behavior

<Localpref> is set to 100.

Impact on communication

None

When the change is applied

The change is applied when the command is set.

Notes

None

Related commands

None

bgp graceful-restart mode

The "bgp graceful-restart mode" command specifies the use of graceful restart and the running mode of graceful restart. The graceful restart function is negotiated for the peer for which this command is specified.

This command is common to BGP4 (including VRF) and BGP4+ (including VRF).

Syntax

To set or change information:

bgp graceful-restart mode {restart | receive | both}

To delete information:

no bgp graceful-restart mode

Notes

This command must be set before you set the "bgp graceful-restart restart-time" command and "bgp graceful-restart stalepath-time" command. You cannot delete this command alone if the "bgp graceful-restart restart-time" or "bgp graceful-restart stalepath-time" command has been set.

If you specify no "bgp graceful-restart", this command is also deleted.

Input mode

```
(config-router)
```

Parameters

{restart | receive | both}

restart

Enables the restart router function and disables the receiving router function.

receive

Enables the receiving router function and disables the restart router function.

both

Enables both the restart router function and the receiving router function.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

Default behavior

The graceful restart is not negotiated for the peer.

Impact on communication

The BGP session with a specified peer will temporarily be disconnected in the following cases. As a result, communication stops until the routes are relearned.

- If this command is used to change the status of graceful restarts (enabled or disabled)

- If a parameter value change has changed the graceful restart mode to the status where only the receiving router function is enabled, or a parameter value change has changed the mode with only the receiving router function enabled to another mode

When the change is applied

The change is applied when the command is set.

Notes

None

Related commands

bgp graceful-restart restart-time

bgp graceful-restart stalepath-time

routing options graceful-restart time-limit

bgp graceful-restart restart-time

The "bgp graceful-restart restart-time" command specifies the maximum time that a peer will wait to be re-connected after a neighboring router has commenced a graceful restart.

This command is common to BGP4 (including VRF) and BGP4+ (including VRF).

Syntax

To set or change information:

bgp graceful-restart restart-time <Seconds>

To delete information:

no bgp graceful-restart restart-time

Notes

Set this command after setting the "bgp graceful-restart mode" command.

If you specify no "bgp graceful-restart", this command is also deleted.

Input mode

```
(config-router)
```

Parameters

<Seconds>

Specifies the maximum time (seconds) that a peer will wait to be reconnected after a neighboring router has commenced a graceful restart. If the peer cannot be reconnected within the maximum time, the receiving router deletes the routes received from the peer.

Also, the restart router stops monitoring the reception of the End-of-RIB from the target peer.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 3600 in decimal.

Default behavior

The initial value is 120 (seconds).

Impact on communication

None

When the change is applied

The change is applied to the timer value used by the device when the next graceful restart is performed.

Notes

1. The information set by this command is applied to the timer value used by the device when the next graceful restart is performed. Negotiation with the connected remote device is performed when the next BGP session is established. If only the information set by this command is changed, the BGP session is not automatically reconnected. If you need to notify the connected remote device, use the operation command to reconnect the BGP session.

Related commands

bgp graceful-restart mode

bgp graceful-restart stalepath-time

routing options graceful-restart time-limit

bgp graceful-restart stalepath-time

The "bgp graceful-restart stalepath-time" command specifies the maximum time that a peer will keep routes received before a graceful restart after the neighboring router has commenced the graceful restart.

This command is common to BGP4 (including VRF) and BGP4+ (including VRF).

Syntax

To set or change information:

bgp graceful-restart stalepath-time <Seconds>

To delete information:

no bgp graceful-restart stalepath-time

Notes

Set this command after setting the "bgp graceful-restart mode" command.

If you specify no "bgp graceful-restart", this command is also deleted.

Input mode

```
(config-router)
```

Parameters

<Seconds>

Specifies the maximum time (seconds) that a peer will keep routes received before a graceful restart after the neighboring router has commenced the graceful restart. If the routes cannot be received again from the peer within the maximum time, the routes are deleted.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 3600 in decimal.

Default behavior

The initial value is 360 (seconds).

Impact on communication

None

When the change is applied

The change is applied to the timer value used by the device when the next graceful restart is performed.

Notes

None

Related commands

bgp graceful-restart mode

bgp graceful-restart restart-time

bgp nexthop

The "bgp nexthop" command specifies the route to be used in resolving the next hop of a BGP route.

If settings are performed in config-router mode, the settings are applied to BGP4 routes of the global network.

If you set the command in config-router-af(ipv4 vrf) mode, the setting applies to the BGP4 routes of the specified VRF.

If settings are performed in config-router-af(ipv6) mode, the settings are applied to BGP4+ routes of the global network.

If you set the command in config-router-af(ipv6 vrf) mode, the setting applies to the BGP4+ routes of the specified VRF.

Syntax

To set or change information:

bgp nexthop route-map <route map>

To delete information:

no bgp nexthop

Input mode

```
(config-router)
(config-router-af)(ipv4 vrf)
(config-router-af)(ipv6)
(config-router-af)(ipv6 vrf)
```

Parameters

route-map <route map>

Specifies the route map for which the route filter used to resolve the next hop of a BGP route is specified.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <route map>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

Default behavior

Active IGP routes, static routes, and directly connected routes are used to resolve the next hop of a BGP route.

Impact on communication

None

When the change is applied

- For a BGP4 route, the change is applied when the "clear ip bgp [vrf {<vrf id> | all}] * { in | both }" operation command is executed.

- For a BGP4+ route, the change is applied when the "clear ipv6 bgp [vrf {<vrf id> | all}] * { in | both }" operation command is executed.

Notes

1. If the filter specified for <route map> is not set or if a match protocol entry is not set for the "route-map" command, IGP routes, static routes, directly connected routes, and BGP routes are applicable for the command.
2. Routes imported from other VRFs or the global network are not used to resolve the next hop.

Related commands

route-map

bgp router-id

The "bgp router-id" command sets the router identifier of the Switch to be used for BGP.

If you set the command in config-router mode, the setting applies to BGP4 and BGP4+ of the global network.

If you set the command in config-router-af(ipv4 vrf) mode, the setting applies to BGP4 of the specified VRF.

If you set the command in config-router-af(ipv6 vrf) mode, the setting applies to BGP4+ of the specified VRF.

Syntax

To set or change information:

bgp router-id <IPv4-Address>

To delete information:

no bgp router-id

Input mode

```
(config-router)
(config-router-af)(ipv4 vrf)
(config-router-af)(ipv6 vrf)
```

Parameters

<IPv4-Address>

Specifies the router identifier (IPv4 address).

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify an IPv4 address other than 0.0.0.0.

Default behavior

The IPv4 address assigned to the loopback interface of the VRF or global network to which BGP belongs is used. If no IPv4 address has been assigned to the loopback interface, the largest IPv4 address assigned to the interface is used.

Impact on communication

If you use this command to change the router identifier, all BGP sessions are temporarily disconnected. As a result, communication stops until the routes are relearned.

When the change is applied

The change is applied when the command is set.

Notes

1. If all of the following conditions are met, BGP is disabled:
   - The local router identifier has not been set by this command.

- No IPv4 address has been set for the loopback interface.
- There are no interfaces for which an IPv4 address is set.

2. If the IPv4 address for the loopback interface, or the IPv4 address for an interface, is selected as the local router identifier and then the IPv4 address of the interface is changed, the change is applied to the BGP behavior when any of the following occurs:
   - The Switch is restarted.
   - The IP unicast routing program is restarted.
   - The "disable (BGP4)" command is deleted.
3. If you add, change, or delete information set by this command, BGP sessions with all peers are temporarily disconnected.

Related commands

interface

bgp cluster-id

default-information originate

The "default-information originate" command advertises the default routes redistributed from non-BGP routing protocols to all BGP peers.

If settings are performed in config-router mode, the settings are applied to the IPv4 default routes of the global network.

If you set the command in config-router-af(ipv4 vrf) mode, the setting applies to the IPv4 default routes of the specified VRF.

If settings are performed in config-router-af(ipv6) mode, the settings are applied to the IPv6 default routes of the global network.

If you set the command in config-router-af(ipv6 vrf) mode, the setting applies to the IPv6 default routes of the specified VRF.

Syntax

To set information:

default-information originate

To delete information:

no default-information originate

Input mode

```
(config-router)
(config-router-af)(ipv4 vrf)
(config-router-af)(ipv6)
(config-router-af)(ipv6 vrf)
```

Parameters

None

Default behavior

The default routes learned by non-BGP routing protocols are not advertised via BGP.

Impact on communication

None

When the change is applied

The change is applied when the command is set.

Notes

1. A default route learned via BGP will be advertised regardless of the command setting.

Related commands

ip route

redistribute

default-metric

The "default-metric" command sets the metric value (MED attribute) of the routing information to be advertised via BGP. This command applies when routing information is advertised to external peers or when routing information learned by another protocol is advertised via BGP. The metric specified for the "neighbor route-map" or "redistribute" command has priority over the metric specified for this command.

If settings are performed in config-router mode, the settings are applied to BGP4 routes of the global network.

If you set the command in config-router-af(ipv4 vrf) mode, the setting applies to the BGP4 routes of the specified VRF.

If settings are performed in config-router-af(ipv6) mode, the settings are applied to BGP4+ routes of the global network.

If you set the command in config-router-af(ipv6 vrf) mode, the setting applies to the BGP4+ routes of the specified VRF.

Syntax

To set or change information:

default-metric <Metric>

To delete information:

no default-metric

Input mode

```
(config-router)
(config-router-af)(ipv4 vrf)
(config-router-af)(ipv6)
(config-router-af)(ipv6 vrf)
```

Parameters

<Metric>

Sets the metric value (MED attribute) of the routing information to be advertised.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 0 to 4294967295 in decimal.

Default behavior

The metric (MED attribute) is not set when routing information is advertised to external peers or when routing information learned by another protocol is advertised via BGP.

Impact on communication

None

When the change is applied

The change is applied when the command is set.

Notes

None

Related commands

distribute-list

redistribute

disable

The "disable" command disables BGP even if the BGP setting is specified.

If you set the command in config-router mode, the setting applies to BGP4 and BGP4+ of the global network.

If you set the command in config-router-af(ipv4 vrf) mode, the setting applies to BGP4 of the specified VRF.

If you set the command in config-router-af(ipv6 vrf) mode, the setting applies to BGP4+ of the specified VRF.

Syntax

To set information:

disable

To delete information:

no disable

Input mode

```
(config-router)
(config-router-af)(ipv4 vrf)
(config-router-af)(ipv6 vrf)
```

Parameters

None

Default behavior

BGP is enabled.

Impact on communication

A BGP route is not generated.

When the change is applied

The change is applied when the command is set.

Notes

None

Related commands

None

distance bgp

The "distance bgp" command sets distance values for the routing information learned from an external peer, internal peer, and member AS peer.

If settings are performed in config-router mode, the settings are applied to BGP4 routes of the global network.

If you set the command in config-router-af(ipv4 vrf) mode, the setting applies to the BGP4 routes of the specified VRF.

If settings are performed in config-router-af(ipv6) mode, the settings are applied to BGP4+ routes of the global network.

If you set the command in config-router-af(ipv6 vrf) mode, the setting applies to the BGP4+ routes of the specified VRF.

Syntax

To set or change information:

distance bgp <External-Distance> <Internal-Distance>

To delete information:

no distance bgp

Input mode

```
(config-router)
(config-router-af)(ipv4 vrf)
(config-router-af)(ipv6)
(config-router-af)(ipv6 vrf)
```

Parameters

<External-Distance>

Sets the distance value of a route learned from an external peer.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 2 to 255 in decimal. 2 indicates the highest priority, and 255 indicates the lowest priority.

<Internal-Distance>

Specifies the distance value of routes learned from an internal peer and member AS peer.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 2 to 255 in decimal. 2 indicates the highest priority, and 255 indicates the lowest priority.

Default behavior

<External-Distance> is set to 20, and <Internal-Distance> is set to 200.

Impact on communication

None

When the change is applied

The change is applied when the command is set.

Notes

None

Related commands

None

exit-address-family

The "exit-address-family" command exits config-router-af mode, and returns to config-router mode.

Syntax

To set information:

exit-address-family

Input mode

```
(config-router-af)(ipv4 vrf)
(config-router-af)(ipv6)
(config-router-af)(ipv6 vrf)
```

Parameters

None

Default behavior

This command is automatically set when a configuration is set in config-router-af mode.

Impact on communication

None

When the change is applied

None

Notes

1. Use this command to copy and paste configuration entries that have already been set. To set a configuration on a command line, use the "exit" command.

Related commands

None

maximum-paths

The "maximum-paths" command generates multipaths using the specified value as the maximum number of paths when multiple routing information entries of equal cost to a given destination exist.

The maximum number of paths that can be generated for a multipath BGP4 or BGP4+ route is equal to the value specified in this command or the upper limit of the Switch, whichever is smaller.

If settings are performed in config-router mode, the settings are applied to BGP4 routes of the global network.

If you set the command in config-router-af(ipv4 vrf) mode, the setting applies to the BGP4 routes of the specified VRF.

If settings are performed in config-router-af(ipv6) mode, the settings are applied to BGP4+ routes of the global network.

If you set the command in config-router-af(ipv6 vrf) mode, the setting applies to the BGP4+ routes of the specified VRF.

Syntax

To set or change information:

maximum-paths <Number> [{ same-as | all-as }]

To delete information:

no maximum-paths

Input mode

```
(config-router)
(config-router-af)(ipv4 vrf)
(config-router-af)(ipv6)
(config-router-af)(ipv6 vrf)
```

Parameters

<Number>

Specifies the maximum number of multipaths.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 16 in decimal (when 1 is specified, multipaths are not generated).

{ same-as | all-as }

Specifies BGP routes for which multipaths can be generated. If you specify same-as, multipaths can be generated for the BGP routes received from the same neighboring AS. If you specify all-as, multipaths can be generated for the BGP routes learned from different ASs. Note that all-as must be specified together with bgp always-compare-med.

1. Default value when this parameter is omitted:

   same-as is applied.

2. Range of values:

   None

Default behavior

Multipaths are not generated.

Impact on communication

Load balancing is used when packets are forwarded over BGP multipaths to the same destination generated by the command.

When the change is applied

The change is applied when the command is set.

If a warning-level operation message is output, then the change is applied by restarting the device.

Notes

1. If this command is set, a next hop with the smallest address is preferentially selected for the BGP route from the next hops of equal-cost BGP routes.

Related commands

bgp always-compare-med

neighbor activate

The "neighbor activate" command enables an exchange of routes between an IPv6 address family and peers.

This command applies only to BGP4+.

If settings are performed in config-router-af(ipv6) mode, the settings are applied to BGP4+ routes of the global network.

If you set the command in config-router-af(ipv6 vrf) mode, the setting applies to BGP4+ of the specified VRF.

Syntax

To set information:

neighbor {<IPv6-Address> | <Peer-Group>} activate

To delete information:

no neighbor {<IPv6-Address> | <Peer-Group>} [activate]

Notes

no neighbor <IPv6-Address> deletes all "neighbor" command settings for the peer. no neighbor <Peer-Group> deletes all "neighbor" command settings for the peer group, including the settings for the peers that belong to the peer group.

Input mode

```
(config-router-af)(ipv6)
(config-router-af)(ipv6 vrf)
```

Parameters

{<IPv6-Address> | <Peer-Group>}

Specifies the IPv6 address of the BGP4+ peer or the BGP4+ peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv6-Address>, specify an IPv6 address of a peer.

   For <Peer-Group>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

Default behavior

IPv6 routes cannot be exchanged.

Impact on communication

If this command is not set, a BGP session using an IPv6 address as a peer address is not established.

When the change is applied

The change is applied when the command is set.

Notes

1. If this command is not set when an IPv6 address is used for peering, a BGP session with the peer cannot be established.
2. Before you can set this command for a peer, you need to use the "neighbor remote-as" command to set the peer or use the "neighbor peer-group (assigning member)" command to assign the peer to the peer group.
3. Before you can set this command for a peer group, you need to use the "neighbor peer-group (creating)" command to configure the peer group.

Related commands

neighbor remote-as

neighbor peer-group (assigning member)

neighbor peer-group (creating)

neighbor always-nexthop-self

The "neighbor always-nexthop-self" command specifies that the next hop of routes advertised to an internal peer is to be forcibly changed to the address of the local router used for peering with the internal peer. (This command also applies when using route reflection or when advertising IGP routes by BGP.)

If settings are performed in config-router mode, the settings are applied to BGP4 routes of the global network.

If you set the command in config-router-af(ipv4 vrf) mode, the setting applies to the BGP4 routes of the specified VRF.

If settings are performed in config-router-af(ipv6) mode, the settings are applied to BGP4+ routes of the global network.

If you set the command in config-router-af(ipv6 vrf) mode, the setting applies to the BGP4+ routes of the specified VRF.

Syntax

To set information:

For config-router mode or config-router-af(ipv4 vrf) mode:

neighbor {<IPv4-Address> | <Peer-Group>} always-nexthop-self

For config-router-af(ipv6) mode or config-router-af(ipv6 vrf) mode:

neighbor {<IPv6-Address> | <Peer-Group>} always-nexthop-self

To delete information:

For config-router mode or config-router-af(ipv4 vrf) mode:

no neighbor {<IPv4-Address> | <Peer-Group>} [always-nexthop-self]

For config-router-af(ipv6) mode or config-router-af(ipv6 vrf) mode:

no neighbor {<IPv6-Address> | <Peer-Group>} [always-nexthop-self]

Notes

no neighbor {<IPv4-Address> | <IPv6-Address>} deletes all "neighbor" command settings for the peer. no neighbor <Peer-Group> deletes all "neighbor" command settings for the peer group, including the settings for the peers that belong to the peer group.

Input mode

```
(config-router)
(config-router-af)(ipv4 vrf)
(config-router-af)(ipv6)
(config-router-af)(ipv6 vrf)
```

Parameters

{<IPv4-Address> | <Peer-Group>}

Specifies the IPv4 address of the BGP4 peer or the BGP4 peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv4-Address>, specify an IPv4 address.

For <Peer-Group>, specify a name of no more than 31 characters.

For details, see "Specifiable values for parameters".

{<IPv6-Address> | <Peer-Group>}

Specifies the IPv6 address of the BGP4+ peer or the BGP4+ peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv6-Address>, specify an IPv6 address.

   For <Peer-Group>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

Default behavior

If the peer from which the BGP route was learned and the advertising destination peer are on the same network interface, the next hop of the routing information advertised to an internal peer is not changed.

Impact on communication

None

When the change is applied

The change is applied when the command is set.

Notes

1. For route reflection, when routes learned from a client are advertised to the client (reflected) or IGP routes are advertised to an internal peer by BGP, the next hop is not changed even if the "neighbor next-hop-self" command is set. Use this command if you want to change the next hop to the peering address of local router when using route reflection or when advertising IGP routes to an internal peer by BGP.
2. Internal peers can only be specified.
3. Before you can set this command for a peer, you need to use the "neighbor remote-as" command to set the peer or use the "neighbor peer-group (assigning member)" command to assign the peer to the peer group.
4. Before you can set this command for a peer group, you need to use the "neighbor peer-group (creating)" command to configure the peer group.

Related commands

neighbor route-reflector-client

neighbor remote-as

neighbor peer-group (assigning member)

neighbor peer-group (creating)

neighbor as-override

The "neighbor as-override" command specifies that the first AS number set for the AS_SEQUENCE path type of the ASPATH attribute is to be overwritten with the local AS number and advertised to an external peer. If the same number as the first AS number appears in succession, all the consecutive AS numbers are overwritten.

If settings are performed in config-router mode, the settings are applied to BGP4 routes of the global network.

If you set the command in config-router-af(ipv4 vrf) mode, the setting applies to the BGP4 routes of the specified VRF.

If settings are performed in config-router-af(ipv6) mode, the settings are applied to BGP4+ routes of the global network.

If you set the command in config-router-af(ipv6 vrf) mode, the setting applies to the BGP4+ routes of the specified VRF.

Syntax

To set information:

For config-router mode or config-router-af(ipv4 vrf) mode:

neighbor {<IPv4-Address> | <Peer-Group>} as-override

For config-router-af(ipv6) mode or config-router-af(ipv6 vrf) mode:

neighbor {<IPv6-Address> | <Peer-Group>} as-override

To delete information:

For config-router mode or config-router-af(ipv4 vrf) mode:

no neighbor {<IPv4-Address> | <Peer-Group>} [as-override]

For config-router-af(ipv6) mode or config-router-af(ipv6 vrf) mode:

no neighbor {<IPv6-Address> | <Peer-Group>} [as-override]

Notes

no neighbor {<IPv4-Address> | <IPv6-Address>} deletes all "neighbor" command settings for the peer. no neighbor <Peer-Group> deletes all "neighbor" command settings for the peer group, including the settings for the peers that belong to the peer group.

Input mode

```
(config-router)
(config-router-af)(ipv4 vrf)
(config-router-af)(ipv6)
(config-router-af)(ipv6 vrf)
```

Parameters

{<IPv4-Address> | <Peer-Group>}

Specifies the IPv4 address of the BGP4 peer or the BGP4 peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

For <IPv4-Address>, specify an IPv4 address.

For <Peer-Group>, specify a name of no more than 31 characters.

For details, see "Specifiable values for parameters".

{<IPv6-Address> | <Peer-Group>}

Specifies the IPv6 address of the BGP4+ peer or the BGP4+ peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv6-Address>, specify an IPv6 address.

   For <Peer-Group>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

Default behavior

Handled as the normal ASPATH attribute.

Impact on communication

None

When the change is applied

The change is applied when the command is set.

Notes

None

Related commands

neighbor remote-as

neighbor peer-group (assigning member)

neighbor peer-group (creating)

neighbor bfd

The "neighbor bfd" command works in collaboration with BFD to disconnect peers.

If you set the command in config-router mode, the setting applies to BGP4 of the global network.

If you set the command in config-router-af(ipv4 vrf) mode, the setting applies to BGP4 of the specified VRF.

Syntax

To set or change information:

neighbor {<IPv4-Address> | <Peer-Group>} bfd <bfd name>

To delete information:

no neighbor {<IPv4-Address> | <Peer-Group>} [bfd]

Notes

no neighbor <IPv4-Address> deletes all "neighbor" command settings for the peer. no neighbor <Peer-Group> deletes all "neighbor" command settings for the peer group, including the settings for the peers that belong to the peer group.

Input mode

```
(config-router)
(config-router-af)(ipv4 vrf)
```

Parameters

{<IPv4-Address> | <Peer-Group>}

Specifies the IPv4 address of the BGP4 peer or the BGP4 peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv4-Address>, specify an IPv4 address.

   For <Peer-Group>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

bfd <bfd name>

Specifies the BFD name to collaborate with.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a name that is no more than 31 characters long.

   For details, see "Specifiable values for parameters".

Default behavior

No collaboration with BFD is performed.

Impact on communication

None

When the change is applied

The change is applied when the command is set.

Notes

1. Before you can set this command for a peer, you need to use the "neighbor remote-as" command to set the peer or use the "neighbor peer-group (assigning member)" command to assign the peer to the peer group.
2. Before you can set this command for a peer group, you need to use the "neighbor peer-group (creating)" command to configure the peer group.

Related commands

neighbor remote-as

neighbor peer-group (assigning member)

neighbor peer-group (creating)

bfd name

neighbor description

The "neighbor description" command specifies supplementary information for the peer. The specified information is displayed in the configuration file and added to the log data related to the peer.

If you set the command in config-router mode, the setting applies to BGP4 and BGP4+ of the global network.

If you set the command in config-router-af(ipv4 vrf) mode, the setting applies to BGP4 of the specified VRF.

If you set the command in config-router-af(ipv6 vrf) mode, the setting applies to BGP4+ of the specified VRF.

Syntax

To set or change information:

For config-router mode:

neighbor {<IPv4-Address> | <IPv6-Address> | <Peer-Group>} description <Text>

For config-router-af(ipv4 vrf) mode:

neighbor {<IPv4-Address> | <Peer-Group>} description <Text>

For config-router-af(ipv6 vrf) mode:

neighbor {<IPv6-Address> | <Peer-Group>} description <Text>

To delete information:

For config-router mode:

no neighbor {<IPv4-Address> | <IPv6-Address> | <Peer-Group>} [description]

For config-router-af(ipv4 vrf) mode:

no neighbor {<IPv4-Address> | <Peer-Group>} [description]

For config-router-af(ipv6 vrf) mode:

no neighbor {<IPv6-Address> | <Peer-Group>} [description]

Notes

no neighbor {<IPv4-Address> | <IPv6-Address>} deletes all "neighbor" command settings for the peer. no neighbor <Peer-Group> deletes all "neighbor" command settings for the peer group, including the settings for the peers that belong to the peer group.

Input mode

```
(config-router)
(config-router-af)(ipv4 vrf)
(config-router-af)(ipv6 vrf)
```

Parameters

{<IPv4-Address> | <IPv6-Address> | <Peer-Group>}

Specifies the IPv4 address of the BGP4 peer, IPv6 address of the BGP4+ peer, or the BGP4 or BGP4+ peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv4-Address>, specify an IPv4 address.

For <IPv6-Address>, specify an IPv6 address.

For <Peer-Group>, specify a name of no more than 31 characters.

For details, see "Specifiable values for parameters".

{<IPv4-Address> | <Peer-Group>}

Specifies the IPv4 address of the BGP4 peer or the BGP4 peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv4-Address>, specify an IPv4 address.

   For <Peer-Group>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

{<IPv6-Address> | <Peer-Group>}

Specifies the IPv6 address of the BGP4+ peer or the BGP4+ peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv6-Address>, specify an IPv6 address.

   For <Peer-Group>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

<Text>

Specifies the supplementary information.

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 64 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 "■Arbitrary character string" in "Specifiable values for parameters".

Default behavior

A supplementary description of a peer is not added.

Impact on communication

None

When the change is applied

The change is applied when the command is set.

Notes

1. Before you can set this command for a peer, you need to use the "neighbor remote-as" command to set the peer or use the "neighbor peer-group (assigning member)" command to assign the peer to the peer

group.

2. Before you can set this command for a peer group, you need to use the "neighbor peer-group (creating)" command to configure the peer group.

Related commands

neighbor remote-as

neighbor peer-group (assigning member)

neighbor peer-group (creating)

neighbor ebgp-multihop

The "neighbor ebgp-multihop" command allows BGP connection between an external peer that is not directly connected and a member AS peer.

If you set the command in config-router mode, the setting applies to BGP4 and BGP4+ of the global network.

If you set the command in config-router-af(ipv4 vrf) mode, the setting applies to BGP4 of the specified VRF.

If you set the command in config-router-af(ipv6 vrf) mode, the setting applies to BGP4+ of the specified VRF.

Syntax

To set or change information:

For config-router mode:

neighbor {<IPv4-Address> | <IPv6-Address> | <Peer-Group>} ebgp-multihop [<Ttl>]

For config-router-af(ipv4 vrf) mode:

neighbor {<IPv4-Address> | <Peer-Group>} ebgp-multihop [<Ttl>]

For config-router-af(ipv6 vrf) mode:

neighbor {<IPv6-Address> | <Peer-Group>} ebgp-multihop [<Ttl>]

To delete information:

For config-router mode:

no neighbor {<IPv4-Address> | <IPv6-Address> | <Peer-Group>} [ebgp-multihop]

For config-router-af(ipv4 vrf) mode:

no neighbor {<IPv4-Address> | <Peer-Group>} [ebgp-multihop]

For config-router-af(ipv6 vrf) mode:

no neighbor {<IPv6-Address> | <Peer-Group>} [ebgp-multihop]

Notes

no neighbor {<IPv4-Address> | <IPv6-Address>} deletes all "neighbor" command settings for the peer. no neighbor <Peer-Group> deletes all "neighbor" command settings for the peer group, including the settings for the peers that belong to the peer group.

Input mode

```
(config-router)
(config-router-af)(ipv4 vrf)
(config-router-af)(ipv6 vrf)
```

Parameters

{<IPv4-Address> | <IPv6-Address> | <Peer-Group>}

Specifies the IPv4 address of the BGP4 peer, IPv6 address of the BGP4+ peer, or the BGP4 or BGP4+ peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv4-Address>, specify an IPv4 address.

For <IPv6-Address>, specify an IPv6 address.

For <Peer-Group>, specify a name of no more than 31 characters.

For details, see "Specifiable values for parameters".

{<IPv4-Address> | <Peer-Group>}

Specifies the IPv4 address of the BGP4 peer or the BGP4 peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv4-Address>, specify an IPv4 address.

   For <Peer-Group>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

{<IPv6-Address> | <Peer-Group>}

Specifies the IPv6 address of the BGP4+ peer or the BGP4+ peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv6-Address>, specify an IPv6 address.

   For <Peer-Group>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

<Ttl>

Specifies the number of hops.

1. Default value when this parameter is omitted:

   255

2. Range of values:

   Specify 1 to 255 in decimal.

Default behavior

If an external peer and a member AS peer are not directly connected, no BGP connection can be established.

Impact on communication

If you change the setting of this command, the BGP session with the specified peer is temporarily disconnected. As a result, communication stops until the routes are relearned from the peer.

When the change is applied

The change is applied when the command is set.

Notes

1. Only external peers or AS peers can be specified. For internal peers, this command is not required even if the peers are not directly connected to the interface.
2. If you add, change, or delete information set by this command, the BGP session with the peer is temporarily disconnected.

3. Before you can set this command for a peer, you need to use the "neighbor remote-as" command to set the peer or use the "neighbor peer-group (assigning member)" command to assign the peer to the peer group.
4. Before you can set this command for a peer group, you need to use the "neighbor peer-group (creating)" command to configure the peer group.

Related commands

neighbor update-source

neighbor remote-as

neighbor peer-group (assigning member)

neighbor peer-group (creating)

neighbor maximum-prefix

The "neighbor maximum-prefix" command limits the number of routes that can be learned from a BGP peer. You can specify that the BGP peer is to be disconnected if the number of learned routes exceeds a maximum so that no more routes are learned.

The disconnected BGP peer is reconnected by input of the "clear ip bgp" (for BGP4) or "clear ipv6 bgp" (for BGP4+) operation command.

If settings are performed in config-router mode, the settings are applied to BGP4 routes of the global network.

If you set the command in config-router-af(ipv4 vrf) mode, the setting applies to the BGP4 routes of the specified VRF.

If settings are performed in config-router-af(ipv6) mode, the settings are applied to BGP4+ routes of the global network.

If you set the command in config-router-af(ipv6 vrf) mode, the setting applies to the BGP4+ routes of the specified VRF.

Syntax

To set or change information:

For config-router mode or config-router-af(ipv4 vrf) mode:

neighbor {<IPv4-Address> | <Peer-Group>} maximum-prefix <Maximum> [<Threshold>] [{warning-only | restart <Minutes>}]

For config-router-af(ipv6) mode or config-router-af(ipv6 vrf) mode:

neighbor {<IPv6-Address> | <Peer-Group>} maximum-prefix <Maximum> [<Threshold>] [{warning-only | restart <Minutes>}]

To delete information:

For config-router mode or config-router-af(ipv4 vrf) mode:

no neighbor {<IPv4-Address> | <Peer-Group>} [maximum-prefix]

For config-router-af(ipv6) mode or config-router-af(ipv6 vrf) mode:

no neighbor {<IPv6-Address> | <Peer-Group>} [maximum-prefix]

Notes

no neighbor {<IPv4-Address> | <IPv6-Address>} deletes all "neighbor" command settings for the peer. no neighbor <Peer-Group> deletes all "neighbor" command settings for the peer group, including the settings for the peers that belong to the peer group.

Notes

- Using the command prefixed by no cannot delete information specified for a parameter.
- After a parameter has been set, if you set the command again without specifying the parameter, information set for that parameter will be deleted.

Input mode

```
(config-router)
(config-router-af)(ipv4 vrf)
(config-router-af)(ipv6)
(config-router-af)(ipv6 vrf)
```

Parameters

{<IPv4-Address> | <Peer-Group>}

Specifies the IPv4 address of the BGP4 peer or the BGP4 peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv4-Address>, specify an IPv4 address.

   For <Peer-Group>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

{<IPv6-Address> | <Peer-Group>}

Specifies the IPv6 address of the BGP4+ peer or the BGP4+ peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv6-Address>, specify an IPv6 address.

   For <Peer-Group>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

maximum-prefix <Maximum>

Specifies the maximum number of routes that can be learned from a BGP peer.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 4294967295 in decimal.

<Threshold>

Sets a threshold to output a warning operation message for the maximum number of routes that can be learned from a BGP peer. If you specify 100%, a warning operation message is not output.

1. Default value when this parameter is omitted:

   75 is applied.

2. Range of values:

   Specify 1 to 100 (%) in decimal.

warning-only

Specifies that the BGP peer is not to be disconnected even if the number of routes learned from the BGP peer exceeds the maximum.

1. Default value when this parameter is omitted:

   The BGP peer is disconnected if the number of routes learned from the BGP peer exceeds the maximum.

2. Range of values:

   None

restart <Minutes>

Specifies the time that a BGP peer will wait to be reconnected after it is disconnected because the number of routes learned from the BGP peer exceeded the maximum. You can reconnect the disconnected

BGP peer anytime by inputting the "clear ip bgp" (for BGP4) or "clear ipv6 bgp" (for BGP4+) operation command.

1. Default value when this parameter is omitted:

   After the number of routes learned from a BGP peer exceeded the maximum and the BGP was disconnected, the BGP peer is not reconnected until the "clear ip bgp" (for BGP4) or "clear ipv6 bgp" (for BGP4+) operation command is entered.

2. Range of values:

   Specify 1 to 65535 (minutes) in decimal.

Default behavior

The number of routes that can be learned from a BGP peer is not limited.

Impact on communication

None

When the change is applied

The change is applied when the command is set.

Notes

1. Before you can set this command for a peer, you need to use the "neighbor remote-as" command to set the peer or use the "neighbor peer-group (assigning member)" command to assign the peer to the peer group.
2. Before you can set this command for a peer group, you need to use the "neighbor peer-group (creating)" command to configure the peer group.

Related commands

neighbor remote-as

neighbor peer-group (assigning member)

neighbor peer-group (creating)

neighbor next-hop-self

The "neighbor next-hop-self" command allows the next hop when a route learned from a BGP peer is advertised to BGP peers to be changed to the local address used for peering with the destination BGP peers.

If settings are performed in config-router mode, the settings are applied to BGP4 routes of the global network.

If you set the command in config-router-af(ipv4 vrf) mode, the setting applies to the BGP4 routes of the specified VRF.

If settings are performed in config-router-af(ipv6) mode, the settings are applied to BGP4+ routes of the global network.

If you set the command in config-router-af(ipv6 vrf) mode, the setting applies to the BGP4+ routes of the specified VRF.

Syntax

To set information:

For config-router mode or config-router-af(ipv4 vrf) mode:

neighbor {<IPv4-Address> | <Peer-Group>} next-hop-self

For config-router-af(ipv6) mode or config-router-af(ipv6 vrf) mode:

neighbor {<IPv6-Address> | <Peer-Group>} next-hop-self

To delete information:

For config-router mode or config-router-af(ipv4 vrf) mode:

no neighbor {<IPv4-Address> | <Peer-Group>} [next-hop-self]

For config-router-af(ipv6) mode or config-router-af(ipv6 vrf) mode:

no neighbor {<IPv6-Address> | <Peer-Group>} [next-hop-self]

Notes

no neighbor {<IPv4-Address> | <IPv6-Address>} deletes all "neighbor" command settings for the peer. no neighbor <Peer-Group> deletes all "neighbor" command settings for the peer group, including the settings for the peers that belong to the peer group.

Input mode

```
(config-router)
(config-router-af)(ipv4 vrf)
(config-router-af)(ipv6)
(config-router-af)(ipv6 vrf)
```

Parameters

{<IPv4-Address> | <Peer-Group>}

Specifies the IPv4 address of the BGP4 peer or the BGP4 peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv4-Address>, specify an IPv4 address.

For <Peer-Group>, specify a name of no more than 31 characters.

For details, see "Specifiable values for parameters".

{<IPv6-Address> | <Peer-Group>}

Specifies the IPv6 address of the BGP4+ peer or the BGP4+ peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv6-Address>, specify an IPv6 address.

   For <Peer-Group>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

Default behavior

If the peer from which the BGP route was learned and the advertising destination peer are on the same network interface, the next hop of the routing information advertised to an internal peer is not changed.

Impact on communication

None

When the change is applied

The change is applied when the command is set.

Notes

1. When route reflection is used or when an IGP route is advertised to an internal peer by BGP, the next hop to be advertised to the client is not changed even if this command is set. If you want to change the next hop when using route reflection or when advertising an IGP route to an internal peer by BGP, use the "neighbor always-nexthop-self" command.
2. Before you can set this command for a peer, you need to use the "neighbor remote-as" command to set the peer or use the "neighbor peer-group (assigning member)" command to assign the peer to the peer group.
3. Before you can set this command for a peer group, you need to use the "neighbor peer-group (creating)" command to configure the peer group.

Related commands

neighbor always-nexthop-self

neighbor remote-as

neighbor peer-group (assigning member)

neighbor peer-group (creating)

neighbor password

The "neighbor password" command sets TCP MD5 authentication information (authentication key used to generate message digests) between peers.

If you set the command in config-router mode, the setting applies to BGP4 and BGP4+ of the global network.

If you set the command in config-router-af(ipv4 vrf) mode, the setting applies to BGP4 of the specified VRF.

If you set the command in config-router-af(ipv6 vrf) mode, the setting applies to BGP4+ of the specified VRF.

Syntax

To set or change information:

For config-router mode:
neighbor {<IPv4-Address> | <IPv6-Address> | <Peer-Group>} password <Key>

For config-router-af(ipv4 vrf) mode:
neighbor {<IPv4-Address> | <Peer-Group>} password <Key>

For config-router-af(ipv6 vrf) mode:
neighbor {<IPv6-Address> | <Peer-Group>} password <Key>

To delete information:

For config-router mode:
no neighbor {<IPv4-Address> | <IPv6-Address> | <Peer-Group>} [password]

For config-router-af(ipv4 vrf) mode:
no neighbor {<IPv4-Address> | <Peer-Group>} [password]

For config-router-af(ipv6 vrf) mode:
no neighbor {<IPv6-Address> | <Peer-Group>} [password]

Notes
no neighbor {<IPv4-Address> | <IPv6-Address>} deletes all "neighbor" command settings for the peer. no neighbor <Peer-Group> deletes all "neighbor" command settings for the peer group, including the settings for the peers that belong to the peer group.

Input mode

```
(config-router)
(config-router-af)(ipv4 vrf)
(config-router-af)(ipv6 vrf)
```

Parameters

{<IPv4-Address> | <IPv6-Address> | <Peer-Group>}

Specifies the IPv4 address of the BGP4 peer, IPv6 address of the BGP4+ peer, or the BGP4 or BGP4+ peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv4-Address>, specify an IPv4 address.

   For <IPv6-Address>, specify an IPv6 address.

   For <Peer-Group>, specify a name of no more than 31 characters.

For details, see "Specifiable values for parameters".

{<IPv4-Address> | <Peer-Group>}

Specifies the IPv4 address of the BGP4 peer or the BGP4 peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv4-Address>, specify an IPv4 address.

   For <Peer-Group>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

{<IPv6-Address> | <Peer-Group>}

Specifies the IPv6 address of the BGP4+ peer or the BGP4+ peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv6-Address>, specify an IPv6 address.

   For <Peer-Group>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

<Key>

Specifies TCP MD5 authentication information.

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 80 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 "■Arbitrary character string" in "Specifiable values for parameters".

Default behavior

TCP MD5 authentication is not used.

Impact on communication

If you use this command to change the authentication key, the BGP session with the specified peer is temporarily disconnected. As a result, communication stops until the routes are relearned from the peer.

When the change is applied

The change is applied when the command is set.

Notes

1. If you use this command to add, change, or delete TCP MD5 authentication information, the BGP session with the peer is temporarily disconnected.
2. Before you can set this command for a peer, you need to use the "neighbor remote-as" command to set the peer or use the "neighbor peer-group (assigning member)" command to assign the peer to the peer

group.

3. Before you can set this command for a peer group, you need to use the "neighbor peer-group (creating)" command to configure the peer group.

Related commands

neighbor remote-as

neighbor peer-group (assigning member)

neighbor peer-group (creating)

neighbor peer-group (assigning members)

The "neighbor peer-group (assigning members)" command assigns a peer to a peer group. Because the "neighbor" command settings for a peer group apply to all peers that belong to the peer group, you can simplify settings by assigning the peers that have the same "neighbor" command settings to the same peer group. It is also possible to separately set the "neighbor" command settings for each peer in the peer group. In this case, the "neighbor" command settings for the peer are applied.

If you set the command in config-router mode, the setting applies to BGP4 and BGP4+ of the global network. Note, however, that BGP4 peers and BGP4+ peers cannot be assigned to the same peer group.

If you set the command in config-router-af(ipv4 vrf) mode, the setting applies to BGP4 of the specified VRF.

If you set the command in config-router-af(ipv6 vrf) mode, the setting applies to BGP4+ of the specified VRF.

Syntax

To set or change information:

For config-router mode:

neighbor {<IPv4-Address> | <IPv6-Address>} peer-group <Peer-Group>

For config-router-af(ipv4 vrf) mode:

neighbor <IPv4-Address> peer-group <Peer-Group>

For config-router-af(ipv6 vrf) mode:

neighbor <IPv6-Address> peer-group <Peer-Group>

To delete information:

For config-router mode:

no neighbor {<IPv4-Address> | <IPv6-Address>} [peer-group]

For config-router-af(ipv4 vrf) mode:

no neighbor <IPv4-Address> [peer-group]

For config-router-af(ipv6 vrf) mode:

no neighbor <IPv6-Address> [peer-group]

Notes

no neighbor {<IPv4-Address> | <IPv6-Address>} deletes all "neighbor" command settings for the peer.

Input mode

```
(config-router)
(config-router-af)(ipv4 vrf)
(config-router-af)(ipv6 vrf)
```

Parameters

{<IPv4-Address> | <IPv6-Address>}

Specifies the IPv4 address of the BGP4 peer or the IPv6 address of the BGP4+ peer.

<IPv4-Address>

Specifies the IPv4 address of the BGP4 peer.

<IPv6-Address>

Specifies the IPv6 address of the BGP4+ peer.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv4-Address>, specify an IPv4 address.

   For <IPv6-Address>, specify an IPv6 address.

   For details, see "Specifiable values for parameters".

<IPv4-Address>

Specifies the IPv4 address of the BGP4 peer.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv4-Address>, specify an IPv4 address.

   For details, see "Specifiable values for parameters".

<IPv6-Address>

Specifies the IPv6 address of the BGP4+ peer.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv6-Address>, specify an IPv6 address.

   For details, see "Specifiable values for parameters".

<Peer-Group>

Specifies the peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a name that is no more than 31 characters long.

   For details, see "Specifiable values for parameters".

Default behavior

Peers are not assigned to a peer group.

Impact on communication

None

When the change is applied

The change is applied when the command is set.

Notes

1. Before you can set this command, you need to use the "neighbor peer-group (creating)" command to configure a peer group.
2. Before you can set this command, you need to use the "neighbor remote-as" command to set the peer or the AS number for the peer group containing the peer.
3. If you delete the information set by the command when the "neighbor remote-as" command has not been set for the peer, all information about the peer is deleted.
4. External peers and member AS peers cannot be assigned to a group that contains internal peers.
5. BGP4 peers and BGP4+ peers in the global network cannot be assigned to the same peer group. In VRFs, you can set the same peer group ID for BGP4 and BGP4+. In this case, the BGP4 peer group and BGP4+ peer group are handled as different peer groups.
6. Peers of the global network and peers of a VRF cannot be assigned to the same peer group. Peers of different VRFs cannot be assigned to the same peer group. The same peer group ID can be set for the peers of the global network and peers of a VRF, or peers in different VRFs. In this case, the peers of the global network and peers of a VRF, or the peers of different VRFs, are handled as different peer groups.
7. If you change the target peer group, the route filtering for the new peer group does not apply to the peers unless either of the following operation commands is entered: The "clear ip bgp [vrf {<vrf id> | all}] * {both| in | out}" command for BGP4 or the "clear ipv6 bgp [vrf {<vrf id> | all}] * {both| in | out}" command for BGP4+.

Related commands

neighbor peer-group (creating)

neighbor remote-as

neighbor peer-group (creating)

The "neighbor peer-group (creating)" command sets a group of peers that share the configuration settings. The "neighbor" command settings apply to all peers that belong to the specified peer group. It is also possible to separately set the "neighbor" command settings for each peer in the peer group. In this case, the "neighbor" command settings for the peer are applied.

If you set the command in config-router mode, the setting applies to BGP4 and BGP4+ of the global network. Note, however, that BGP4 peers and BGP4+ peers cannot be assigned to the same peer group.

If you set the command in config-router-af(ipv4 vrf) mode, the setting applies to BGP4 of the specified VRF.

If you set the command in config-router-af(ipv6 vrf) mode, the setting applies to BGP4+ of the specified VRF.

Syntax

To set information:

neighbor <Peer-Group> peer-group

To delete information:

no neighbor <Peer-Group> [peer-group]

Notes

no neighbor <Peer-Group> deletes all "neighbor" command settings for the peer group, including the settings for the peers that belong to the peer group.

Input mode

```
(config-router)
(config-router-af)(ipv4 vrf)
(config-router-af)(ipv6 vrf)
```

Parameters

<Peer-Group>

Specifies the peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a name that is no more than 31 characters long.

   For details, see "Specifiable values for parameters".

Default behavior

A group of peers that share the configuration settings is not set.

Impact on communication

None

When the change is applied

The change is applied when the command is set.

Notes

1. You must set this command before you can specify another "neighbor" command for the peer group.
2. If you delete the information set by this command, all the "neighbor" command settings for the peer group are deleted. If the "neighbor remote-as" command has not been set for a peer that belongs to the specified peer group, all information about the peer is also deleted. If the "neighbor remote-as" command has been set, the information about the peer is not deleted.
3. External peers and member AS peers cannot be assigned to a group that contains internal peers.
4. BGP4 peers and BGP4+ peers in the global network cannot be assigned to the same peer group. In VRFs, you can set the same peer group ID for BGP4 and BGP4+. In this case, the BGP4 peer group and BGP4+ peer group are handled as different peer groups.
5. Peers of the global network and peers of a VRF cannot be assigned to the same peer group. Peers of different VRFs cannot be assigned to the same peer group. The same peer group ID can be set for the peers of the global network and peers of a VRF, or peers in different VRFs. In this case, the peers of the global network and peers of a VRF, or the peers of different VRFs, are handled as different peer groups.

Related commands

neighbor peer-group (assigning members)

neighbor permit-asloop

The "neighbor permit-asloop" command allows a received route to be accepted as a normal route even if the ASPATH attribute of the received route shows an AS loop.

If settings are performed in config-router mode, the settings are applied to BGP4 routes of the global network.

If you set the command in config-router-af(ipv4 vrf) mode, the setting applies to the BGP4 routes of the specified VRF.

If settings are performed in config-router-af(ipv6) mode, the settings are applied to BGP4+ routes of the global network.

If you set the command in config-router-af(ipv6 vrf) mode, the setting applies to the BGP4+ routes of the specified VRF.

Syntax

To set information:

For config-router mode or config-router-af(ipv4 vrf) mode:

neighbor {<IPv4-Address> | <Peer-Group>} permit-asloop

For config-router-af(ipv6) mode or config-router-af(ipv6 vrf) mode:

neighbor {<IPv6-Address> | <Peer-Group>} permit-asloop

To delete information:

For config-router mode or config-router-af(ipv4 vrf) mode:

no neighbor {<IPv4-Address> | <Peer-Group>} [permit-asloop]

For config-router-af(ipv6) mode or config-router-af(ipv6 vrf) mode:

no neighbor {<IPv6-Address> | <Peer-Group>} [permit-asloop]

Notes

no neighbor {<IPv4-Address> | <IPv6-Address>} deletes all "neighbor" command settings for the peer. no neighbor <Peer-Group> deletes all "neighbor" command settings for the peer group, including the settings for the peers that belong to the peer group.

Input mode

```
(config-router)
(config-router-af)(ipv4 vrf)
(config-router-af)(ipv6)
(config-router-af)(ipv6 vrf)
```

Parameters

{<IPv4-Address> | <Peer-Group>}

Specifies the IPv4 address of the BGP4 peer or the BGP4 peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv4-Address>, specify an IPv4 address.

For <Peer-Group>, specify a name of no more than 31 characters.

For details, see "Specifiable values for parameters".

{<IPv6-Address> | <Peer-Group>}

Specifies the IPv6 address of the BGP4+ peer or the BGP4+ peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv6-Address>, specify an IPv6 address.

   For <Peer-Group>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

Default behavior

AS loop routes are not accepted.

Impact on communication

None

When the change is applied

The change is applied when the command is set.

Notes

None

Related commands

neighbor remote-as

neighbor peer-group (assigning member)

neighbor peer-group (creating)

neighbor remote-as

The "neighbor remote-as" command sets the AS number of a BGP peer or peer group. This command must be used to set a BGP peer.

If you set the command in config-router mode, the setting applies to BGP4 and BGP4+ of the global network.

If you set the command in config-router-af(ipv4 vrf) mode, the setting applies to BGP4 of the specified VRF.

If you set the command in config-router-af(ipv6 vrf) mode, the setting applies to BGP4+ of the specified VRF.

Syntax

To set or change information:

For config-router mode:

neighbor {<IPv4-Address> | <IPv6-Address> | <Peer-Group>} remote-as <As>

For config-router-af(ipv4 vrf) mode:

neighbor {<IPv4-Address> | <Peer-Group>} remote-as <As>

For config-router-af(ipv6 vrf) mode:

neighbor {<IPv6-Address> | <Peer-Group>} remote-as <As>

To delete information:

For config-router mode:

no neighbor {<IPv4-Address> | <IPv6-Address> | <Peer-Group>} [remote-as]

For config-router-af(ipv4 vrf) mode:

no neighbor {<IPv4-Address> | <Peer-Group>} [remote-as]

For config-router-af(ipv6 vrf) mode:

no neighbor {<IPv6-Address> | <Peer-Group>} [remote-as]

Notes

no neighbor {<IPv4-Address> | <IPv6-Address>} deletes all "neighbor" command settings for the peer. no neighbor <Peer-Group> deletes all "neighbor" command settings for the peer group, including the settings for the peers that belong to the peer group.

Input mode

```
(config-router)
(config-router-af)(ipv4 vrf)
(config-router-af)(ipv6 vrf)
```

Parameters

{<IPv4-Address> | <IPv6-Address> | <Peer-Group>}

Specifies the IPv4 address of the BGP4 peer, IPv6 address of the BGP4+ peer, or the BGP4 or BGP4+ peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv4-Address>, specify an IPv4 address.

For <IPv6-Address>, specify an IPv6 address.

For <Peer-Group>, specify a name of no more than 31 characters.

For details, see "Specifiable values for parameters".

{<IPv4-Address> | <Peer-Group>}

Specifies the IPv4 address of the BGP4 peer or the BGP4 peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv4-Address>, specify an IPv4 address.

   For <Peer-Group>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

{<IPv6-Address> | <Peer-Group>}

Specifies the IPv6 address of the BGP4+ peer or the BGP4+ peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv6-Address>, specify an IPv6 address.

   For <Peer-Group>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

<As>

Specifies the AS number of the BGP peer.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 65535 in decimal.

Default behavior

No BGP peer is set.

Impact on communication

If you use this command to change the AS number of the peer, the BGP session with the peer is temporarily disconnected. As a result, communication stops until the routes are relearned from the peer.

When the change is applied

The change is applied when the command is set.

Notes

1. Notes on setting information

   - Before you can set this command for a peer group, you need to use the "neighbor peer-group (creating)" command to configure the peer group.
   - If you set this command for a peer group, you cannot set the command for a peer that belong to the peer group.

- If you set this command for a peer that belongs to a peer group, you cannot set the command for the peer group.
- This command must be set for a peer before you can specify another "neighbor" command for that peer. When peers belong to a peer group, this command must be set for either each peer or the peer group.

2. To use a link-local address for <IPv6-Address>, you need to use the "neighbor update-source" command to specify the interface that indicates the local peer address (link-local address).

Related commands

Other neighbor commands related to the peer or peer group

bgp confederation identifier

bgp confederation peers

neighbor remove-private-as

The "neighbor remove-private-as" command specifies the removal of private AS numbers when the routing information whose AS_PATH attribute contains only private AS numbers (64512 to 65535) is advertised to external peers or member AS peers.

If settings are performed in config-router mode, the settings are applied to BGP4 routes of the global network.

If you set the command in config-router-af(ipv4 vrf) mode, the setting applies to the BGP4 routes of the specified VRF.

If settings are performed in config-router-af(ipv6) mode, the settings are applied to BGP4+ routes of the global network.

If you set the command in config-router-af(ipv6 vrf) mode, the setting applies to the BGP4+ routes of the specified VRF.

Syntax

To set information:

For config-router mode or config-router-af(ipv4 vrf) mode:

neighbor {<IPv4-Address> | <Peer-Group>} remove-private-as

For config-router-af(ipv6) mode or config-router-af(ipv6 vrf) mode:

neighbor {<IPv6-Address> | <Peer-Group>} remove-private-as

To delete information:

For config-router mode or config-router-af(ipv4 vrf) mode:

no neighbor {<IPv4-Address> | <Peer-Group>} remove-private-as

For config-router-af(ipv6) mode or config-router-af(ipv6 vrf) mode:

no neighbor {<IPv6-Address> | <Peer-Group>} remove-private-as

Notes

no neighbor {<IPv4-Address> | <IPv6-Address>} deletes all "neighbor" command settings for the peer. no neighbor <Peer-Group> deletes all "neighbor" command settings for the peer group, including the settings for the peers that belong to the peer group.

Input mode

```
(config-router)
(config-router-af)(ipv4 vrf)
(config-router-af)(ipv6)
(config-router-af)(ipv6 vrf)
```

Parameters

{<IPv4-Address> | <Peer-Group>}

Specifies the IPv4 address of the BGP4 peer or the BGP4 peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv4-Address>, specify an IPv4 address.

For <Peer-Group>, specify a name of no more than 31 characters.

For details, see "Specifiable values for parameters".

{<IPv6-Address> | <Peer-Group>}

Specifies the IPv6 address of the BGP4+ peer or the BGP4+ peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv6-Address>, specify an IPv6 address.

   For <Peer-Group>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

Default behavior

Private AS numbers are advertised without change.

Impact on communication

None

When the change is applied

The change is applied when the "clear ip bgp [vrf {<vrf id> | all}] * { out | both }" (for BGP4) or "clear ipv6 bgp [vrf {<vrf id> | all}] * { out | both }" (for BGP4+) operation command is executed.

Notes

None

Related commands

None

neighbor route-reflector-client

The "neighbor route-reflector-client" command specifies the route reflector client. This command also specifies that the local router is to work as a route reflector.

If settings are performed in config-router mode, the settings are applied to BGP4 routes of the global network.

If you set the command in config-router-af(ipv4 vrf) mode, the setting applies to the BGP4 routes of the specified VRF.

If settings are performed in config-router-af(ipv6) mode, the settings are applied to BGP4+ routes of the global network.

If you set the command in config-router-af(ipv6 vrf) mode, the setting applies to the BGP4+ routes of the specified VRF.

Syntax

To set information:

For config-router mode or config-router-af(ipv4 vrf) mode:

neighbor {<IPv4-Address> | <Peer-Group>} route-reflector-client

For config-router-af(ipv6) mode or config-router-af(ipv6 vrf) mode:

neighbor {<IPv6-Address> | <Peer-Group>} route-reflector-client

To delete information:

For config-router mode or config-router-af(ipv4 vrf) mode:

no neighbor {<IPv4-Address> | <Peer-Group>} [route-reflector-client]

For config-router-af(ipv6) mode or config-router-af(ipv6 vrf) mode:

no neighbor {<IPv6-Address> | <Peer-Group>} [route-reflector-client]

Notes

no neighbor {<IPv4-Address> | <IPv6-Address>} deletes all "neighbor" command settings for the peer. no neighbor <Peer-Group> deletes all "neighbor" command settings for the peer group, including the settings for the peers that belong to the peer group.

Input mode

```
(config-router)
(config-router-af)(ipv4 vrf)
(config-router-af)(ipv6)
(config-router-af)(ipv6 vrf)
```

Parameters

{<IPv4-Address> | <Peer-Group>}

Specifies the IPv4 address of the BGP4 peer or the BGP4 peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv4-Address>, specify an IPv4 address.

For <Peer-Group>, specify a name of no more than 31 characters.

For details, see "Specifiable values for parameters".

{<IPv6-Address> | <Peer-Group>}

Specifies the IPv6 address of the BGP4+ peer or the BGP4+ peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv6-Address>, specify an IPv6 address.

   For <Peer-Group>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

Default behavior

The route reflector client is not specified.

Impact on communication

None

When the change is applied

The change is applied when the command is set.

Notes

1. Internal peers can only be specified.
2. Before you can set this command for a peer, you need to use the "neighbor remote-as" command to set the peer or use the "neighbor peer-group (assigning member)" command to assign the peer to the peer group.
3. Before you can set this command for a peer group, you need to use the "neighbor peer-group (creating)" command to configure the peer group.

Related commands

bgp cluster-id

bgp client-to-client reflection

neighbor always-nexthop-self

neighbor set-nexthop-peer

neighbor remote-as

neighbor peer-group (assigning member)

neighbor peer-group (creating)

neighbor send-community

The "neighbor send-community" command specifies that the COMMUNITIES attribute is to be sent if it is added to the BGP routing information that is to be advertised.

If settings are performed in config-router mode, the settings are applied to BGP4 routes of the global network.

If you set the command in config-router-af(ipv4 vrf) mode, the setting applies to the BGP4 routes of the specified VRF.

If settings are performed in config-router-af(ipv6) mode, the settings are applied to BGP4+ routes of the global network.

If you set the command in config-router-af(ipv6 vrf) mode, the setting applies to the BGP4+ routes of the specified VRF.

Syntax

To set information:

For config-router mode or config-router-af(ipv4 vrf) mode:

neighbor {<IPv4-Address> | <Peer-Group>} send-community

For config-router-af(ipv6) mode or config-router-af(ipv6 vrf) mode:

neighbor {<IPv6-Address> | <Peer-Group>} send-community

To delete information:

For config-router mode or config-router-af(ipv4 vrf) mode:

no neighbor {<IPv4-Address> | <Peer-Group>} [send-community]

For config-router-af(ipv6) mode or config-router-af(ipv6 vrf) mode:

no neighbor {<IPv6-Address> | <Peer-Group>} [send-community]

Notes

no neighbor {<IPv4-Address> | <IPv6-Address>} deletes all "neighbor" command settings for the peer. no neighbor <Peer-Group> deletes all "neighbor" command settings for the peer group, including the settings for the peers that belong to the peer group.

Input mode

```
(config-router)
(config-router-af)(ipv4 vrf)
(config-router-af)(ipv6)
(config-router-af)(ipv6 vrf)
```

Parameters

{<IPv4-Address> | <Peer-Group>}

Specifies the IPv4 address of the BGP4 peer or the BGP4 peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv4-Address>, specify an IPv4 address.

For <Peer-Group>, specify a name of no more than 31 characters.

For details, see "Specifiable values for parameters".

{<IPv6-Address> | <Peer-Group>}

Specifies the IPv6 address of the BGP4+ peer or the BGP4+ peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv6-Address>, specify an IPv6 address.

   For <Peer-Group>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

Default behavior

The COMMUNITIES attribute is not sent even if it is added to the BGP routing information to be advertised.

Impact on communication

None

When the change is applied

The change is applied when the command is set.

Notes

1. Before you can set this command for a peer, you need to use the "neighbor remote-as" command to set the peer or use the "neighbor peer-group (assigning member)" command to assign the peer to the peer group.
2. Before you can set this command for a peer group, you need to use the "neighbor peer-group (creating)" command to configure the peer group.

Related commands

neighbor remote-as

neighbor peer-group (assigning member)

neighbor peer-group (creating)

neighbor set-nexthop-peer

The "neighbor set-nexthop-peer" command specifies that the next hop of the received routing information is to be changed to the remote IP address used for peering.

If settings are performed in config-router mode, the settings are applied to BGP4 routes of the global network.

If you set the command in config-router-af(ipv4 vrf) mode, the setting applies to the BGP4 routes of the specified VRF.

If settings are performed in config-router-af(ipv6) mode, the settings are applied to BGP4+ routes of the global network.

If you set the command in config-router-af(ipv6 vrf) mode, the setting applies to the BGP4+ routes of the specified VRF.

Syntax

To set information:

For config-router mode or config-router-af(ipv4 vrf) mode:

neighbor {<IPv4-Address> | <Peer-Group>} set-nexthop-peer

For config-router-af(ipv6) mode or config-router-af(ipv6 vrf) mode:

neighbor {<IPv6-Address> | <Peer-Group>} set-nexthop-peer

To delete information:

For config-router mode or config-router-af(ipv4 vrf) mode:

no neighbor {<IPv4-Address> | <Peer-Group>} [set-nexthop-peer]

For config-router-af(ipv6) mode or config-router-af(ipv6 vrf) mode:

no neighbor {<IPv6-Address> | <Peer-Group>} [set-nexthop-peer]

Notes

no neighbor {<IPv4-Address> | <IPv6-Address>} deletes all "neighbor" command settings for the peer. no neighbor <Peer-Group> deletes all "neighbor" command settings for the peer group, including the settings for the peers that belong to the peer group.

Input mode

```
(config-router)
(config-router-af)(ipv4 vrf)
(config-router-af)(ipv6)
(config-router-af)(ipv6 vrf)
```

Parameters

{<IPv4-Address> | <Peer-Group>}

Specifies the IPv4 address of the BGP4 peer or the BGP4 peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv4-Address>, specify an IPv4 address.

For <Peer-Group>, specify a name of no more than 31 characters.

For details, see "Specifiable values for parameters".

{<IPv6-Address> | <Peer-Group>}

Specifies the IPv6 address of the BGP4+ peer or the BGP4+ peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv6-Address>, specify an IPv6 address.

   For <Peer-Group>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

Default behavior

The next hop of the received routing information is not changed.

Impact on communication

None

When the change is applied

The change is applied when the command is set.

Notes

1. Before you can set this command for a peer, you need to use the "neighbor remote-as" command to set the peer or use the "neighbor peer-group (assigning member)" command to assign the peer to the peer group.
2. Before you can set this command for a peer group, you need to use the "neighbor peer-group (creating)" command to configure the peer group.

Related commands

neighbor remote-as

neighbor peer-group (assigning member)

neighbor peer-group (creating)

neighbor shutdown

The "neighbor shutdown" command suppresses a peer connection.

If you set the command in config-router mode, the setting applies to BGP4 and BGP4+ of the global network.

If you set the command in config-router-af(ipv4 vrf) mode, the setting applies to BGP4 of the specified VRF.

If you set the command in config-router-af(ipv6 vrf) mode, the setting applies to BGP4+ of the specified VRF.

Syntax

To set information:

For config-router mode:

neighbor {<IPv4-Address> | <IPv6-Address> | <Peer-Group>} shutdown

For config-router-af(ipv4 vrf) mode:

neighbor {<IPv4-Address> | <Peer-Group>} shutdown

For config-router-af(ipv6 vrf) mode:

neighbor {<IPv6-Address> | <Peer-Group>} shutdown

To delete information:

For config-router mode:

no neighbor {<IPv4-Address> | <IPv6-Address> | <Peer-Group>} [shutdown]

For config-router-af(ipv4 vrf) mode:

no neighbor {<IPv4-Address> | <Peer-Group>} [shutdown]

For config-router-af(ipv6 vrf) mode:

no neighbor {<IPv6-Address> | <Peer-Group>} [shutdown]

Notes

no neighbor {<IPv4-Address> | <IPv6-Address>} deletes all "neighbor" command settings for the peer. no neighbor <Peer-Group> deletes all "neighbor" command settings for the peer group, including the settings for the peers that belong to the peer group.

Input mode

```
(config-router)
(config-router-af)(ipv4 vrf)
(config-router-af)(ipv6 vrf)
```

Parameters

{<IPv4-Address> | <IPv6-Address> | <Peer-Group>}

Specifies the IPv4 address of the BGP4 peer, IPv6 address of the BGP4+ peer, or the BGP4 or BGP4+ peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv4-Address>, specify an IPv4 address.

For <IPv6-Address>, specify an IPv6 address.

For <Peer-Group>, specify a name of no more than 31 characters.

For details, see "Specifiable values for parameters".

{<IPv4-Address> | <Peer-Group>}

Specifies the IPv4 address of the BGP4 peer or the BGP4 peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv4-Address>, specify an IPv4 address.

   For <Peer-Group>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

{<IPv6-Address> | <Peer-Group>}

Specifies the IPv6 address of the BGP4+ peer or the BGP4+ peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv6-Address>, specify an IPv6 address.

   For <Peer-Group>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

Default behavior

A peer connection is not suppressed.

Impact on communication

Because this command disconnects the BGP session with the specified peer, communication to the destination routes learned from the peer stops.

When the change is applied

The change is applied when the command is set.

Notes

1. Before you can set this command for a peer, you need to use the "neighbor remote-as" command to set the peer or use the "neighbor peer-group (assigning member)" command to assign the peer to the peer group.
2. Before you can set this command for a peer group, you need to use the "neighbor peer-group (creating)" command to configure the peer group.

Related commands

neighbor remote-as

neighbor peer-group (assigning member)

neighbor peer-group (creating)

neighbor soft-reconfiguration

The "neighbor soft-reconfiguration" command stores routes that have been suppressed by the input policy. If the input policy is changed, this command allows the new input policy without disconnecting the BGP session.

If settings are performed in config-router mode, the settings are applied to BGP4 routes of the global network.

If you set the command in config-router-af(ipv4 vrf) mode, the setting applies to the BGP4 routes of the specified VRF.

If settings are performed in config-router-af(ipv6) mode, the settings are applied to BGP4+ routes of the global network.

If you set the command in config-router-af(ipv6 vrf) mode, the setting applies to the BGP4+ routes of the specified VRF.

Syntax

To set information:

For config-router mode or config-router-af(ipv4 vrf) mode:

neighbor {<IPv4-Address> | <Peer-Group>} soft-reconfiguration inbound

For config-router-af(ipv6) mode or config-router-af(ipv6 vrf) mode:

neighbor {<IPv6-Address> | <Peer-Group>} soft-reconfiguration inbound

To delete information:

For config-router mode or config-router-af(ipv4 vrf) mode:

no neighbor {<IPv4-Address> | <Peer-Group>} [soft-reconfiguration inbound]

For config-router-af(ipv6) mode or config-router-af(ipv6 vrf) mode:

no neighbor {<IPv6-Address> | <Peer-Group>} [soft-reconfiguration inbound]

Notes

no neighbor {<IPv4-Address> | <IPv6-Address>} deletes all "neighbor" command settings for the peer. no neighbor <Peer-Group> deletes all "neighbor" command settings for the peer group, including the settings for the peers that belong to the peer group.

Input mode

```
(config-router)
(config-router-af)(ipv4 vrf)
(config-router-af)(ipv6)
(config-router-af)(ipv6 vrf)
```

Parameters

{<IPv4-Address> | <Peer-Group>}

Specifies the IPv4 address of the BGP4 peer or the BGP4 peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv4-Address>, specify an IPv4 address.

   For <Peer-Group>, specify a name of no more than 31 characters.

For details, see "Specifiable values for parameters".

{<IPv6-Address> | <Peer-Group>}

Specifies the IPv6 address of the BGP4+ peer or the BGP4+ peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv6-Address>, specify an IPv6 address.

   For <Peer-Group>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

inbound

Specifies the input policy.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

Default behavior

The routes suppressed by the input policy are not stored.

Impact on communication

If the route refresh function has not been negotiated with the peer when the information set by this command is deleted, the BGP session is temporarily disconnected. As a result, communication stops until the routes are relearned.

When the change is applied

The change is applied when the command is set.

Notes

1. If the route refresh function has not been negotiated with the peer when the information set by this command is deleted, the BGP session is temporarily disconnected.
2. Before you can set this command for a peer, you need to use the "neighbor remote-as" command to set the peer or use the "neighbor peer-group (assigning member)" command to assign the peer to the peer group.
3. Before you can set this command for a peer group, you need to use the "neighbor peer-group (creating)" command to configure the peer group.

Related commands

neighbor remote-as

neighbor peer-group (assigning member)

neighbor peer-group (creating)

neighbor timers

The "neighbor timers" command sets the KEEPALIVE message sending interval and hold timer value for BGP peers.

If you set the command in config-router mode, the setting applies to BGP4 and BGP4+ of the global network.

If you set the command in config-router-af(ipv4 vrf) mode, the setting applies to BGP4 of the specified VRF.

If you set the command in config-router-af(ipv6 vrf) mode, the setting applies to BGP4+ of the specified VRF.

Syntax

To set or change information:

For config-router mode:

neighbor {<IPv4-Address> | <IPv6-Address> | <Peer-Group>} timers <Keepalive> <Holdtime>

For config-router-af(ipv4 vrf) mode:

neighbor {<IPv4-Address> | <Peer-Group>} timers <Keepalive> <Holdtime>

For config-router-af(ipv6 vrf) mode:

neighbor {<IPv6-Address> | <Peer-Group>} timers <Keepalive> <Holdtime>

To delete information:

For config-router mode:

no neighbor {<IPv4-Address> | <IPv6-Address> | <Peer-Group>} [timers]

For config-router-af(ipv4 vrf) mode:

no neighbor {<IPv4-Address> | <Peer-Group>} [timers]

For config-router-af(ipv6 vrf) mode:

no neighbor {<IPv6-Address> | <Peer-Group>} [timers]

Notes

no neighbor {<IPv4-Address> | <IPv6-Address>} deletes all "neighbor" command settings for the peer. no neighbor <Peer-Group> deletes all "neighbor" command settings for the peer group, including the settings for the peers that belong to the peer group.

Input mode

```
(config-router)
(config-router-af)(ipv4 vrf)
(config-router-af)(ipv6 vrf)
```

Parameters

{<IPv4-Address> | <IPv6-Address> | <Peer-Group>}

Specifies the IPv4 address of the BGP4 peer, IPv6 address of the BGP4+ peer, or the BGP4 or BGP4+ peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv4-Address>, specify an IPv4 address.

For <IPv6-Address>, specify an IPv6 address.

For <Peer-Group>, specify a name of no more than 31 characters.

For details, see "Specifiable values for parameters".

{<IPv4-Address> | <Peer-Group>}

Specifies the IPv4 address of the BGP4 peer or the BGP4 peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv4-Address>, specify an IPv4 address.

   For <Peer-Group>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

{<IPv6-Address> | <Peer-Group>}

Specifies the IPv6 address of the BGP4+ peer or the BGP4+ peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv6-Address>, specify an IPv6 address.

   For <Peer-Group>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

<Keepalive>

Specifies the KEEPALIVE message sending interval (seconds) for BGP.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 0 to 65534 (seconds) in decimal.

   If 0 is specified, no KEEPALIVE messages are sent when the BGP session is established.

   You can specify only 0 for this parameter if you specify 0 for <Holdtime>. If the <Holdtime> value is other than 0, the value of this parameter must be smaller than the <Holdtime> value.

   The following shows the KEEPALIVE message sending interval to be applied according to the negotiation result of the hold timer value when the BGP4 or BGP4+ session is established.

   - If the local hold timer value is selected during negotiation of the hold timer value, the value of this parameter is used.
   - If the remote hold timer value is selected during negotiation of the hold timer value and one third of the hold timer value in the negotiation result is smaller than the value of this parameter, that one-third value is used. If one third of the hold timer value in the negotiation result is equal to or greater than the value of this parameter, the value of this parameter is used.

<Holdtime>

Specifies the Holdtime timer value in seconds.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

Specify 0 or 3 to 65535 (seconds) in decimal.

If you specify 0, the hold time with a peer is not monitored.

If you specify 0 for <Keepalive>, you can specify only 0 for this parameter.

Default behavior

If the KEEPALIVE message sending interval and hold timer value have been set by the "timers bgp" command, the values specified for the "timers bgp" command are applied. If these values have not been set by the "timers bgp" command, <Keepalive> is set to 60 and <Holdtime> is set to 180.

Impact on communication

If you use this command to change the hold timer value or KEEPALIVE message sending interval, the BGP session with the specified peer is temporarily disconnected. As a result, communication stops until the routes are relearned from the peer.

When the change is applied

The change is applied when the command is set.

Notes

1. Before you can set this command for a peer, you need to use the "neighbor remote-as" command to set the peer or use the "neighbor peer-group (assigning member)" command to assign the peer to the peer group.
2. Before you can set this command for a peer group, you need to use the "neighbor peer-group (creating)" command to configure the peer group.

Related commands

neighbor remote-as

neighbor peer-group (assigning member)

neighbor peer-group (creating)

neighbor update-source

The "neighbor update-source" command specifies the interface used as the local IPv4 address (or IPv6 address) for the BGP session with a peer.

If you set the command in config-router mode, the setting applies to BGP4 and BGP4+ of the global network.

If you set the command in config-router-af(ipv4 vrf) mode, the setting applies to BGP4 of the specified VRF.

If you set the command in config-router-af(ipv6 vrf) mode, the setting applies to BGP4+ of the specified VRF.

Syntax

To set or change information:

For config-router mode:

neighbor {<IPv4-Address> | <IPv6-Address> | <Peer-Group>} update-source <interface type> <interface number>

For config-router-af(ipv4 vrf) mode:

neighbor {<IPv4-Address> | <Peer-Group>} update-source <interface type> <interface number>

For config-router-af(ipv6 vrf) mode:

neighbor {<IPv6-Address> | <Peer-Group>} update-source <interface type> <interface number>

To delete information:

For config-router mode:

no neighbor {<IPv4-Address> | <IPv6-Address> | <Peer-Group>} [update-source]

For config-router-af(ipv4 vrf) mode:

no neighbor {<IPv4-Address> | <Peer-Group>} [update-source]

For config-router-af(ipv6 vrf) mode:

no neighbor {<IPv6-Address> | <Peer-Group>} [update-source]

Notes

no neighbor {<IPv4-Address> | <IPv6-Address>} deletes all "neighbor" command settings for the peer. no neighbor <Peer-Group> deletes all "neighbor" command settings for the peer group, including the settings for the peers that belong to the peer group.

Input mode

```
(config-router)
(config-router-af)(ipv4 vrf)
(config-router-af)(ipv6 vrf)
```

Parameters

{<IPv4-Address> | <IPv6-Address> | <Peer-Group>}

Specifies the IPv4 address of the BGP4 peer, IPv6 address of the BGP4+ peer, or the BGP4 or BGP4+ peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

For <IPv4-Address>, specify an IPv4 address.

For <IPv6-Address>, specify an IPv6 address.

For <Peer-Group>, specify a name of no more than 31 characters.

For details, see "Specifiable values for parameters".

{<IPv4-Address> | <Peer-Group>}

Specifies the IPv4 address of the BGP4 peer or the BGP4 peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv4-Address>, specify an IPv4 address.

   For <Peer-Group>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

{<IPv6-Address> | <Peer-Group>}

Specifies the IPv6 address of the BGP4+ peer or the BGP4+ peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv6-Address>, specify an IPv6 address.

   For <Peer-Group>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

<interface type> <interface number>

Specifies the interface used as the local IPv4 address (or IPv6 address).

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <interface type> <interface number>, you can specify the interface name and interface number corresponding to the following interface type groups. For details, see "■How to specify the interface" in "Specifiable values for parameters".

   - VLAN interface
   - Loopback interface

Default behavior

The source IPv4 address is set to the local IPv4 address for which the BGP connection has been set. Similarly, the source IPv6 address is set to the local IPv6 address for which the BGP connection has been set.

Impact on communication

If you use this command to change the local peer address, the BGP session with the specified peer is temporarily disconnected. As a result, communication stops until the routes are relearned from the peer.

When the change is applied

The change is applied when the command is set.

Notes

1. If multiple addresses have been set for the specified interface, the largest address is selected.
2. If you use this command to change the local peer address, the BGP session with the peer is temporarily disconnected.
3. Before you can set this command for a peer, you need to use the "neighbor remote-as" command to set the peer or use the "neighbor peer-group (assigning member)" command to assign the peer to the peer group.
4. Before you can set this command for a peer group, you need to use the "neighbor peer-group (creating)" command to configure the peer group.

Related commands

neighbor ebgp-multihop

neighbor remote-as

neighbor peer-group (assigning member)

neighbor peer-group (creating)

neighbor weight

The "neighbor weight" command sets the weighting of routes received from a peer. If routes with the same destination are learned from multiple peers, routes with larger values are handled as preferred routes.

If settings are performed in config-router mode, the settings are applied to BGP4 routes of the global network.

If you set the command in config-router-af(ipv4 vrf) mode, the setting applies to the BGP4 routes of the specified VRF.

If settings are performed in config-router-af(ipv6) mode, the settings are applied to BGP4+ routes of the global network.

If you set the command in config-router-af(ipv6 vrf) mode, the setting applies to the BGP4+ routes of the specified VRF.

Syntax

To set or change information:

For config-router mode or config-router-af(ipv4 vrf) mode:

neighbor {<IPv4-Address> | <Peer-Group>} weight <Number>

For config-router-af(ipv6) mode or config-router-af(ipv6 vrf) mode:

neighbor {<IPv6-Address> | <Peer-Group>} weight <Number>

To delete information:

For config-router mode or config-router-af(ipv4 vrf) mode:

no neighbor {<IPv4-Address> | <Peer-Group>} [weight]

For config-router-af(ipv6) mode or config-router-af(ipv6 vrf) mode:

no neighbor {<IPv6-Address> | <Peer-Group>} [weight]

Notes

no neighbor {<IPv4-Address> | <IPv6-Address>} deletes all "neighbor" command settings for the peer. no neighbor <Peer-Group> deletes all "neighbor" command settings for the peer group, including the settings for the peers that belong to the peer group.

Input mode

```
(config-router)
(config-router-af)(ipv4 vrf)
(config-router-af)(ipv6)
(config-router-af)(ipv6 vrf)
```

Parameters

{<IPv4-Address> | <Peer-Group>}

Specifies the IPv4 address of the BGP4 peer or the BGP4 peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv4-Address>, specify an IPv4 address.

For <Peer-Group>, specify a name of no more than 31 characters.

For details, see "Specifiable values for parameters".

{<IPv6-Address> | <Peer-Group>}

Specifies the IPv6 address of the BGP4+ peer or the BGP4+ peer group identifier.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv6-Address>, specify an IPv6 address.

   For <Peer-Group>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

<Number>

Specifies the weight value.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 0 to 255 in decimal. 0 indicates the lowest priority, and 255 indicates the highest priority.

Default behavior

The weighting is handled as 0 (lowest priority).

Impact on communication

None

When the change is applied

The change is applied when the command is set.

Notes

1. Before you can set this command for a peer, you need to use the "neighbor remote-as" command to set the peer or use the "neighbor peer-group (assigning member)" command to assign the peer to the peer group.
2. Before you can set this command for a peer group, you need to use the "neighbor peer-group (creating)" command to configure the peer group.

Related commands

neighbor remote-as

neighbor peer-group (assigning member)

neighbor peer-group (creating)

network

The "network" command specifies the network address of the routing information generated and advertised via BGP. If there is an active route of any protocol that matches the specified network address, a BGP advertised route is generated and advertised. Advertised routes are inactive routes which are not registered in the forwarding table.

If settings are performed in config-router mode, the settings are applied to BGP4 routes of the global network.

If you set the command in config-router-af(ipv4 vrf) mode, the setting applies to the BGP4 routes of the specified VRF.

If settings are performed in config-router-af(ipv6) mode, the settings are applied to BGP4+ routes of the global network.

If you set the command in config-router-af(ipv6 vrf) mode, the setting applies to the BGP4+ routes of the specified VRF.

This command can be specified more than once.

Syntax

To set information:

For config-router mode or config-router-af(ipv4 vrf) mode:

network <IPv4-Prefix>/<Mask-Len> [ge <Mask-Len>] [le <Mask-Len>]

(multiple lines can be entered)

For config-router-af(ipv6) mode or config-router-af(ipv6 vrf) mode:

network <IPv6-Prefix>/<Prefix-Len> [ge <Prefix-Len>] [le <Prefix -Len>]

(multiple lines can be entered)

To delete information:

For config-router mode or config-router-af(ipv4 vrf) mode:

no network <IPv4-Prefix>/<Mask-Len> [ge <Mask-Len>] [le <Mask-Len>]

For config-router-af(ipv6) mode or config-router-af(ipv6 vrf) mode:

no network <IPv6-Prefix>/<Prefix-Len> [ge <Prefix -Len>] [le <Prefix -Len>]

Input mode

```
(config-router)
(config-router-af)(ipv4 vrf)
(config-router-af)(ipv6)
(config-router-af)(ipv6 vrf)
```

Parameters

<IPv4-Prefix>

Specify the prefix of the IPv4 address.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

Specify the prefix of the IPv4 address.

Note: Set all the bits following the bits specified for <Mask-Len> of <IPv4-Prefix> to 0.

<Mask-Len>

Specifies the mask length of the IPv4 address.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 0 to 32 in decimal.

<IPv6-Prefix>

Specify the prefix of the IPv6 address.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify the prefix of the IPv6 address.

   Note: Set all the bits following the bits specified for <Prefix-Len> of <IPv6-Prefix> to 0.

<Prefix-Len>

Specifies the mask length of the IPv6 address.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 0 to 128 in decimal.

ge <Mask-Len>

Sets a condition that the prefix mask length must be equal to or greater than the <Mask-Len> value.

1. Default value when this parameter is omitted:

   The mask length must be equal to or greater than the <Mask-Len> value specified for <IPv4-Prefix>/<Mask-Len>.

2. Range of values:

   Specify 0 to 32 in decimal.

le <Mask-Len>

Sets a condition that the prefix mask length must be equal to or smaller than the <Mask-Len> value.

The ge <Mask-Len> value must be equal to or smaller than the le <Mask-Len> value.

1. Default value when this parameter is omitted:

   The mask length must be equal to or smaller than the <Mask-Len> value specified for <IPv4-Prefix>/<Mask-Len>.

2. Range of values:

   Specify 0 to 32 in decimal.

ge <Prefix-Len>

Sets a condition that the prefix length must be equal to or greater than the <Prefix-Len> value.

1. Default value when this parameter is omitted:

   The mask length must be equal to or greater than the <Prefix-Len> value specified for <IPv6-Prefix>/<Prefix-Len>.

2. Range of values:

   Specify 0 to 128 in decimal.

le <Prefix-Len>

Sets a condition that the prefix length must be equal to or smaller than the <Prefix-Len> value.

The ge <Prefix-Len> value must be equal to or smaller than the le <Prefix-Len> value.

1. Default value when this parameter is omitted:

   The mask length must be equal to or smaller than the <Prefix-Len> value specified for <IPv6-Prefix>/<Prefix-Len>.

2. Range of values:

   Specify 0 to 128 in decimal.

Default behavior

Advertised routes are not generated or advertised.

Impact on communication

None

When the change is applied

The change is applied when the command is set.

Notes

1. Advertised routes are advertised to all peers unless route filtering is explicitly set. Make sure that you use route filtering to suppress advertisements to the router from which the BGP route was learned. If a route generated from the BGP route and bound for the same destination as the BGP route is advertised to that router, a routing loop might occur.

Related commands

route-map

router bgp

The "router bgp" command configures router settings related to the BGP (BGP4 and BGP4+) routing protocol.

After this command is entered, the mode changes to config-router mode.

Use the "address-family ipv4" command to change config-router mode to config-router-af(ipv4 vrf) mode.

Use the "address-family ipv6" command to change config-router mode to config-router-af(ipv6) or config-router-af(ipv6 vrf) mode.

This command is common to BGP4 (including VRF) and BGP4+ (including VRF).

Syntax

To set information:

router bgp <As>

To delete information:

no router bgp <As>

Input mode

```
(config)
```

Parameters

<As>

Specifies the AS number of the autonomous system to which the Switch belongs. If the AS number for the confederation is set by the "bgp confederation identifier" command, specify the member AS number of the member to which the local router belongs.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 65535 in decimal.

Default behavior

BGP is disabled.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. BGP4+ routing information can be learned and advertised only via a BGP session used for peering with an IPv6 address.

2. The BGP4 policy for the global network must be set in config-router mode. Before setting the BGP4 policy for a VRF, use the "address-family ipv4" command to switch to config-router-af(ipv4) mode. Before setting the BGP4+ policy for the global network, use the "address-family ipv6" command to switch to config-router-af(ipv6) mode. Before setting the BGP4+ policy for a VRF, use the "address-family ipv6" command to switch to config-router-af(ipv6 vrf) mode.
3. If you delete the information set by this command, all information set by the commands in config-router and config-router-af modes is deleted.

Related commands

interface

snmp

bgp confederation identifier

timers bgp

The "timers bgp" command sets the KEEPALIVE message sending interval and hold timer value for all BGP peers.

However, if the "neighbor timers" command has been set, the KEEPALIVE message sending interval and hold timer value set by the "neighbor timers" command have priority.

If you set the command in config-router mode, the setting applies to BGP4 and BGP4+ of the global network.

If you set the command in config-router-af(ipv4 vrf) mode, the setting applies to BGP4 of the specified VRF.

If you set the command in config-router-af(ipv6 vrf) mode, the setting applies to BGP4+ of the specified VRF.

Syntax

To set or change information:

timers bgp <Keepalive> <Holdtime>

To delete information:

no timers bgp

Input mode

```
(config-router)
(config-router-af)(ipv4 vrf)
(config-router-af)(ipv6 vrf)
```

Parameters

<Keepalive>

Specifies the KEEPALIVE message sending interval (seconds) for BGP.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 0 to 65534 (seconds) in decimal.

   If 0 is specified, no KEEPALIVE messages are sent when the BGP session is established.

   You can specify only 0 for this parameter if you specify 0 for <Holdtime>. If the <Holdtime> value is other than 0, the value of this parameter must be smaller than the <Holdtime> value.

   The following shows the KEEPALIVE message sending interval to be applied according to the negotiation result of the hold timer value when the BGP4 or BGP4+ session is established.

   - If the local hold timer value is selected during negotiation of the hold timer value, the value of this parameter is used.
   - If the remote hold timer value is selected during negotiation of the hold timer value and one third of the hold timer value in the negotiation result is smaller than the value of this parameter, that one-third value is used. If one third of the hold timer value in the negotiation result is equal to or greater than the value of this parameter, the value of this parameter is used.

<Holdtime>

Specifies the Holdtime timer value in seconds.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

   Specify 0 or 3 to 65535 (seconds) in decimal.

   If you specify 0, the hold time with a peer is not monitored.

   You can specify only 0 for this parameter if you specify 0 for <Keepalive>.

Default behavior

<Keepalive> is set to 60, and <Holdtime> is set to 180.

Impact on communication

If you use this command to change the hold timer value or KEEPALIVE message sending interval, BGP sessions with all peers are temporarily disconnected. As a result, communication stops until the routes are relearned.

When the change is applied

The change is applied when the command is set.

Notes

1. If the hold-time negotiation result is not 0 when a BGP session with the peer is established and <Keepalive> is set to 0, a hold-time timeout occurs on the specified peer and the BGP session with the peer is disconnected.

Related commands

neighbor timers

15 Route Filtering (IPv4 and IPv6)

distribute-list in (BGP4) [SL-L3A]

The "distribute-list in (BGP4)" command filters which BGP4-learned routes are added to the routing table.

If you set the command in config-router mode, the setting applies to BGP4 of the global network.

If you set the command in config-router-af (ipv4 vrf) mode, the setting applies to BGP4 of the specified VRF.

Syntax

To set or change information:

distribute-list {<access list> | prefix <prefix list> | route-map <route map>} in

To delete information:

no distribute-list [{<access list> | prefix <prefix list> | route-map <route map>}] in

Input mode

```
(config-router)
(config-router-af)
```

Parameters

{<access list> | prefix <prefix list> | route-map <route map>}

Specifies the access-list, prefix-list, or route-map used for filtering.

1. Default value when this parameter is omitted:
   This parameter cannot be omitted.
2. Range of values:
   For <access list>, specify 1 to 199 or 1300 to 2699 in decimal, or a name of no more than 31 characters.
   For <prefix list>, specify a name of no more than 31 characters.
   For <route map>, specify a name of no more than 31 characters.
   For details, see "Specifiable values for parameters".

Default behavior

BGP4-learned routes are not controlled.

Impact on communication

None

When the change is applied

The change is applied when the "clear ip bgp [vrf {<vrf id> | all}] * { in | both }" operation command is executed.

Notes

None

Related commands

access-list

ip access-list

ip prefix-list

route-map

distribute-list in (BGP4+) [SL-L3A]

The "distribute-list in (BGP4+)" command filters which BGP4+ learned routes are added to the routing table.

If you set the command in config-router-af (ipv6) mode, the setting applies to the BGP4+ routes of the global network.

If you set the command in config-router-af (ipv6 vrf) mode, the setting applies to the BGP4+ routes of the specified VRF.

Syntax

To set or change information:

distribute-list {prefix-list <prefix list> | route-map <route map>} in

To delete information:

no distribute-list [{prefix-list <prefix list> | route-map <route map>}] in

Input mode

```
(config-router-af)(ipv6)
(config-router-af)(ipv6 vrf)
```

Parameters

{prefix-list <prefix list> | route-map <route map>}

Specifies the prefix-list or route-map used for filtering.

1. Default value when this parameter is omitted:
   This parameter cannot be omitted.
2. Range of values:
   For <prefix list>, specify a name of no more than 31 characters.
   For <route map>, specify a name of no more than 31 characters.
   For details, see "Specifiable values for parameters".

Default behavior

BGP4+ learned routes are not controlled.

Impact on communication

None

When the change is applied

The change is applied when the "clear ipv6 bgp [vrf {<vrf id> | all}] * { in | both }" operation command is executed.

Notes

None

Related commands

ipv6 prefix-list

route-map

distribute-list in (OSPF) [SL-L3A]

The "distribute-list in (OSPF)" command filters which OSPF-learned routes are added to the routing table.

Syntax

To set or change information:

distribute-list {<access list> | prefix <prefix list> | route-map <route map>} in

To delete information:

no distribute-list [{<access list> | prefix <prefix list> | route-map <route map>}] in

Input mode

```
(config-router)
```

Parameters

{<access list> | prefix <prefix list> | route-map <route map>}

Specifies the access-list, prefix-list, or route-map used for filtering.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <access list>, specify 1 to 199 or 1300 to 2699 in decimal, or a name of no more than 31 characters.

   For <prefix list>, specify a name of no more than 31 characters.

   For <route map>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

Default behavior

OSPF-learned routes are not controlled.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

route-map

distribute-list in (OSPFv3) [SL-L3A]

The "distribute-list in (OSPFv3)" command filters which OSPFv3-learned routes are added to the routing table.

Syntax

To set or change information:

distribute-list {prefix-list <prefix list> | route-map <route map>} in

To delete information:

no distribute-list [{prefix-list <prefix list> | route-map <route map>}] in

Input mode

```
(config-rtr)
```

Parameters

{prefix-list <prefix list> | route-map <route map>}

Specifies the prefix-list or route-map to which the filter conditions apply.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <prefix list>, specify a name of no more than 31 characters.

   For <route map>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

Default behavior

OSPFv3-learned routes are not controlled.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

ipv6 prefix-list

route-map

distribute-list in (RIP)

The "distribute-list in (RIP)" command filters which RIP-learned routes are added to the routing table.

If you set the command in config-router mode, the setting applies to the global network.

If you set the command in config-router-af mode, the setting applies to the specified VRF.

Syntax

To set or change information:

distribute-list {<access list> | prefix <prefix list> | route-map <route map>} in [vlan <vlan id>]

distribute-list {<access list> | prefix <prefix list> | route-map <route map>} gateway <IPv4-Address> in

To delete information:

no distribute-list [{<access list> | prefix <prefix list> | route-map <route map>}] in [vlan <vlan id>]

no distribute-list [{<access list> | prefix <prefix list> | route-map <route map>}] gateway <IPv4-Address> in

Input mode

```
(config-router)
(config-router-af)
```

Parameters

{<access list> | prefix <prefix list> | route-map <route map>}

Specifies the access-list, prefix-list, or route-map used for filtering.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <access list>, specify 1 to 199 or 1300 to 2699 in decimal, or a name of no more than 31 characters.

   For <prefix list>, specify a name of no more than 31 characters.

   For <route map>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

gateway <IPv4-Address>

Specifies the gateway.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify an IPv4 address.

vlan <vlan id>

Specifies the learning source interface.

1. Default value when this parameter is omitted:

   There is no filter dedicated to the interface.

2. Range of values:

For <vlan id>, specify the VLAN ID set by the "interface vlan" command.

Default behavior

RIP-learned routes are not controlled.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

access-list

ip access-list

ip prefix-list

route-map

distribute-list in (RIPng)

The "distribute-list in (RIPng)" command filters which RIPng-learned routes are added to the routing table.

Syntax

To set or change information:

distribute-list {prefix-list <prefix list> | route-map <route map>} in [vlan <vlan id>]

To delete information:

no distribute-list [{prefix-list <prefix list> | route-map <route map>}] in [vlan <vlan id>]

Input mode

```
(config-rtr-rip)
```

Parameters

{prefix-list <prefix list> | route-map <route map>}

Specifies the prefix-list or route-map used for filtering.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <prefix list>, specify a name of no more than 31 characters.

   For <route map>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

vlan <vlan id>

Specifies the learning source interface.

1. Default value when this parameter is omitted:

   Routes are not filtered by the interface.

2. Range of values:

   For <vlan id>, specify the VLAN ID set by the "interface vlan" command.

Default behavior

RIPng-learned routes are not controlled.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

ipv6 prefix-list

route-map

distribute-list out (BGP4) [SL-L3A]

The "distribute-list out (BGP4)" command filters which BGP4 routes are advertised.

If you set the command in config-router mode, the setting applies to BGP4 of the global network.

If you set the command in config-router-af (ipv4 vrf) mode, the setting applies to BGP4 of the specified VRF.

Syntax

To set or change information:

distribute-list {<access list> | prefix <prefix list> | route-map <route map>} out [<Protocol>]

To delete information:

no distribute-list [{<access list> | prefix <prefix list> | route-map <route map>}] out [<Protocol>]

Input mode

```
(config-router)
(config-router-af)
```

Parameters

{<access list> | prefix <prefix list> | route-map <route map>}

Specifies the access-list, prefix-list, or route-map used for filtering.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <access list>, specify 1 to 199 or 1300 to 2699 in decimal, or a name of no more than 31 characters.

   For <prefix list>, specify a name of no more than 31 characters.

   For <route map>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

<Protocol>

Specify the learning source protocol.

1. Default value when this parameter is omitted:

   Routes are not filtered by the protocol.

2. Range of values:

   <Protocol> :={ connected | static | summary | rip | ospf <Domain-No> | bgp | extra-vrf }

   <Domain-No>: 1 to 65535 in decimal

Default behavior

BGP routes to be advertised are not filtered.

Impact on communication

None

When the change is applied

The change is applied when the "clear ip bgp [vrf {<vrf id> | all}] * { out | both }" operation command is executed.

Notes

None

Related commands

access-list

ip access-list

ip prefix-list

route-map

distribute-list out (BGP4+) [SL-L3A]

The "distribute-list out (BGP4+)" command filters which BGP4+ routes are advertised.

If you set the command in config-router-af (ipv6) mode, the setting applies to the BGP4+ routes of the global network.

If you set the command in config-router-af (ipv6 vrf) mode, the setting applies to the BGP4+ routes of the specified VRF.

Syntax

To set or change information:

distribute-list {prefix-list <prefix list> | route-map <route map>} out [<Protocol>]

To delete information:

no distribute-list [{prefix-list <prefix list> | route-map <route map>}] out [<Protocol>]

Input mode

```
(config-router-af)(ipv6)
(config-router-af)(ipv6 vrf)
```

Parameters

{prefix-list <prefix list> | route-map <route map>}

Specifies the prefix-list or route-map used for filtering.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <prefix list>, specify a name of no more than 31 characters.

   For <route map>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

<Protocol>

Specify the learning source protocol.

1. Default value when this parameter is omitted:

   Routes are not filtered by the protocol.

2. Range of values:

   <Protocol> :={ connected | static | summary | rip | ospf <Domain-No> | bgp | extra-vrf }

   <Domain-No>: 1 to 65535 in decimal

Default behavior

BGP4+ routes to be advertised are not filtered.

Impact on communication

None

When the change is applied

The change is applied when the "clear ipv6 bgp [vrf {<vrf id> | all}] * { out | both }" operation command is executed.

Notes

None

Related commands

ipv6 prefix-list

route-map

distribute-list out (OSPF) [SL-L3A]

The "distribute-list out (OSPF)" command filters which OSPF routes are advertised.

Syntax

To set or change information:

distribute-list {<access list> | prefix <prefix list> | route-map <route map>} out [<Protocol>]

To delete information:

no distribute-list [{<access list> | prefix <prefix list> | route-map <route map>}] out [<Protocol>]

Input mode

```
(config-router)
```

Parameters

{<access list> | prefix <prefix list> | route-map <route map>}

Specifies the access-list, prefix-list, or route-map used for filtering.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <access list>, specify 1 to 199 or 1300 to 2699 in decimal, or a name of no more than 31 characters.

   For <prefix list>, specify a name of no more than 31 characters.

   For <route map>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

<Protocol>

Specify the learning source protocol.

1. Default value when this parameter is omitted:

   Routes are not filtered by the protocol.

2. Range of values:

   <Protocol> :={ connected | static | summary | rip | ospf <Domain-No> | bgp | extra-vrf }

   <Domain-No>: 1 to 65535 in decimal

Default behavior

OSPF routes to be advertised are not filtered.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

access-list

ip access-list

ip prefix-list

route-map

distribute-list out (OSPFv3) [SL-L3A]

The "distribute-list out (OSPFv3)" command filters which OSPFv3 routes are advertised.

Syntax

To set or change information:

distribute-list {prefix-list <prefix list> | route-map <route map>} out [<Protocol>]

To delete information:

no distribute-list [{prefix-list <prefix list> | route-map <route map>}] out [<Protocol>]

Input mode

```
(config-rtr)
```

Parameters

{prefix-list <prefix list> | route-map <route map>}

Specifies the prefix-list or route-map to which the filter conditions apply.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <prefix list>, specify a name of no more than 31 characters.

   For <route map>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

<Protocol>

Specify the learning source protocol.

1. Default value when this parameter is omitted:

   Routes are not filtered by the protocol.

2. Range of values:

   <Protocol> :={ connected | static | summary | rip | ospf <Domain-No> | bgp | extra-vrf }

   <Domain-No>: 1 to 65535 in decimal

Default behavior

OSPFv3 routes to be advertised are not filtered.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

ipv6 prefix-list

route-map

distribute-list out (RIP)

The "distribute-list out (RIP)" command filters which RIP routes are advertised.

If you set the command in config-router mode, the setting applies to the global network.

If you set the command in config-router-af mode, the setting applies to the specified VRF.

Syntax

To set or change information:

distribute-list {<access list> | prefix <prefix list> | route-map <route map>} out [{vlan <vlan id> | <Protocol>}]

distribute-list {<access list> | prefix <prefix list> | route-map <route map>} gateway <IPv4-Address> out [<Protocol>]

To delete information:

no distribute-list [{<access list> | prefix <prefix list> | route-map <route map>}] out [{vlan <vlan id> | <Protocol>}]

no distribute-list [{<access list> | prefix <prefix list> | route-map <route map>}] gateway <IPv4-Address> out [<Protocol>]

Input mode

```
(config-router)
(config-router-af)
```

Parameters

{<access list> | prefix <prefix list> | route-map <route map>}

Specifies the access-list, prefix-list, or route-map used for filtering.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <access list>, specify 1 to 199 or 1300 to 2699 in decimal, or a name of no more than 31 characters.

   For <prefix list>, specify a name of no more than 31 characters.

   For <route map>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

vlan <vlan id>

Specifies the learning source interface.

1. Default value when this parameter is omitted:

   Routes are not filtered by the interface.

2. Range of values:

   For <vlan id>, specify the VLAN ID set by the "interface vlan" command.

<Protocol>

Specify the learning source protocol.

1. Default value when this parameter is omitted:

Routes are not filtered by the protocol.

2. Range of values:

<Protocol> := {connected | static | summary | rip | ospf <Domain-No> | bgp | extra-vrf}

<Domain-No>: 1 to 65535 in decimal

gateway <IPv4-Address>

Specifies the gateway.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

Specify an IPv4 address.

Default behavior

RIP routes to be advertised are not filtered.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

access-list

ip access-list

ip prefix-list

route-map

distribute-list out (RIPng)

The "distribute-list out (RIPng)" command filters which RIPng routes are advertised.

Syntax

To set or change information:

distribute-list {prefix-list <prefix list> | route-map <route map>} out [{vlan <vlan id> | <Protocol>}]

To delete information:

no distribute-list [{prefix-list <prefix list> | route-map <route map>}] out [{vlan <vlan id> | <Protocol>}]

Input mode

```
(config-rtr-rip)
```

Parameters

{prefix-list <prefix list> | route-map <route map>}

Specifies the prefix-list or route-map used for filtering.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <prefix list>, specify a name of no more than 31 characters.

   For <route map>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

vlan <vlan id>

Specifies the learning source interface.

1. Default value when this parameter is omitted:

   Routes are not filtered by the interface.

2. Range of values:

   For <vlan id>, specify the VLAN ID set by the "interface vlan" command.

<Protocol>

Specify the learning source protocol.

1. Default value when this parameter is omitted:

   Routes are not filtered by the protocol.

2. Range of values:

   <Protocol> :={ connected | static | summary | rip | ospf <Domain-No> | bgp | extra-vrf }

   <Domain-No>: 1 to 65535 in decimal

Default behavior

RIPng routes to be advertised are not filtered.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

ipv6 prefix-list

route-map

ip as-path access-list [SL-L3A]

The "ip as-path access-list" command sets an access-list that works as an AS_PATH filter for BGP4 and BGP4+. The access-list working as the AS_PATH filter filters routes based on the AS_PATH attribute specified in a regular expression.

Syntax

To set information (information cannot be changed):

ip as-path access-list <Id> {permit | deny} <Regexp>

To delete information:

no ip as-path access-list <Id>

Input mode

```
(config)
```

Parameters

<Id>

Specifies the identifier used to identify the access-list for the AS_PATH filter. This identifier is used to reference the access-list.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 500 in decimal.

{permit | deny}

Permits or denies access when filter conditions are met. Specify permit to permit access. Specify deny to deny access.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

<Regexp>

Specifies the AS_PATH attribute in a regular expression. Enclose <Regexp> in double quotation marks (").

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a regular expression. For regular expressions, see "Configuration Guide Vol. 3, 14.1.2(3) (d) Regular expressions".

Default behavior

No access-list is used.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. The filter denies any routes that do not match the filter conditions.

   An as-path access-list that does not exist can also be used as a filter. In this case, the filter permits all routes.

2. Do not use a configuration displayed by the "show" command to enter a regular expression that contains a question mark (?).

Related commands

match as-path

ip community-list [SL-L3A]

The "ip community-list" command configures a community-list that works as a Community filter for BGP4 and BGP4+. A community-list working as a Community filter filters routes based on their Communities attribute.

Syntax

To set information (information cannot be changed):

ip community-list {<Standard> | standard <Id>} {permit | deny} [{<Community> | <AA>:<NN> | local-AS | no-advertise | no-export}] [...]

ip community-list {<Expanded> | expanded <Id>} {permit | deny} <Regexp>

To delete information:

no ip community-list {<Standard> | <Expanded> | standard <Id> | expanded <Id>}

Input mode

```
(config)
```

Parameters

{<Standard> | standard <Id>}

Specifies the identifier used to identify the community-list. This identifier is used to reference the community-list. If you specify this parameter, you need to specify a set of Communities attributes as filter conditions.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <Standard>, specify 1 to 99 in decimal.

   For <Id>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

{<Expanded> | expanded <Id>}

Specifies the identifier used to identify the community-list. This identifier is used to reference the community-list. If you specify this parameter, you need to specify the Communities attribute in a regular expression as filter conditions.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <Expanded>, specify 100 to 500 in decimal.

   For <Id>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

{permit | deny}

Permits or denies access when filter conditions are met. Specify permit to permit access. Specify deny to deny access.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

{<Community> | <AA>:<NN> | local-AS | no-advertise | no-export}

Specifies the Communities attribute as filter conditions. You can specify a maximum of 25 parameters.

1. Default value when this parameter is omitted:

   A match of any Communities attribute is set as filter conditions.

2. Range of values:

   For <Community>, specify 0 to 4294967295 in decimal.

   For each of <AA>:<NN>, specify 0 to 65535 in decimal.

<Regexp>

Specifies the Communities attribute in a regular expression. Enclose <Regexp> in double quotation marks (").

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a regular expression. For regular expressions, see "Configuration Guide Vol. 3, 14.1.2(3) (d) Regular expressions".

Default behavior

No community-list is used.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. The filter denies any routes that do not match the filter conditions.

   A community-list that does not exist can also be used as a filter. In this case, the filter permits all routes.

2. Do not use a configuration displayed by the "show" command to enter a regular expression that contains a question mark (?).

Related commands

match community

ip prefix-list

The "ip prefix-list" command configures an IPv4 prefix list. You can use the IPv4 prefix-list to filter routes by IPv4 address or IPv4 prefix.

Syntax

To set information:

ip prefix-list <Id> description <Text>

ip prefix-list <Id> [seq <Seq>] {permit | deny} <IPv4-Prefix>/<Mask-Len> [ge <Min-Len>] [le <Max-Len>]

To change information:

ip prefix-list <Id> description <Text>

To delete information:

no ip prefix-list <Id>

no ip prefix-list <Id> description

no ip prefix-list <Id> seq <Seq>

Input mode

```
(config)
```

Parameters

<Id>

Specifies the identifier of the IPv4 prefix-list to be configured.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a name that is no more than 31 characters long.

   For details, see "Specifiable values for parameters".

description <Text>

Sets a supplementary description of an IPv4 prefix-list.

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 64 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 "■Arbitrary character string" in "Specifiable values for parameters".

seq <Seq>

Sets the sequence in which filter conditions are applied.

1. Default value when this parameter is omitted:

   If a condition has never been set in the prefix-list, the initial value is 10. If any condition has been

set, the maximum value of the condition that has ever been set plus 10 is used.

2. Range of values:

   Specify 1 to 4294967295 in decimal. If you omit <Seq> when a value greater than 4294967285 has ever been set, an error occurs.

{permit | deny}

Permits or denies access when filter conditions are met. Specify permit to permit access. Specify deny to deny access.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

<IPv4-Prefix>/<Mask-Len>

Specifies the address condition for the IPv4 prefix as filter conditions. Specify an address for <IPv4-Prefix> and the range of checking a match for <Mask-Len>.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv4-Prefix>, specify an IPv4 prefix. For <Mask-Len>, specify 0 to 32 in decimal.

   Note: Set all the bits following the bits specified for <Mask-Len> of <IPv4-Prefix> to 0.

[ge <Min-Len>] [le <Max-Len>]

Specifies the minimum and maximum values of the mask length to be used as filter conditions. For ge <Min-Len>, specify the minimum mask length. For le <Max-Len>, specify the maximum mask length.

1. Default value when this parameter is omitted:

   If both ge and le are omitted, the condition is a match of the <Mask-Len> value.

   If le is omitted, a value equal to or greater than the <Min-Len> value and equal to or smaller than 32 meets the condition.

   If ge is omitted, a value equal to or greater than the <Mask-Len> value and equal to or smaller than the <Max-Len> value meets the condition.

2. Range of values:

   For <Min-Len>, specify 0 to 32 in decimal.

   For <Max-Len>, specify 0 to 32 in decimal.

   If you omit ge, make sure that the <Mask-Len> value is equal to or smaller than the <Max-Len> value.

   If you specify ge, make sure that the <Min-Len> value is equal to or smaller than the <Max-Len> value.

Default behavior

No prefix-list is used.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. The filter denies any routes that do not match the filter conditions.

   A prefix-list without permit or deny specified can also be used as a filter. In this case, the filter permits all routes.

2. After you have set values by using this command, this command can only be used to change the value of the description parameter. Each prefix-list identifier (<Id>) must have a unique prefix setting (<IPv4-Prefix>/<Mask-Len> and [ge <Min-Len>] [le <Max-Len>]).

Related commands

distribute-list in (RIP) (OSPF) (BGP4)

distribute-list out (RIP) (OSPF) (BGP4)

neighbor in (BGP4)

neighbor out (BGP4)

ipv6 prefix-list

The "ipv6 prefix-list" command configures an IPv6 prefix list. You can use the IPv6 prefix-list to filter routes by IPv6 address or IPv6 prefix.

Syntax

To set information:

ipv6 prefix-list <Id> description <Text>

ipv6 prefix-list <Id> [seq <Seq>] {permit | deny} <IPv6-Prefix>/<Prefix-Len> [ge <Min-Len>] [le <Max-Len>]

To change information:

ipv6 prefix-list <Id> description <Text>

To delete information:

no ipv6 prefix-list <Id>

no ipv6 prefix-list <Id> description

no ipv6 prefix-list <Id> seq <Seq>

Input mode

```
(config)
```

Parameters

<Id>

Specifies the identifier of the IPv6 prefix-list to be configured.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a name that is no more than 31 characters long.

   For details, see "Specifiable values for parameters".

description <Text>

Sets a supplementary description of an IPv6 prefix-list.

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 64 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 "■Arbitrary character string" in "Specifiable values for parameters".

seq <Seq>

Sets the sequence in which filter conditions are applied.

1. Default value when this parameter is omitted:

   If a condition has never been specified in the prefix-list, the initial value is 10. If any condition has

been set, the maximum value of the condition that has ever been set plus 10 is used.

2. Range of values:

   Specify 1 to 4294967295 in decimal. If you omit <Seq> when a value greater than 4294967285 has ever been set, an error occurs.

{permit | deny}

Permits or denies access when filter conditions are met. Specify permit to permit access. Specify deny to deny access.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

<IPv6-Prefix>/<Prefix-Len>

Specifies the address condition for the IPv6 prefix as filter conditions. Specify an address for <IPv6-Prefix> and the range of checking a match for <Prefix-Len>.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv6-Prefix>, specify an IPv6 prefix.

   For <Prefix-Len>, specify 0 to 128 in decimal.

   Note: Set all the bits following the bits specified for <Prefix-Len> of <IPv6-Prefix> to 0.

[ge <Min-Len>] [le <Max-Len>]

Specifies the minimum and maximum values of the prefix length to be used as filter conditions. For ge <Min-Len>, specify the minimum prefix length. For le <Max-Len>, specify the maximum prefix length.

1. Default value when this parameter is omitted:

   If both ge and le are omitted, the condition is a match of the <Mask-Len> value.

   If le is omitted, a value equal to or greater than the <Min-Len> value and equal to or smaller than 128 meets the condition.

   If ge is omitted, a value equal to or greater than the <Mask-Len> value and equal to or smaller than the <Max-Len> value meets the condition.

2. Range of values:

   For <Min-Len>, specify 0 to 128 in decimal.

   For <Max-Len>, specify 0 to 128 in decimal.

   If you omit ge, make sure that the <Mask-Len> value is equal to or smaller than the <Max-Len> value.

   If you specify ge, make sure that the <Min-Len> value is equal to or smaller than the <Max-Len> value.

Default behavior

No prefix-list is used.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. The filter denies any routes that do not match the filter conditions.

   A prefix-list without permit or deny specified can also be used as a filter. In this case, the filter permits all routes.

2. After you have set values by using this command, this command can only be used to change the value of the description parameter. Each prefix-list identifier (<Id>) must have a unique prefix setting (<IPv6-Prefix>/<Prefix-Len> and [ge <Min-Len>] [le <Max-Len>]).

Related commands

distribute-list in (RIPng) (OSPFv3) (BGP4+)

distribute-list out (RIPng) (OSPFv3) (BGP4+)

neighbor in (BGP4+)

neighbor out (BGP4+)

match as-path [SL-L3A]

The "match as-path" command configures route-map to use the AS_PATH attribute as filter conditions.

Syntax

To set or add information (information cannot be changed):

match as-path <Aspath-List> [...]

To delete information:

no match as-path [<Aspath-List> [...]]

Input mode

```
(config-route-map)
```

Parameters

<Aspath-List>

Specifies the AS_PATH filter access-list to be used as filter conditions. If a match as-path entry already exists, the information you specified is added to the existing entry. However, if the entered AS_PATH filter access-list already exists, no information is added. You can specify a maximum of 16 parameters.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 500 in decimal.

Default behavior

The AS_PATH attribute is not used as filter conditions.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

ip as-path access-list

match community [SL-L3A]

The "match community" command configures route-map to use the Communities attribute as filter conditions.

Syntax

To set or add information (information cannot be changed):

match community <Community-List> [...]

To delete information:

no match community [<Community-List> [...]]

Input mode

```
(config-route-map)
```

Parameters

<Community-List>

Specifies the community-list to be used as filter conditions. If a match community entry already exists, the information you specified is added to the existing entry. However, if the entered community-list already exists, no information is added. You can specify a maximum of 16 parameters.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 500 in decimal, or a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

Default behavior

The Communities attribute is not used as filter conditions.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

ip community-list

match interface

The "match interface" command configures route-map to use the interface of the route as filter conditions.

Syntax

To set or add information (information cannot be changed):

match interface <interface type> <interface number> [...]

To delete information:

no match interface [<interface type> <interface number> [...]]

Input mode

```
(config-route-map)
```

Parameters

<interface type> <interface number>

Specifies the interface to be used as filter conditions. If a match interface entry already exists, the information you specified is added to the existing entry. However, if the entered interface already exists, no information is added. You can specify a maximum of 16 parameters.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <interface type> <interface number>, you can specify the interface name and interface number corresponding to the following interface type groups. For details, see "■How to specify the interface" in "Specifiable values for parameters".

   - VLAN interface
   - Loopback interface
   - Null interface

Default behavior

The interface is not used as filter conditions.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. With BGP4 or BGP4+ learned route filtering, routes do not match any interface.

Related commands

None

match ip address

The "match ip address" command configures route-map to use the IPv4 address prefix as filter conditions.

Syntax

To set or add information (information cannot be changed):

match ip address {<access list> [...] | prefix-list <prefix list> [...]}

To delete information:

no match ip address [{<access list> [...] | prefix-list <prefix list> [...]}]

Input mode

```
(config-route-map)
```

Parameters

{<access list> [...] | prefix-list <prefix list> [...]}

Specifies the access-list or prefix-list for the IPv4 address prefix to be used as filter conditions. If a match ip address entry already exists, the information you specified is added to the existing entry. However, if the entered list already exists, no information is added. You cannot specify an access-list and prefix-list simultaneously in the same entry. You can specify a maximum of 16 parameters.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <access list>, specify 1 to 199 or 1300 to 2699 in decimal, or a name of no more than 31 characters.

   For <prefix list>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

Default behavior

The IPv4 address prefix is not used as filter conditions.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. This command permits access for any IPv6 address prefix.

Related commands

access-list

ip access-list

prefix-list

match ip route-source

The "match ip route-source" command configures route-map to use the source IPv4 address as filter conditions.

Syntax

To set or add information (information cannot be changed):

match ip route-source {<access list> [...] | prefix-list <prefix list> [...]}

To delete information:

no match ip route-source [{<access list> [...] | prefix-list <prefix list> [...]}]

Input mode

```
(config-route-map)
```

Parameters

{<access list> [...] | prefix-list <prefix list> [...]}

Specifies the access-list or prefix-list for the source IPv4 address to be used as filter conditions. If a match ip route-source entry already exists, the information you specified is added to the existing entry. However, if the entered list already exists, no information is added. You cannot specify an access-list and prefix-list simultaneously in the same entry. You can specify a maximum of 16 parameters.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <access list>, specify 1 to 199 or 1300 to 2699 in decimal, or a name of no more than 31 characters.

   For <prefix list>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

Default behavior

The source IPv4 address is not used as filter conditions.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. This command permits access for any source IPv6 address.

Related commands

access-list

ip access-list

ip prefix-list

match ipv6 address

The "match ipv6 address" command configures route-map to use the IPv6 address prefix as filter conditions.

Syntax

To set or add information (information cannot be changed):

match ipv6 address {<access list> [...] | prefix-list <prefix list> [...]}

To delete information:

no match ipv6 address [{<access list> [...] | prefix-list <prefix list> [...]}]

Input mode

```
(config-route-map)
```

Parameters

{<access list> [...] | prefix-list <prefix list> [...]}

Specifies the access-list or prefix-list for the IPv6 address prefix to be used as filter conditions. If a match ipv6 address entry already exists, the information you specified is added to the existing entry. However, if the entered list already exists, no information is added. You cannot specify an access-list and prefix-list simultaneously in the same entry. You can specify a maximum of 16 parameters.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <access list>, specify a name of no more than 31 characters.

   For <prefix list>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

Default behavior

The IPv6 address prefix is not used as filter conditions.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. This command permits access for any IPv4 address prefix.

Related commands

ipv6 access-list

ipv6 prefix-list

match ipv6 route-source

The "match ipv6 route-source" command configures route-map to use the source IPv6 address as filter conditions.

Syntax

To set or add information (information cannot be changed):

match ipv6 route-source {<access list> [...] | prefix-list <prefix list> [...]}

To delete information:

no match ipv6 route-source [{<access list> [...] | prefix-list <prefix list> [...]}]

Input mode

```
(config-route-map)
```

Parameters

{<access list> [...] | prefix-list <prefix list> [...]}

Specifies the access-list or prefix-list for the source IPv6 address to be used as filter conditions. If a match ipv6 route-source entry already exists, the information you specified is added to the existing entry. However, if the entered list already exists, no information is added. You cannot specify an access-list and prefix-list simultaneously in the same entry. You can specify a maximum of 16 parameters.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <access list>, specify a name of no more than 31 characters.

   For <prefix list>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

Default behavior

The source IPv6 address is not used as filter conditions.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. This command permits access for any source IPv4 address.

Related commands

ipv6 access-list

ipv6 prefix-list

match origin [SL-L3A]

The "match origin" command configures route-map to use the ORIGIN attribute as filter conditions.

Syntax

To set or add information (information cannot be changed):

match origin [igp] [egp] [incomplete]

To delete information:

no match origin [igp] [egp] [incomplete]

Input mode

```
(config-route-map)
```

Parameters

[igp] [egp] [incomplete]

Specifies the ORIGIN attribute to be used as filter conditions. If a match origin entry already exists, the information you specified is added to the existing entry. However, if the entered ORIGIN attribute already exists, no information is added.

1. Default value when this parameter is omitted:

   None. Nothing is created if a match origin entry does not exist.

2. Range of values:

   None

Default behavior

The ORIGIN attribute is not used as filter conditions.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

match protocol

The "match protocol" command configures route-map to use the routing protocol as filter conditions.

Syntax

To set or add information (information cannot be changed):

match protocol <Protocol> [...]

To delete information:

no match protocol [<Protocol> [...]]

Input mode

```
(config-route-map)
```

Parameters

<Protocol>

Specifies the protocol to be used as filter conditions. If a match protocol entry already exists, the information you specified is added to the existing entry. However, if the entered protocol already exists, no information is added. You can specify a maximum of 16 parameters.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   <Protocol> :={ connected | static | summary | rip | ospf <Domain-No> | bgp | extra-vrf }

   <Domain-No>: 1 to 65535 in decimal

Default behavior

The protocol is not used as filter conditions.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

match route-type [SL-L3A]

The "match route-type" command configures route-map to use the route type as filter conditions.

Syntax

To set or add information (information cannot be changed):

match route-type [local] [internal] [external] [external type-1] [external type-2] [nssa-external] [nssa-external type-1] [nssa-external type-2]

To delete information:

no match route-type [local] [internal] [external] [external type-1] [external type-2] [nssa-external] [nssa-external type-1] [nssa-external type-2]

Input mode

```
(config-route-map)
```

Parameters

[local] [internal] [external] [external type-1] [external type-2] [nssa-external] [nssa-external type-1] [nssa-external type-2]

Specifies the route type to be used as filter conditions. If a match route-type entry already exists, the information you specified is added to the existing entry. However, if the entered parameter already exists, no information is added.

Specify local to use a route generated by BGP4/BGP4+ advertised route generation as the learning source.

Specify internal to use OSPF/OSPFv3 intra-area routes and inter-area routes.

Specify external to use OSPF/OSPFv3 external AS routes. type-1 and type-2 are the metric types of external AS routes. If you specify external, the processing is the same as when both external type-1 and external type-2 are specified.

Specify nssa-external to use external AS routes learned from OSPF NSSA. type-1 and type-2 are the metric types of external AS routes. If you specify nssa-external, the processing is the same as when both nssa-external type-1 and nssa-external type-2 are specified.

1. Default value when this parameter is omitted:

   None. Nothing is created if a match route-type entry does not exist.

2. Range of values:

   None

Default behavior

The route type is not used as filter conditions.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

match tag

The "match tag" command configures route-map to use the tag value as filter conditions.

Syntax

To set or add information (information cannot be changed):

match tag <Tag> [...]

To delete information:

no match tag [<Tag> [...]]

Input mode

```
(config-route-map)
```

Parameters

<Tag>

Specifies the tag to be used as filter conditions. If a match tag entry already exists, the information you specified is added to the existing entry. However, if the entered tag already exists, no information is added. You can specify a maximum of 16 parameters.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 0 to 4294967295 in decimal.

Default behavior

The tag value is not used as filter conditions.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

match vrf [SL-L3A]

The "match vrf" command configures route-map to use a VRF as filter conditions.

Syntax

To set or add information (information cannot be changed):

match vrf {<vrf id> | global } [<vrf id> ...]

To delete information:

no match vrf [{<vrf id> | global } [<vrf id> ...]]

Input mode

```
(config-route-map)
```

Parameters

{<vrf id> | global } [<vrf id> ...]

Specifies the VRF to be used as filter conditions. If a match vrf entry already exists, the information you specified is added to the existing entry. However, if the entered parameter already exists, no information is added. You can specify a maximum of 16 parameters for this command.

<vrf id>

The VRF route is used as a filter condition.

global

The global route is used as a filter condition.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <vrf id>, specify a VRF ID.

   For details, see "Specifiable values for parameters".

Default behavior

A VRF is not used as a filter condition.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

neighbor in (BGP4) [SL-L3A]

The "neighbor in (BGP4)" command filters which BGP4-learned routes are added to the routing table.

If you set the command in config-router mode, the setting applies to BGP4 of the global network.

If you set the command in config-router-af (ipv4 vrf) mode, the setting applies to BGP4 of the specified VRF.

Syntax

To set or change information:

neighbor {<IPv4-Address> | <Peer-Group>} {distribute-list <access list> | prefix-list <prefix list> | route-map <route map>} in

To delete information:

no neighbor {<IPv4-Address> | <Peer-Group>} [{distribute-list [<access list>] | prefix-list [<prefix list>] | route-map [<route map>]} in]

Notes

no neighbor <IPv4-Address> deletes all "neighbor" command settings for the peer. no neighbor <Peer-Group> deletes all "neighbor" command settings for the peer group, including the settings for the peers that belong to the peer group.

Input mode

```
(config-router)
(config-router-af)
```

Parameters

{<IPv4-Address> | <Peer-Group>}

Specifies the neighbor IPv4 address used for filtering or the BGP4 peer group identifier used for filtering.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv4-Address>, specify an IPv4 address.

   For <Peer-Group>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

{distribute-list <access list> | prefix-list <prefix list> | route-map <route map>}

Specifies the access-list, prefix-list, or route-map used for filtering.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <access list>, specify 1 to 199 or 1300 to 2699 in decimal, or a name of no more than 31 characters.

   For <prefix list>, specify a name of no more than 31 characters.

   For <route map>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

Default behavior

BGP4-learned routes are not controlled.

Impact on communication

None

When the change is applied

The change is applied when the "clear ip bgp [vrf {<vrf id> | all}] * { in | both }" operation command is executed.

Notes

None

Related commands

access-list

ip access-list

ip prefix-list

route-map

neighbor in (BGP4+) [SL-L3A]

The "neighbor in (BGP4+)" command filters which BGP4+ learned routes are added to the routing table.

If you set the command in config-router-af (ipv6) mode, the setting applies to the BGP4+ routes of the global network.

If you set the command in config-router-af (ipv6 vrf) mode, the setting applies to the BGP4+ routes of the specified VRF.

Syntax

To set or change information:

neighbor {<IPv6-Address> | <Peer-Group>} {prefix-list <prefix list> | route-map <route map> } in

To delete information:

no neighbor {<IPv6-Address> | <Peer-Group>} [{prefix-list [<prefix list>] | route-map [<route map>] } in]

Notes

no neighbor <IPv6-Address> deletes all "neighbor" command settings for the peer. no neighbor <Peer-Group> deletes all "neighbor" command settings for the peer group, including the settings for the peers that belong to the peer group.

Input mode

```
(config-router-af)(ipv6)
(config-router-af)(ipv6 vrf)
```

Parameters

{<IPv6-Address> | <Peer-Group>}

Specifies the neighbor IPv6 address used for filtering or the BGP4+ peer group identifier used for filtering.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv6-Address>, specify an IPv6 address.

   For <Peer-Group>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

{prefix-list <prefix list> | route-map <route map>}

Specifies the prefix-list or route-map to which the filter conditions apply.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <prefix list>, specify a name of no more than 31 characters.

   For <route map>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

Default behavior

BGP4+ learned routes are not controlled.

Impact on communication

None

When the change is applied

The change is applied when the "clear ipv6 bgp [vrf {<vrf id> | all}] * { in | both }" operation command is executed.

Notes

None

Related commands

ipv6 prefix-list

route-map

neighbor out (BGP4) [SL-L3A]

The "neighbor out (BGP4)" command filters which BGP4 routes are advertised.

If you set the command in config-router mode, the setting applies to BGP4 of the global network.

If you set the command in config-router-af (ipv4 vrf) mode, the setting applies to BGP4 of the specified VRF.

Syntax

To set or change information:

neighbor {<IPv4-Address> | <Peer-Group>} {distribute-list <access list> | prefix-list <prefix list> | route-map <route map>} out [<Protocol>]

To delete information:

no neighbor {<IPv4-Address> | <Peer-Group>} [{distribute-list [<access list>] | prefix-list [<prefix list>] | route-map [<route map>]} out [<Protocol>]]

Notes

no neighbor <IPv4-Address> deletes all "neighbor" command settings for the peer. no neighbor <Peer-Group> deletes all "neighbor" command settings for the peer group, including the settings for the peers that belong to the peer group.

Input mode

```
(config-router)
(config-router-af)
```

Parameters

{<IPv4-Address> | <Peer-Group>}

Specifies the neighbor IPv4 address used for filtering or the BGP4 peer group identifier used for filtering.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv4-Address>, specify an IPv4 address.

   For <Peer-Group>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

{distribute-list <access list> | prefix-list <prefix list> | route-map <route map>}

Specifies the access-list, prefix-list, or route-map used for filtering.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <access list>, specify 1 to 199 or 1300 to 2699 in decimal, or a name of no more than 31 characters.

   For <prefix list>, specify a name of no more than 31 characters.

   For <route map>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

<Protocol>

Specify the learning source protocol.

1. Default value when this parameter is omitted:

   Routes are not filtered by the protocol.

2. Range of values:

   <Protocol> := {connected | static | summary | rip | ospf <Domain-No> | bgp | extra-vrf}

   <Domain-No>: 1 to 65535 in decimal

Default behavior

BGP4 routes to be advertised are not filtered.

Impact on communication

None

When the change is applied

The change is applied when the "clear ip bgp [vrf {<vrf id> | all}] * { out | both }" operation command is executed.

Notes

None

Related commands

access-list

ip access-list

ip prefix-list

route-map

neighbor out (BGP4+) [SL-L3A]

The "neighbor out (BGP4+)" command filters which BGP4+ routes are advertised.

If you set the command in config-router-af (ipv6) mode, the setting applies to the BGP4+ routes of the global network.

If you set the command in config-router-af (ipv6 vrf) mode, the setting applies to the BGP4+ routes of the specified VRF.

Syntax

To set or change information:

neighbor {<IPv6-Address> | <Peer-Group>} {prefix-list <prefix list> | route-map <route map> } out [<Protocol>]

To delete information:

no neighbor {<IPv6-Address> | <Peer-Group>} [{prefix-list [<prefix list>] | route-map [<route map>] } out [<Protocol>]]

Notes

no neighbor <IPv6-Address> deletes all "neighbor" command settings for the peer. no neighbor <Peer-Group> deletes all "neighbor" command settings for the peer group, including the settings for the peers that belong to the peer group.

Input mode

```
(config-router-af)(ipv6)
(config-router-af)(ipv6 vrf)
```

Parameters

{<IPv6-Address> | <Peer-Group>}

Specifies the neighbor IPv6 address used for filtering or the BGP4+ peer group identifier used for filtering.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv6-Address>, specify an IPv6 address.

   For <Peer-Group>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

{prefix-list <prefix list> | route-map <route map>}

Specifies the prefix-list or route-map to which the filter conditions apply.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <prefix list>, specify a name of no more than 31 characters.

   For <route map>, specify a name of no more than 31 characters.

   For details, see "Specifiable values for parameters".

<Protocol>

Specify the learning source protocol.

1. Default value when this parameter is omitted:

   Routes are not filtered by the protocol.

2. Range of values:

   <Protocol> := {connected | static | summary | rip | ospf <Domain-No> | bgp | extra-vrf}

   <Domain-No>: 1 to 65535 in decimal

Default behavior

BGP4+ routes to be advertised are not filtered.

Impact on communication

None

When the change is applied

The change is applied when the "clear ipv6 bgp [vrf {<vrf id> | all}] * { out | both }" operation command is executed.

Notes

None

Related commands

ipv6 prefix-list

route-map

redistribute (BGP4) [SL-L3A]

The "redistribute (BGP4)" command filters which routes learned by other protocols are advertised to BGP4.

If you set the command in config-router mode, the setting applies to BGP4 of the global network.

If you set the command in config-router-af (ipv4 vrf) mode, the setting applies to BGP4 of the specified VRF.

Syntax

To set, change, or add information:

redistribute <Protocol> [<Protocol-Options>] [metric <Metric>] [route-map <route map>]

To delete information:

no redistribute <Protocol>

Input mode

```
(config-router)
(config-router-af)
```

Parameters

<Protocol>

Specify the learning source protocol.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   <Protocol> := {connected | static | summary | rip | ospf <Domain-No> | bgp | extra-vrf}

   <Domain-No>: 1 to 65535 in decimal

<Protocol-Options>

Specifies the route type. You can specify this parameter only when <Protocol> is set to ospf.

1. Default value when this parameter is omitted:

   All routes are to be filtered.

2. Range of values:

   <Protocol-Options> := match {[internal] [external] [external 1] [external 2] [nssa-external] [nssa-external 1] [nssa-external 2]}

metric <Metric>

Specifies the metric value for routes to be advertised.

1. Default value when this parameter is omitted:

   The default value for BGP4 is used.

2. Range of values:

   Specify 0 to 4294967295 in decimal.

route-map <route map>

Specifies the route-map which applies the filter conditions.

1. Default value when this parameter is omitted:

No route-map is used for filtering.

2. Range of values:

   Specify a name that is no more than 31 characters long.

   For details, see "Specifiable values for parameters".

Default behavior

Routes learned by other protocols are not advertised.

Impact on communication

None

When the change is applied

The change is applied when the "clear ip bgp [vrf {<vrf id> | all}] * { out | both }" operation command is executed.

Notes

None

Related commands

route-map

redistribute (BGP4+) [SL-L3A]

The "redistribute (BGP4+)" command filters which routes learned by other protocols are advertised to BGP4+.

If you set the command in config-router-af (ipv6) mode, the setting applies to the BGP4+ routes of the global network.

If you set the command in config-router-af (ipv6 vrf) mode, the setting applies to the BGP4+ routes of the specified VRF.

Syntax

To set, change, or add information:

redistribute <Protocol> [<Protocol-Options>] [metric <Metric>] [route-map <route map>]

To delete information:

no redistribute <Protocol>

Input mode

```
(config-router-af)(ipv6)
(config-router-af)(ipv6 vrf)
```

Parameters

<Protocol>

Specify the learning source protocol.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   <Protocol> :={ connected | static | summary | rip | ospf <Domain-No> | bgp | extra-vrf }

   <Domain-No>: 1 to 65535 in decimal

<Protocol-Options>

Specifies the route type. You can specify this parameter only when <Protocol> is set to ospf.

1. Default value when this parameter is omitted:

   All routes are to be filtered.

2. Range of values:

   <Protocol-Options> := match {[internal] [external] [external 1] [external 2] [nssa-external] [nssa-external 1] [nssa-external 2]}

metric <Metric>

Specifies the metric value for routes to be advertised.

1. Default value when this parameter is omitted:

   The default value for BGP4+ is used.

2. Range of values:

   Specify 0 to 4294967295 in decimal.

route-map <route map>

Specifies the route-map which applies the filter conditions.

1. Default value when this parameter is omitted:

   No route-map is used for filtering.

2. Range of values:

   Specify a name that is no more than 31 characters long.

   For details, see "Specifiable values for parameters".

Default behavior

Routes learned by other protocols are not advertised.

Impact on communication

None

When the change is applied

The change is applied when the "clear ipv6 bgp [vrf {<vrf id> | all}] * { out | both }" operation command is executed.

Notes

None

Related commands

route-map

redistribute (OSPF) [SL-L3A]

The "redistribute (OSPF)" command filters which routes learned by other protocols are injected to OSPF.

Syntax

To set, change, or add information:

redistribute <Protocol> [<Protocol-Options>] [metric <Metric>] [metric-type [{1 | 2}]] [tag <Tag>] [route-map <route map>]

To delete information:

no redistribute <Protocol>

Input mode

```
(config-router)
```

Parameters

<Protocol>

Specify the learning source protocol.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   <Protocol> :={ connected | static | summary | rip | ospf <Domain-No> | bgp | extra-vrf }

   <Domain-No>: 1 to 65535 in decimal

<Protocol-Options>

Specifies the route type. You can specify this parameter only when <Protocol> is set to ospf.

1. Default value when this parameter is omitted:

   All routes are to be filtered.

2. Range of values:

   <Protocol-Options> := match {[internal] [external] [external 1] [external 2] [nssa-external] [nssa-external 1] [nssa-external 2]}

metric <Metric>

Specifies the metric value for routes to be advertised.

1. Default value when this parameter is omitted:

   The value set by the "default-metric" command is used. If the "default-metric" command has not been set, 0 or the metric value for the learning source protocol is used.

2. Range of values:

   Specify 0 to 16777214 in decimal.

metric-type [{1 | 2}]

Specifies the metric type for routes to be advertised.

1. Default value when this parameter is omitted:

   type 2

2. Range of values:

   None

tag <Tag>

Specifies the tag value for routes to be advertised.

1. Default value when this parameter is omitted:

   0

2. Range of values:

   Specify 0 to 4294967295 in decimal.

route-map <route map>

Specifies the route-map which applies the filter conditions.

1. Default value when this parameter is omitted:

   No route-map is used for filtering.

2. Range of values:

   Specify a name that is no more than 31 characters long.

   For details, see "Specifiable values for parameters".

Default behavior

Routes learned by other protocols are not injected.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

route-map

redistribute (OSPFv3) [SL-L3A]

The "redistribute (OSPFv3)" command filters which routes learned by other protocols are advertised to OSPFv3.

Syntax

To set, change, or add information:

redistribute <Protocol> [<Protocol-Options>] [metric <Metric>] [metric-type [{1 | 2}]] [tag <Tag>] [route-map <route map>]

To delete information:

no redistribute <Protocol>

Input mode

```
(config-rtr)
```

Parameters

<Protocol>

Specify the learning source protocol.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   <Protocol> :={ connected | static | summary | rip | ospf <Domain-No> | bgp | extra-vrf }

   <Domain-No>: 1 to 65535 in decimal

<Protocol-Options>

Specifies the route type. You can specify this parameter only when <Protocol> is set to ospf.

1. Default value when this parameter is omitted:

   All routes are to be filtered.

2. Range of values:

   <Protocol-Options> := match {[internal] [external] [external 1] [external 2] [nssa-external] [nssa-external 1] [nssa-external 2]}

metric <Metric>

Specifies the metric value for routes to be advertised.

1. Default value when this parameter is omitted:

   The value set by the "default-metric" command is used. If the "default-metric" command has not been set, 0 or the metric value for the learning source protocol is used.

2. Range of values:

   Specify 0 to 16777214 in decimal.

metric-type [{1 | 2}]

Specifies the metric type for routes to be advertised.

1. Default value when this parameter is omitted:

   No metric type is advertised.

2. Range of values:

   None

tag <Tag>

Specifies the tag value for routes to be advertised. Routes with a tag value of 0 are not advertised in OSPFv3.

1. Default value when this parameter is omitted:

   The tag value is set to 0.

2. Range of values:

   Specify 0 to 4294967295 in decimal.

route-map <route map>

Specifies the route-map which applies the filter conditions.

1. Default value when this parameter is omitted:

   No route-map is used for filtering.

2. Range of values:

   Specify a name that is no more than 31 characters long.

   For details, see "Specifiable values for parameters".

Default behavior

Routes learned by other protocols are not advertised.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

route-map

redistribute (RIP)

The "redistribute (RIP)" command filters which routes learned by other protocols are advertised to RIP.

If you set the command in config-router mode, the setting applies to the global network.

If you set the command in config-router-af mode, the setting applies to the specified VRF.

Syntax

To set, change, or add information:

redistribute <Protocol> [<Protocol-Options>] [metric <Metric>] [route-map <route map>]

To delete information:

no redistribute <Protocol>

Input mode

```
(config-router)
(config-router-af)
```

Parameters

<Protocol>

Specify the learning source protocol.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   <Protocol> :={ connected | static | summary | rip | ospf <Domain-No> | bgp | extra-vrf }

   <Domain-No>: 1 to 65535 in decimal

<Protocol-Options>

Specifies the route type. You can specify this parameter only when <Protocol> is set to ospf.

1. Default value when this parameter is omitted:

   All route types are to be filtered.

2. Range of values:

   <Protocol-Options> := match {[internal] [external] [external 1] [external 2] [nssa-external] [nssa-external 1] [nssa-external 2]}

metric <Metric>

Specifies the metric value for routes to be advertised.

1. Default value when this parameter is omitted:

   The default value for RIP is used.

2. Range of values:

   Specify 1 to 16 in decimal.

route-map <route map>

Specifies the route-map used for filtering.

1. Default value when this parameter is omitted:

No route-map is used for filtering.

2. Range of values:

   Specify a name that is no more than 31 characters long.

   For details, see "Specifiable values for parameters".

Default behavior

Routes learned by other protocols are not advertised.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

route-map

redistribute (RIPng)

The "redistribute (RIPng)" command filters which routes learned by other protocols are advertised to RIPng.

Syntax

To set, change, or add information:

redistribute <Protocol> [<Protocol-Options>] [metric <Metric>] [route-map <route map>]

To delete information:

no redistribute <Protocol>

Input mode

```
(config-rtr-rip)
```

Parameters

<Protocol>

Specify the learning source protocol.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   <Protocol> :={ connected | static | summary | rip | ospf <Domain-No> | bgp | extra-vrf }

   <Domain-No>: 1 to 65535 in decimal

<Protocol-Options>

Specifies the route type. You can specify this parameter only when <Protocol> is set to ospf.

1. Default value when this parameter is omitted:

   All route types are to be filtered.

2. Range of values:

   <Protocol-Options> := match {[internal] [external] [external 1] [external 2] [nssa-external] [nssa-external 1] [nssa-external 2]}

metric <Metric>

Sets the metric value for routes to be advertised.

1. Default value when this parameter is omitted:

   The default value for RIPng is used.

2. Range of values:

   Specify 1 to 16 in decimal.

route-map <route map>

Specifies the route-map used for filtering.

1. Default value when this parameter is omitted:

   No route-map is used for filtering.

2. Range of values:

   Specify a name that is no more than 31 characters long.

   For details, see "Specifiable values for parameters".

Default behavior

Routes learned by other protocols are not advertised.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

route-map

route-map

The "route-map" command configures a route-map. Route-maps allow you to use routing information to filter routes which are sent or received by a routing protocol, and to change routing information. After this command is entered, the mode changes to config-route-map mode.

Syntax

To set or change information (only the permit and deny settings can be changed):

route-map <Id> {permit | deny} [<Seq>]

To delete information:

no route-map <Id>

no route-map <Id> {permit | deny} <Seq>

Input mode

```
(config)
```

Parameters

<Id>

Specifies the identifier used to identify the route-map. This identifier is used to reference the route-map.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a name that is no more than 31 characters long.

   For details, see "Specifiable values for parameters".

{permit | deny}

Permits or denies access when filter conditions are met. Specify permit to permit access. Specify deny to deny access.

If an entry for the entered <Id> value already exists, the parameter value is overwritten.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

<Seq>

Sets the order in which route-maps having the same <Id> value are applied.

1. Default value when this parameter is omitted:

   If there is no entry for the specified <Id>, 10 is set.

   If there is only one entry line for the specified <Id>, the mode changes to config-route-map mode without changing the <Seq> value for that entry.

   If there are multiple lines of entries for the specified <Id>, omitting the <Seq> parameter causes an error.

2. Range of values:

   Specify 1 to 4294967295 in decimal.

Default behavior

No route-map 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

distribute-list in (RIP) (OSPF) (BGP4) (RIPng) (OSPFv3) (BGP4+)

distribute-list out (RIP) (OSPF) (BGP4) (RIPng) (OSPFv3) (BGP4+)

redistribute (RIP) (OSPF) (BGP4) (RIPng) (OSPFv3) (BGP4+)

neighbor in (BGP4) (BGP4+)

neighbor out (BGP4) (BGP4+)

set as-path prepend count [SL-L3A]

Sets the number of AS_PATH numbers added to the routing information.

Syntax

To set or change information:

set as-path prepend count <Count>

To delete information:

no set as-path prepend count

Input mode

```
(config-route-map)
```

Parameters

<Count>

Specifies the number of AS_PATH numbers to be added.

1. Default value when this parameter is omitted:
   This parameter cannot be omitted.
2. Range of values:
   Specify 1 to 25 in decimal.

Default behavior

The number of AS_PATH numbers increases.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

set community [SL-L3A]

The "set community" command replaces the Communities attribute of the route.

Syntax

To set or change information:

set community {<Community> [...] [additive] | none}

To delete information:

no set community

Input mode

```
(config-route-map)
```

Parameters

{<Community> [...] [additive] | none}

Specifies that the Communities attribute is to be replaced, added, or deleted.

<Community> [...] [additive]

Specifies the Communities attribute. You can specify a maximum of 25 <Community> parameters.

If you specify additive, the Communities attribute specified for <Community> is added to the existing routing information.

If you do not specify additive, the Communities attribute specified for <Community> replaces the existing routing information.

none

Deletes the existing Communities attribute.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   <Community> := {0 to 4294967295 (decimal) | <0 to 65535>:<0 to 65535> (decimal) | no-export | no-advertise | local-AS}

Default behavior

The Communities attribute does not change.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

set community-delete [SL-L3A]

The "set community-delete" command deletes the Communities attribute of the route.

Syntax

To set or change information:

set community-delete <Glob> [...]

To delete information:

no set community-delete

Input mode

```
(config-route-map)
```

Parameters

<Glob>

Specifies the community to be deleted from the routing information. You can specify a maximum of 8 parameters.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   <Glob> := {* | 0-4,294,967,295 | {<0-65,535>|*}:{<0-65,535>|*} | no-export | no-advertise | local-AS }

   An asterisk (*) indicates an arbitrary value.

Default behavior

The Communities attribute does not change.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

set distance

The "set distance" command sets the priority of the routing information.

Syntax

To set or change information:

set distance <Distance>

To delete information:

no set distance

Input mode

```
(config-route-map)
```

Parameters

<Distance>

Specifies the priority.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 2 to 255 in decimal. 2 indicates the highest priority, and 255 indicates the lowest priority.

Default behavior

The priority does not change.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

set local-preference [SL-L3A]

The "set local-preference" command sets the LOCAL_PREF attribute of the routing information.

Syntax

To set or change information:

set local-preference [{+ | -}]<Preference>

To delete information:

no set local-preference

Input mode

```
(config-route-map)
```

Parameters

[{+ | -}]<Preference>

Without {+ | -} specified, specifies the LOCAL_PREF attribute value to be set for the routing information.

With {+ | -} specified, specifies the LOCAL_PREF attribute value to be added to or subtracted from the routing information.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <Preference>, specify 0 to 65535 in decimal.

   If you specify +, the <Preference> value is added to the LOCAL_PREF attribute value.

   If you specify -, the <Preference> value is subtracted from the LOCAL_PREF attribute value.

Default behavior

The LOCAL_PREF attribute value does not change.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

set metric

The "set metric" command configures a metric to the routing information.

Syntax

To set or change information:

set metric [{+ | -}]<Metric>

To delete information:

no set metric

Input mode

```
(config-route-map)
```

Parameters

[{+ | -}]<Metric>

Without {+ | -} specified, specifies the metric value to be set for the routing information.

With {+ | -} specified, specifies the metric value to be added to or subtracted from the routing information.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <Metric>, specify 0 to 4294967295 in decimal.

   If you specify +, the <Metric> value is added to the metric value for the learning source protocol.

   If you specify -, the <Metric> value is subtracted from the metric value for the learning source protocol.

Default behavior

The metric value does not change.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. After all filtering has been completed, the metric value for the last result is reduced to the upper or lower limit by each protocol.

Related commands

None

set metric-type [SL-L3A]

The "set metric-type" command sets the metric type or metric value of the routing information.

Syntax

To set or change information:

set metric-type {internal | type-1 | type-2}

To delete information:

no set metric-type

Input mode

```
(config-route-map)
```

Parameters

{ internal | type-1 | type-2 }

Specifies the metric type to be set.

Specify internal to use the metric value of the IGP route used for next-hop resolution in BGP4 or BGP4+.

Use type-1 or type-2 to specify the metric type of external AS routes in OSPF or OSPFv3.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

Default behavior

The metric type and metric value are not changed.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

set origin [SL-L3A]

The "set origin" command sets the ORIGIN attribute of the routing information.

Syntax

To set or change information:

set origin {igp | egp | incomplete}

To delete information:

no set origin

Input mode

```
(config-route-map)
```

Parameters

{ igp | egp | incomplete }

Specifies the ORIGIN attribute to be set for the routing information.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

Default behavior

The ORIGIN attribute does not change.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

set tag

The "set tag" command sets the tag value of the routing information.

Syntax

To set or change information:

set tag <Tag>

To delete information:

no set tag

Input mode

```
(config-route-map)
```

Parameters

<Tag>

Specifies the tag value to be set for the routing information.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 0 to 4294967295 in decimal.

Default behavior

The tag does not change.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

16 IPv4 Multicast Routing Protocol Information

ip igmp group-limit

The "ip igmp group-limit" command specifies the maximum number of groups in which each IGMP interface can join.

When this command is set in global configuration mode, the settings for this command are applied to all IGMP interfaces belonging to the target VRF or the global network. However, if this command is set for the IGMP interface in config-if mode, the settings for the IGMP interface take precedence.

Syntax

To set or change information:

For global configuration mode

ip igmp [vrf <vrf id>] group-limit <number>

For config-if mode

ip igmp group-limit <number>

To delete information:

For global configuration mode

no ip igmp [vrf <vrf id>] group-limit

For config-if mode

no ip igmp group-limit

Input mode

```
(config)
```

```
(config-if)
```

VLAN interface

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

This command is valid only for the interface of the specified VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

2. Range of values:

   See "Specifiable values for parameters".

<number>

Specifies the maximum number of groups in which each IGMP interface can join.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 1024

Default behavior

In group participation, there is no limit on the maximum number of groups that can run per IGMP interface. However, you must operate multicast routing entries within the described capacity limits.

For details about capacity limits, see "Configuration Guide Vol. 1, 3 Capacity limit".

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

1. Values specified by using this command set a limit to the number of groups in which each interface can join, but do not guarantee the normal behavior with the specified value.
2. If a change in configuration would cause the current number of managed groups to exceed the group-limit that is set by this command, the current managed groups remain as such until they are removed from the group. However, they cannot rejoin the group until the number of managed groups on the interface is reduced to less than the group-limit that is set by this command.
3. This function does not limit group participation due to changes in the configuration (when static groups are added). Because the number of static groups is counted in the total number of groups, however, if the number of groups exceeds the limit due to the addition of static groups, additional group participation from hosts is limited.

Related commands

ip pim sparse-mode

ip igmp last-member-query-time

The "ip igmp last-member-query-time" command sets the time before the target group is deleted when an IGMPv2 Leave message or IGMPv3 Report (leave request) message for an IGMP interface is received.

When this command is set in global configuration mode, the settings for this command are applied to all IGMP interfaces belonging to the target VRF or the global network. However, if this command is set for the IGMP interface in config-if mode, the settings for the IGMP interface take precedence.

Syntax

To set or change information:

For global configuration mode

ip igmp [vrf <vrf id>] last-member-query-time <seconds>

For config-if mode

ip igmp last-member-query-time <seconds>

To delete information:

For global configuration mode

no ip igmp [vrf <vrf id>] last-member-query-time

For config-if mode

no ip igmp last-member-query-time

Input mode

```
(config)
```

```
(config-if)
```

VLAN interface

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

2. Range of values:

   See "Specifiable values for parameters".

<seconds>

Sets the time before the target group is deleted when an IGMPv2 Leave message or IGMPv3 Report (leave request) message is received.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 3600 (seconds)

Default behavior

The time before the target group is deleted when an IGMPv2 Leave message or IGMPv3 Report (leave request) message is received is as follows: 3 seconds when the IGMP version is 2, and 2 seconds when it is 3 or 3 only.

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

1. If a value described below is set, in an environment where multiple recipients in the same group exist on the same interface, leaving of one multicast recipient may temporarily interrupt relaying to another multicast recipient.
   - A value less than 3 seconds if the IGMP version is 2
   - A value less than 2 seconds if the IGMP version is 3 or 3 only
2. If multiple routers exist on the same network, set this setting to the same value for all routers. If the values are different, the time to stop relaying when a recipient has left the group depends on which router is the Forwarder.

Related commands

ip pim sparse-mode

ip igmp router

ip igmp router

The "ip igmp router" command runs IGMP on the target interface.

Syntax

To set information:

ip igmp router

To delete information:

no ip igmp router

Input mode

```
(config-if)
```

VLAN interface

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. IGMP runs on interfaces on which the "ip pim sparse-mode" command is set, even if this command is not set.
2. This command cannot be set for an interface with seven or more IPv4 addresses.

Related commands

ip pim max-interface

ip pim sparse-mode

ip igmp source-limit

The "ip igmp source-limit" command specifies the maximum total number of belonging sources to every group that can run per IGMP interface.

When this command is set in global configuration mode, the settings for this command are applied to all IGMP interfaces belonging to the target VRF or the global network. However, if this command is set for the IGMP interface in config-if mode, the settings for the IGMP interface take precedence.

Syntax

To set or change information:

For global configuration mode

ip igmp [vrf <vrf id>] source-limit <number>

For config-if mode

ip igmp source-limit <number>

To delete information:

For global configuration mode

no ip igmp [vrf <vrf id>] source-limit

For config-if mode

no ip igmp source-limit

Input mode

```
(config)
```

```
(config-if)
```

VLAN interface

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

This command is valid only for the interface of the specified VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

2. Range of values:

   See "Specifiable values for parameters".

<number>

Specifies the maximum total number of belonging sources to every group that can run per interface.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 1024

Default behavior

There is no limit on source participation in groups. However, you must operate multicast routing entries within the described capacity limits.

For details about capacity limits, see "Configuration Guide Vol. 1, 3 Capacity limit".

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

1. Values specified by using this command set the limit of the number of sources belonging to groups in which each interface can join, but do not guarantee the normal behavior based on the specified value.
2. If a change in configuration would cause the number of sources in a managed group to exceed the group-limit that is set by this command, the current managed groups remain as such until any of the sources leave the group. However, sources that have left the managed group cannot join in it again until the number of sources in the managed group on the interface is reduced to less than the group-limit that is set by this command.
3. This function does not limit source participation due to changes in the configuration (when static groups are added and PIM-SSM cooperation settings are added). Because this source participation is counted in the total number of sources, however, if the number of sources exceeds the limit due to changes in the configuration, additional source participation from hosts in groups is limited.

Related commands

ip pim sparse-mode

ip igmp ssm-map enable

The "ip igmp ssm-map enable" command enables PIM-SSM to be used for IGMPv1, IGMPv2, or IGMPv3 (EXCLUDE mode).

Syntax

To set information:

ip igmp [vrf <vrf id>] ssm-map enable

To delete information:

no ip igmp [vrf <vrf id>] ssm-map enable

Input mode

```
(config)
```

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

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 the setting value is changed.

Notes

None

Related commands

ip pim ssm

ip igmp ssm-map static

ip igmp ssm-map static

The "ip igmp ssm-map static" command sets the source address for the group address for which PIM-SSM works in IGMPv1, IGMPv2, or IGMPv3 (EXCLUDE mode).

Syntax

To set information:

ip igmp ssm-map [vrf <vrf id>] static <access list> <source address>

To delete information:

no ip igmp ssm-map [vrf <vrf id>] static <access list> <source address>

Input mode

```
(config)
```

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

2. Range of values:

   See "Specifiable values for parameters".

<access list>

Specifies an access list for the multicast group addresses (IPv4 addresses in class D) to be used for PIM-SSM.

The access list ID that can be specified for this parameter is <access list number> or <access list name>.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <access list number>, specify values from 1 to 99 or from 1300 to 1999 (in decimal).

   For <access list name>, specify a name that is no more than 31 characters.

   For details, see "Specifiable values for parameters".

<source address>

Specifies the multicast source address (IPv4 addresses in classes A to C) to be used for PIM-SSM.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify the source address (IPv4 addresses in classes A to C).

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. This command is enabled when the "ip igmp ssm-map enable" command is specified.
2. Specify an address for <access list> within the range of the multicast group addresses specified by using the "ip pim ssm" command.
3. Specify the access list that is set by using the following commands for <access list>. Access lists that have been set by using commands other than this command cannot be specified.
   - "ip access-list standard" command
   - "access-list" command specified with the same access list as that of the "ip access-list standard" command
4. If an access list that has not been set is specified, this command is not valid.
5. Use a consecutive bit string from the most significant bit for a wildcard mask to be specified for <access list name>.

Related commands

ip pim ssm

ip igmp ssm-map enable

ip access-list standard

ip igmp static-group

The "ip igmp static-group" command sets static additions to igmp groups.

Syntax

To set or change information:

ip igmp static-group <group address>

To delete information:

no ip igmp static-group <group address>

Input mode

`(config-if)`

VLAN interface

Parameters

<group address>

Specifies a static group address represented by an IPv4 multicast address.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a static group address represented by an IPv4 multicast address in dot notation.

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

None

Related commands

ip pim sparse-mode

ip igmp version

The "ip igmp version" command specifies the IGMP version to be used by the corresponding interface.

Syntax

To set or change information:

ip igmp version {2 | 3 [only]}

To delete information:

no ip igmp version

Input mode

(config-if)

VLAN interface

Parameters

{2 | 3 [only]}

The following table describes the relationship between the specified value of this parameter and the version of the IGMP interface.

Table 16-1: List of IGMP interface versions

Specified value of this parameter	IGMP version	IGMP running mode
version 2	2	version 1, 2 mixed
version 3	3	version 1, 2, 3 mixed
version 3 only		version 3 fixed

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

Default behavior

The IGMP version to be used by the corresponding interface is the version 1, 2, 3 mixed mode.

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

None

Related commands

ip pim sparse-mode

ip multicast-routing

The "ip multicast-routing" command enables the IPv4 multicast function (PIM) on the switch.

Syntax

To set information:

ip multicast-routing [vrf <vrf id>]

To delete information:

no ip multicast-routing [vrf <vrf id>]

Input mode

```
(config)
```

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

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 the setting value is changed.

Notes

1. If you use the IPv4 multicast function on the Switch, this setting is required.
2. If you use the IPv4 multicast function on the Switch, you must also specify the IPv4 PIM (ip pim sparse-mode) setting for one or more interfaces for the global network or each VRF.

Related commands

None

ip pim accept-bootstrap

The "ip pim accept-bootstrap" command discards the received bootstrap message sent from the applicable interface, and suppresses the forwarding of the message to the local network.

Syntax

To set or change information:

no ip pim accept-bootstrap

To delete information:

ip pim accept-bootstrap

Input mode

```
(config-if)
```

VLAN interface

Parameters

None

Default behavior

Forwards the received bootstrap message sent from the interface to the local network.

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

None

Related commands

ip pim sparse-mode

ip pim bsr-candidate

The "ip pim bsr-candidate" command sets the Switch as a BSR candidate.

Syntax

To set or change information:

ip pim [vrf <vrf id>] bsr-candidate <interface type> <interface number> [priority <value>]

To delete information:

no ip pim [vrf <vrf id>] bsr-candidate <interface type> <interface number> [priority <value>]

Input mode

```
(config)
```

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

2. Range of values:

   Set the same value as the VRF ID to which the target loopback interface belongs.

<interface type> <interface number>

Specifies an interface to be set as a BSR candidate.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <interface type> <interface number>, you can specify the interface name and interface number corresponding to the following interface type groups. For details, see "■How to specify the interface" in "Specifiable values for parameters".

   - VLAN interface
   - Loopback interface

priority <value>

Specify the priority for determining the BSR.

For specification in BSR, a router that has the highest priority becomes the BSR.

1. Default value when this parameter is omitted:

   0

2. Range of values:

   0 to 255

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. To use this command, set an IPv4 address for the loopback interface or a VLAN interface to be used.
2. If the VLAN interface specified by this command is multihomed, it uses the primary IPv4 address as a BSR candidate.
3. If the VLAN interface specified by this command is down, it will not work as a BSR candidate.

Related commands

ip pim sparse-mode

interface loopback

interface vlan

ip pim deletion-delay-time

The "ip pim deletion-delay-time" command sets the remaining time until routing information is deleted by prune reception using PIM join/prune messages.

Syntax

To set or change information:

ip pim [vrf <vrf id>] deletion-delay-time <seconds>

To delete information:

no ip pim [vrf <vrf id>] deletion-delay-time

Input mode

```
(config)
```

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

2. Range of values:

   See "Specifiable values for parameters".

<seconds>

Sets the remaining time (in seconds) until routing information is deleted by prune reception using PIM join/prune messages.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 300 (seconds)

Default behavior

Calculates remaining time until routing information is deleted from information included in the received PIM join/prune messages.

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

1. When multiple routers exist on the same link, if you set the remaining time shorter than the interval at which the downstream router sends PIM join/prune messages, data relaying might be temporarily disconnected. This is because, after prune message reception, data relaying is stopped without waiting for

join reception from other downstream routers. After that, the data relaying resumes when a join message is received.

Related commands

ip pim sparse-mode

ip pim fast-mcache-setting

In a system that uses IPv4 PIM-SM and PIM-SSM, the "ip pim fast-mcache-setting" command reduces the time for multicast forwarding switching by improving the efficiency specifically for multicast forwarding switching as well as enabling distributed processing of deleting multicast routing information and negative caches to process less packets by software.

For PIM-SM:

When multicast forwarding resumes, a multicast forwarding entry is generated without deletion of the negative cache. A negative cache is generated immediately when a multicast forwarding entry is deleted.

For PIM-SSM

A negative cache is generated immediately when a multicast forwarding entry is deleted.

Syntax

To set or change information:

ip pim fast-mcache-setting

To delete information:

no ip pim fast-mcache-setting

Input mode

```
(config)
```

Parameters

None

Default behavior

For PIM-SM:

When multicast forwarding resumes, the reception of multicast forwarding packets from the upstream interface is detected by software and then a multicast forwarding entry is generated. When the multicast forwarding entry is deleted, the reception of multicast forwarding packets is detected by software and then a negative cache is generated.

For PIM-SSM

When the multicast forwarding entry is deleted, the reception of multicast forwarding packets is detected by software and then a negative cache is generated.

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

None

Related commands

None

ip pim keep-alive-time

The "ip pim keep-alive-time" command sets the retention time for non-communication in PIM-SM.

Syntax

To set or change information:

ip pim [vrf <vrf id>] keep-alive-time <seconds>

To delete information:

no ip pim [vrf <vrf id>] keep-alive-time

Input mode

```
(config)
```

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

2. Range of values:

   See "Specifiable values for parameters".

<seconds>

Sets the retention time (in seconds) for non-communication in PIM-SM. If a data packet is not relayed even once during the retention time, the corresponding forwarded entry is deleted.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0, or 60 to 43200 (0 means infinite)

Default behavior

The retention time for non-communication in IPv4 PIM-SM is 210 seconds.

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

1. Even during the retention time (even when it is infinite), the forwarded entry might be deleted depending on the protocol. For example, if multicast routing information is deleted, the corresponding forwarded entry is deleted at the same time.
2. The deletion of forwarded entries caused by non-communication might lag behind this setting value for

up to 90 seconds.

3. The retention time for non-communication in PIM-SSM is infinite.

Related commands

ip pim sparse-mode

ip pim max-interface

The "ip pim max-interface" command specifies the maximum number of interfaces that can run IPv4 PIM or IGMP to adjust memory efficiency.

Syntax

To set or change information:

ip pim max-interface { 32 | 64 | 128 | 512 }

To delete information:

no ip pim max-interface

Input mode

```
(config)
```

Parameters

{ 32 | 64 | 128 | 512 }

Specifies the number of interfaces that can run IPv4 multicast. Note that, the number of interfaces that can be set will be one less than the specified value because a protocol reserves one interface.

When the value of this command is changed, the IPv4 multicast routing program restarts automatically.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

Default behavior

IPv4 PIM or IGMP runs with a maximum of 512 interfaces.

Impact on communication

When the value of this command is changed, the IPv4 multicast routing program restarts automatically. Therefore, IPv4 multicast routing stops temporarily.

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

None

Related commands

ip pim sparse-mode

ip igmp router

ip pim mcache-limit

The "ip pim mcache-limit" command sets the maximum total number of IPv4 PIM-SM/SSM multicast forwarding entries and negative cache entries.

Syntax

To set or change information:

ip pim [vrf <vrf id>] mcache-limit <number>

To delete information:

no ip pim [vrf <vrf id>] mcache-limit

Input mode

```
(config)
```

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

2. Range of values:

   See "Specifiable values for parameters".

<number>

Specifies the maximum total number of IPv4 PIM-SM/SSM multicast forwarding entries and negative cache entries.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 8191

Default behavior

There is no limit on the maximum total number of IPv4 PIM-SM/SSM multicast forwarding entries and negative cache entries. However, you must operate multicast routing entries within the described capacity limits.

For details about capacity limits, see "Configuration Guide Vol. 1, 3 Capacity limit".

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

1. Values specified by using this command set the maximum total number of IPv4 PIM-SM/SSM multicast forwarding entries and negative cache entries, but do not guarantee the normal behavior based on the specified value.
2. If the maximum total number of IPv4 PIM-SM/SSM multicast forwarding entries and negative cache entries exceeds the setting value of this command due to changes in the configuration, existing entries are maintained until they are deleted. If an entry is deleted in this state, it cannot be recreated until the number of entries becomes the value of this command or less.
3. When the total number of IPv4 PIM-SM/SSM multicast forwarding entries and negative cache entries exceeds the maximum, the following actions are performed:
   - For PIM-SM, IPv4 multicast forwarding entries cannot be created.
   - For PIM-SSM, IPv4 multicast (S, G) routing information entries cannot be created.

   You must use the maximum value within the described capacity limits.

   For details about capacity limits, see "Configuration Guide Vol. 1, 3 Capacity limit".

Related commands

ip pim sparse-mode

ip pim message-interval

The "ip pim message-interval" command sets the sending interval of join/prune messages that are sent regularly by PIM of the Switch.

When this command is set in global configuration mode, the settings for this command are applied to all interfaces belonging to the target VRF or the global network. However, if this command is set for the interface in config-if mode, the settings for the interface take precedence.

Syntax

To set or change information:

For global configuration mode

ip pim [vrf <vrf id>] message-interval <seconds>

For config-if mode

ip pim message-interval <seconds>

To delete information:

For global configuration mode

no ip pim [vrf <vrf id>] message-interval

For config-if mode

no ip pim message-interval

Input mode

```
(config)
(config-if)
```

VLAN interface

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

This command is valid only for the interface of the specified VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

2. Range of values:

   See "Specifiable values for parameters".

<seconds>

Sets the interval (in seconds) for sending join/prune messages that are sent regularly by PIM of the Switch.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   30 to 3600 (seconds)

Default behavior

The sending interval of join/prune messages that are sent regularly by PIM of the Switch is 60 seconds.

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

None

Related commands

ip pim sparse-mode

ip pim mroute-limit

The "ip pim mroute-limit" command specifies the maximum number of PIM-SM/SSM multicast routing information entries (total of (S, G) and (*, G) entries).

Syntax

To set or change information:

ip pim [vrf <vrf id>] mroute-limit <number>

To delete information:

no ip pim [vrf <vrf id>] mroute-limit

Input mode

```
(config)
```

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

2. Range of values:

   See "Specifiable values for parameters".

<number>

Specifies the maximum number of PIM-SM/SSM multicast routing information entries (total of (S, G) and (*, G) entries).

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 8191

Default behavior

There is no limit on the maximum number of PIM-SM/SSM multicast routing information entries (total of (S, G) and (*, G) entries). However, you must operate multicast routing entries within the described capacity limits.

For details about capacity limits, see "Configuration Guide Vol. 1, 3 Capacity limit".

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

1. Values specified by using this command set the limit for the maximum number of PIM-SM/SSM multicast routing information entries, but do not guarantee the normal behavior based on the specified value.
2. If the number of PIM-SM/SSM multicast routing information entries exceeds the setting value of this command due to a change in the configuration, existing entries are maintained until they are deleted. If an entry is deleted in this state, it cannot be recreated until the number of entries becomes the value of this command or less.

Related commands

ip pim sparse-mode

ip pim multiple-negative-cache

The "ip pim multiple-negative-cache" command specifies that the same (S, G) multiple negative cache entries can be created for each VLAN.

Syntax

To set or change information:

ip pim [vrf <vrf id>] multiple-negative-cache

To delete information:

no ip pim [vrf <vrf id>] multiple-negative-cache

Input mode

```
(config)
```

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

2. Range of values:

   See "Specifiable values for parameters".

Default behavior

Only one negative cache entry can be created for the same (S,G) entries for the global network or each VRF. The negative cache entry that can be created is the one whose receiving interface is the VLAN that receives the first packet.

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

1. When you set or clear this command, all negative cache entries for the relevant global network or VRFs are deleted.
2. This command and the "ip pim nonstop-forwarding" command cannot be used at the same time. If both are set at the same time, only the function set by the "ip pim nonstop-forwarding" command works.

Related commands

ip multicast-routing

ip pim sparse-mode

ip pim negative-cache-time

The "ip pim negative-cache-time" command sets the retention time for negative caches in PIM-SM.

Syntax

To set or change information:

ip pim [vrf <vrf id>] negative-cache-time <seconds>

To delete information:

no ip pim [vrf <vrf id>] negative-cache-time

Input mode

```
(config)
```

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

1. Default value when this parameter is omitted:
   Specifies the global network.
2. Range of values:
   See "Specifiable values for parameters".

<seconds>

Sets the retention time (in seconds) for negative caches in PIM-SM.

1. Default value when this parameter is omitted:
   This parameter cannot be omitted.
2. Range of values:
   10 to 3600 (seconds)

Default behavior

The retention time for negative caches in IPv4 PIM-SM is 210 seconds.

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

1. The retention time for negative caches in PIM-SSM is fixed as 3600 seconds.

Related commands

ip pim sparse-mode

ip pim nonstop-forwarding

The "ip pim nonstop-forwarding" command specifies that the communication of IPv4 PIM-SM and PIM-SSM multicast forwarding to be switched in a short period of time when the master switch is switched in a stack configuration.

Syntax

To set or change information:

ip pim nonstop-forwarding [keep-incoming]

To delete information:

no ip pim nonstop-forwarding

Input mode

```
(config)
```

Parameters

keep-incoming

Even if the upstream route is changed during the re-learning time after the master switch is switched, the upstream interface of multicast forwarding entry will not be switched.

1. Default value when this parameter is omitted:

   If the upstream route is changed during the re-learning time after the master switch is switched, the upstream interface of the multicast forwarding entry will be switched.

2. Range of values:

   None

Default behavior

When the master switch is switched, the communication of IPv4 PIM-SM and PIM-SSM multicast forwarding will not be switched in a short period of time but will temporarily stop.

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

1. This command and the "ip pim multiple-negative-cache" command cannot be used at the same time. If both are set at the same time, only the function set by this command works.

Related commands

ip multicast-routing

ip pim sparse-mode

ip pim query-interval

The "ip pim query-interval" command sets the sending interval of Hello messages that are sent regularly by PIM of the Switch.

When this command is set in global configuration mode, the settings for this command are applied to all interfaces belonging to the target VRF or the global network. However, if this command is set for the interface in config-if mode, the settings for the interface take precedence.

Syntax

To set or change information:

For global configuration mode

ip pim [vrf <vrf id>] query-interval <seconds>

For config-if mode

ip pim query-interval <seconds>

To delete information:

For global configuration mode

no ip pim [vrf <vrf id>] query-interval

For config-if mode

no ip pim query-interval

Input mode

```
(config)
(config-if)
```

VLAN interface

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

This command is valid only for the interface of the specified VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

2. Range of values:

   See "Specifiable values for parameters".

<seconds>

Sets the interval (in seconds) for sending Hello messages that are sent regularly by PIM.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   5 to 3600 (seconds)

Default behavior

The sending interval of Hello messages that are sent regularly by the PIM of the Switch is 30 seconds.

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

None

Related commands

ip pim sparse-mode

ip pim register-checksum

The "ip pim register-checksum" command sets the calculation range of PIM checksums for sending PIM-Register messages (encapsulation packets).

Syntax

To set or change information:

ip pim [vrf <vrf id>] register-checksum {header | all}

To delete information:

no ip pim [vrf <vrf id>] register-checksum

Input mode

```
(config)
```

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

2. Range of values:

   See "Specifiable values for parameters".

{header | all}

If header is specified, checksums are calculated for only the PIM message part (eight bytes) when PIM-Register messages (encapsulation packets) are sent. If all is specified, checksums are calculated for all of the PIM message part (eight bytes) and encapsulated data when PIM-Register messages (encapsulation packets) are sent.

If the Switch is not configured as the rendezvous point, and multicast communication is not possible due to checksum error, specify all.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

Default behavior

Performs the behavior for when the header parameter is specified.

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

None

Related commands

ip pim sparse-mode

ip pim register-probe-time

The "ip pim register-probe-time" command specifies the start time for null-Register sending based on the suppression time for Register sending.

Syntax

To set or change information:

ip pim [vrf <vrf id>] register-probe-time <seconds>

To delete information:

no ip pim [vrf <vrf id>] register-probe-time

Input mode

```
(config)
```

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

2. Range of values:

   See "Specifiable values for parameters".

<seconds>

Specifies the start time (in seconds) for null-Register sending based on the suppression time for Register sending.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   5 to 60 (seconds)

Default behavior

The start time for null-Register sending based on the suppression time for Register sending is five seconds.

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

1. If the remaining time of Register-Suppression-Timer becomes the value specified by using this parameter or less, null-Register messages are sent every five seconds.

Related commands

ip pim sparse-mode

ip pim rp-address

The "ip pim rp-address" command sets the static rendezvous point information.

Syntax

To set information:

ip pim [vrf <vrf id>] rp-address <ipv4 address> [<access list>]

To delete information:

no ip pim [vrf <vrf id>] rp-address <ipv4 address> [<access list>]

Input mode

```
(config)
```

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

2. Range of values:

   See "Specifiable values for parameters".

<ipv4 address>

Specifies the IPv4 address of the rendezvous point.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify an IPv4 address.

<access list>

Specifies an access list for the IPv4 multicast group addresses to be managed in the applicable rendezvous point.

The access list ID that can be specified for this parameter is <access list number> or <access list name>.

1. Default value when this parameter is omitted:

   224.0.0.0/4 (the group address is 224.0.0.0, and the mask length is 4)

2. Range of values:

   For <access list number>, specify values from 1 to 99 or from 1300 to 1999 (in decimal).

   For <access list name>, specify a name that is no more than 31 characters.

   For details, 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. Specify the access list that is set by using the following commands for <access list>. Access lists that have been set by using commands other than this command cannot be specified.
   - "ip access-list standard" command
   - "access-list" command specified with the same access list as that of the "ip access-list standard" command
2. If an access list that has not been set is specified, this command is not valid.
3. When setting the Switch as a rendezvous point, specify the IPv4 address of the loopback interface or the VLAN interface set as a rendezvous point candidate.
4. Use a consecutive bit string from the most significant bit for a wildcard mask to be specified for <access list name>.

Related commands

ip pim sparse-mode

ip access-list standard

ip pim rp-candidate

The "ip pim rp-candidate" command sets the Switch as a rendezvous point candidate.

Syntax

To set or change information:

ip pim [vrf <vrf id>] rp-candidate <interface type> <interface number> [priority <value>] [group-list <access list>]

To delete information:

no ip pim [vrf <vrf id>] rp-candidate <interface type> <interface number> [priority <value>] [group-list <access list>]

Input mode

```
(config)
```

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

2. Range of values:

   Set the same value as the VRF ID to which the target loopback interface belongs.

<interface type> <interface number>

Specify an interface to be set as a rendezvous point candidate.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <interface type> <interface number>, you can specify the interface name and interface number corresponding to the following interface type groups. For details, see "■How to specify the interface" in "Specifiable values for parameters".

   - VLAN interface
   - Loopback interface

priority <value>

Specify the priority for determining the rendezvous point. The router that has the lowest priority becomes the rendezvous point.

1. Default value when this parameter is omitted:

   255

2. Range of values:

   0 to 255

group-list <access list>

Specifies an access list for the multicast group addresses (IPv4 addresses in class D) to be managed at the applicable rendezvous point.

The access list ID that can be specified for this parameter is <access list number> or <access list name>.

1. Default value when this parameter is omitted:

   224.0.0.0/4 (the group address is 224.0.0.0, and the mask length is 4)

2. Range of values:

   For <access list number>, specify values from 1 to 99 or from 1300 to 1999 (in decimal).

   For <access list name>, specify a name that is no more than 31 characters.

   For details, 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. Specify the access list that is set by using the following commands for <access list>. Access lists that have been set by using commands other than this command cannot be specified.
   - "ip access-list standard" command
   - "access-list" command specified with the same access list as that of the "ip access-list standard" command
2. If an access list that has not been set is specified, this command is not valid.
3. To use this command, set an IPv4 address for the loopback interface or a VLAN interface to be used.
4. Use a consecutive bit string from the most significant bit for a wildcard mask to be specified for <access list name>.
5. If the VLAN interface specified by this command is multihomed, it uses the primary IPv4 address as a rendezvous point candidate.
6. If the VLAN interface specified by this command is down, it will not work as a rendezvous point candidate.

Related commands

ip pim sparse-mode

interface loopback

interface vlan

ip access-list standard

ip pim rp-mapping-algorithm

The "ip pim rp-mapping-algorithm" command specifies the rendezvous point selection algorithm to be used by IPv4 PIM.

Syntax

To set or change information:

ip pim [vrf <vrf id>] rp-mapping-algorithm {method1 | method2}

To delete information:

no ip pim [vrf <vrf id>] rp-mapping-algorithm

Input mode

```
(config)
```

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

This command is valid only for the interface of the specified VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

2. Range of values:

   See "Specifiable values for parameters".

{method1 | method2}

Specifies the rendezvous point selection algorithm to be used by IPv4 PIM.

method1

Uses the algorithm described in RFC 2362.

method2

Uses the algorithm described in RFC 4601.

Adds the longest match for the multicast group addresses managed at the rendezvous point as the selection condition of method1.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

Default behavior

The algorithm described in RFC 2362 is used as the rendezvous point selection algorithm to be used by IPv4 PIM.

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

None

Related commands

ip pim sparse-mode

ip pim sparse-mode

The "ip pim sparse-mode" command specifies that the interface works as an IPv4 PIM-SM.

Syntax

To set information:

ip pim sparse-mode

To delete information:

no ip pim sparse-mode

Input mode

`(config-if)`

VLAN interface

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 you use the IPv4 multicast function on the corresponding interface, this setting is required.
2. This command cannot be set for an interface with seven or more IPv4 addresses.

Related commands

ip multicast-routing

ip igmp router

ip pim ssm

The "ip pim ssm" command uses PIM-SSM on interfaces for which the "ip pim sparse-mode" command is specified.

Syntax

To set information:

ip pim [vrf <vrf id>] ssm {default | range <access list>}

To delete information:

no ip pim [vrf <vrf id>] ssm {default | range <access list>}

Input mode

```
(config)
```

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

This command is valid only for the interface of the specified VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

2. Range of values:

   See "Specifiable values for parameters".

default

The multicast group address to be used for PIM-SSM is 232.0.0.0/8 (the group address is 232.0.0.0, and the mask length is 8).

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

range <access list>

Specifies an access list for the multicast group addresses to be used for PIM-SSM.

The access list ID that can be specified for this parameter is <access list number> or <access list name>.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <access list number>, specify values from 1 to 99 or from 1300 to 1999 (in decimal).

   For <access list name>, specify a name that is no more than 31 characters.

   For details, 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. The access list specified by this command must satisfy the following conditions. If the conditions are not met, PIM-SSM may not work normally.
   - The access list must be the one that has already been created.
   - The IPv4 address filter must be created by using the "ip access-list standard" command or "access-list" command.
   - The filter condition must be permit.
   - When specifying an access list created by using the "ip access-list standard" command, there must be one entry.
   - The multicast group address used by PIM-SSM must be set in the IPv4 address of the access list. Also, if a wildcard mask is set, it must be set as a consecutive bit string starting from the most significant bit.

Related commands

ip pim sparse-mode

ip access-list standard

ip pim vrf-gateway [SL-L3A]

The "ip pim vrf-gateway" command enables PIM-SM protocol relay between different VRFs or global networks when PIM-SM is used.

Syntax

To set information:

ip pim [vrf <vrf id>] vrf-gateway

To delete information:

no ip pim [vrf <vrf id>] vrf-gateway

Input mode

```
(config)
```

Parameters

vrf <vrf id>

Specifies the target VRF on the network that contains the source.

1. Default value when this parameter is omitted:

   Specifies the global network.

2. Range of values:

   See "Specifiable values for parameters".

Default behavior

PIM-SM protocol relay between different VRFs or global networks is not possible.

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

None

Related commands

import multicast inter-vrf

ip pim sparse-mode

17 IPv6, NDP, ICMPv6

ipv6 address

The "ipv6 address" command sets the local IPv6 address.

Syntax

To set or change information:

ipv6 address { <ipv6 address>[/<prefixlen>] | <ipv6 prefix>[/<prefixlen>] }

ipv6 address <ipv6 address> link-local

To delete information:

no ipv6 address { <ipv6 address>[/<prefixlen>] | <ipv6 prefix>[/<prefixlen>] }

no ipv6 address <ipv6 address>

Input mode

```
(config-if)
```

VLAN interface, management port

Parameters

<ipv6 address>

Specifies the local IPv6 address.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify an IPv6 global address or IPv6 link-local address in colon notation.

<ipv6 prefix>

Specifies the IPv6 prefix. Specify this parameter to automatically set the interface ID. To set the interface ID automatically, you must set the prefix length to 64.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify the IPv6 prefix format in which all bits of the interface ID of the IPv6 address are set to 0. However, you cannot specify fe80::0.

/<prefixlen>

Specifies the prefix length.

1. Default value when this parameter is omitted:

   64

2. Range of values:

   Specify 1 to 128.

link-local

Overwrites the link-local address that is automatically created by the "ipv6 enable" command.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

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 IPv6 address of an interface configured to use router advertisements is changed, the interface re-sends the RA packets.

Related commands

None

ipv6 enable

Specify this command when using IPv6 addresses.

This command automatically creates a link address.

Syntax

To set information:

ipv6 enable

To delete information:

no ipv6 enable

Input mode

```
(config-if)
```

VLAN interface, management port

Parameters

None

Default behavior

IPv6 addresses cannot be used.

Specify ipv6 enable to use IPv6 addresses.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. Before you use this command, make sure that you use the "swrt_table_resource" command to set which mode you want to use IPv6 resources in.

Related commands

ipv6 address

swrt_table_resource

ipv6 icmp error-interval

The "ipv6 icmp error-interval" command specifies the sending interval of ICMPv6 error messages.

Syntax

To set or change information:

ipv6 icmp error-interval <milli seconds>

To delete information:

no ipv6 icmp error-interval

Input mode

```
(config)
```

Parameters

<milli seconds>

Sets the minimum time between ICMP error messages. If you specify 0, the interval between the sending of ICMP error packets is not limited to the specified or default interval for sending error messages.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 2147483647 (milliseconds)

Default behavior

The sending interval of ICMPv6 error messages is set to 100 milliseconds.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

ipv6 icmp nodeinfo-query

The "ipv6 icmp nodeinfo-query" command responds to queries from terminals.

Syntax

To set information:

ipv6 icmp nodeinfo-query

To delete information:

no ipv6 icmp nodeinfo-query

Input mode

```
(config)
```

Parameters

None

Default behavior

Does not respond to a query from a terminal.

Specify ipv6 icmp nodeinfo-query to respond to queries from terminals.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

ipv6 neighbor

The "ipv6 neighbor" command creates a static NDP table. If a product that does not support NDP is connected, an IPv6 address cannot be converted to a physical address. You need to create a static NDP table in advance.

Syntax

To set or change information:

ipv6 neighbor <ipv6 address> interface vlan <vlan id> <mac address> [proxy]

To delete information:

no ipv6 neighbor <ipv6 address> [interface vlan <vlan id>]

Input mode

```
(config)
```

Parameters

<ipv6 address>

Specifies a next-hop IPv6 address.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

interface vlan <vlan id>

Specifies a VLAN ID.

1. Default value when this parameter is omitted:

   To set or change information:

   This parameter cannot be omitted.

   To delete information:

   This parameter cannot be omitted if there are multiple static NDP entries that have the same next-hop IPv6 address.

2. Range of values:

   For <vlan id>, specify the VLAN ID set by the "interface vlan" command.

<mac address>

Specifies the destination MAC address (in a canonical format).

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 first-byte lowest bit is set to 1) cannot be set.

proxy

Uses the specified next-hop IPv6 address as Proxy NDP.

1. Default value when this parameter is omitted:

The specified next-hop IPv6 address is not used as Proxy NDP.

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 a static NDP is to be set, the destination MAC addresses must be set at the same time using static MAC addresses. If the destination MAC addresses are not set, IP forwarding might be performed by software processing.
2. When static NDP entries that have the same next-hop IPv6 address are configured for different VRFs, the interface vlan parameter is used to identify the VRFs. Therefore, you cannot omit the interface vlan parameter when deleting information for multiple static NDP entries that have the same next-hop IPv6 address. [SL-L3A]

Related commands

None

ipv6 redirects

The "ipv6 redirects" command specifies whether ICMPv6 Redirect messages can be sent.

If a virtual interface of the VRRP is configured for the same interface and in the Master status, ICMP Redirect messages are not sent irrespective of the specification of this command.

Syntax

To set information:

no ipv6 redirects

To delete information:

ipv6 redirects

Input mode

`(config-if)`

VLAN interface

Parameters

None

Default behavior

ICMPv6 Redirect messages are sent.

Specify "no ipv6 redirects" to suppress the sending of ICMPv6 Redirect messages.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. Before ICMPv6 Redirect messages can actually be sent, the "ip redirects" command must be executed in global configuration mode to enable the sending function of ICMP/ICMPv6 redirect messages throughout the device.
2. Packets are passed to the CPU even if this command is used to locally disable the sending function of ICMPv6 redirect messages. If the CPU is under a heavy load when ICMPv6 redirects occur frequently, we recommend that you execute the "ip redirects" command in global configuration mode to disable the sending function of ICMP or ICMPv6 redirect messages throughout the device.

Related commands

None

ipv6 source-route

The "ipv6 source-route" command enables packet processing for IPv6 routing header type 0.

Syntax

To set information:

ipv6 source-route

To delete information:

no ipv6 source-route

Input mode

```
(config)
```

Parameters

None

Default behavior

Discards IPv6 routing header type 0 packets sent to the Switch.

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 for IPv6 packets sent to the Switch. If a routing header is added to IPv6 packets to be forwarded, the packets will be forwarded regardless of whether this command is set.

Related commands

None

nd-limit [SL-L3A]

The "nd-limit" command specifies the maximum number of NDP entries for VRF.

Syntax

To set or change information:

nd-limit <count>

To delete information:

no nd-limit

Input mode

```
(config-vrf)
```

Parameters

<count>

Specifies the maximum number of NDP entries for each VRF.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 23040

Default behavior

The number of NDP entries for each VRF is not limited. It must not exceed the capacity limit of the entire device.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If the number of NDP entries exceeds the maximum value set by this command, a warning operation message is output the next time an NDP entry is being registered. The new NDP entry is registered after an old NDP entry in the VRF is deleted.
2. If the number of NDP entries has not reached the maximum value set by the command, but the capacity limit of the entire device has been exceeded, a warning operation message is also output. Then the new NDP entry is registered after an old NDP entry is deleted.
3. Static NDP entries have priority over dynamically-learned NDP entries, and can be registered beyond the maximum value specified by the command. If you register more static NDP entries than the maximum value specified by the command, dynamically-learned NDP entries cannot be registered for the VRF. Such registration cannot be recommended because a warning operation message also remains.
4. Even if you use this command to re-specify a maximum value smaller than the current setting, the NDP entries that have been registered based on the previous maximum value are not deleted. For example, if

the VRF has 50 NDP entries and you use the command to set the maximum value to 30, the difference of 20 entries will not be deleted. If you re-specify a smaller value, ALAXALA Networks Corporation recommends that you use the "clear ipv6 neighbor" operation command to delete the NDP entries.

Related commands

ipv6 neighbor

vrf forwarding [SL-L3A]

See "vrf forwarding [SL-L3A] in 2 IPv4, ARP, ICMP".

18 Loopback Interface (IPv6)

interface loopback

See "interface loopback in 3 Loopback Interface (IPv4)".

ipv6 address (loopback)

The "ipv6 address" command specifies an IPv6 address for a loopback interface.

You can specify this command regardless of the "ipv6 enable" command setting.

Syntax

To set information:

ipv6 address <ipv6 address>

To delete information:

no ipv6 address

Input mode

(config-if)

Loopback interface

Parameters

<ipv6 address>

Specify an IPv6 address for a loopback interface.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify an IPv6 global address in colon notation. You can specify only one IPv6 address. Even if you specify multiple addresses, only the last specified address is applied. An IPv6 link-local address cannot 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. To set an IPv6 address with this command when a value other than 0 is specified for the "interface loopback" command, you need to specify a VRF ID by using the "vrf forwarding" command. [SL-L3A]

Related commands

vrf forwarding

vrf forwarding (loopback) [SL-L3A]

See " vrf forwarding (loopback) [SL-L3A] in 3 Loopback Interface (IPv4)".

19 Null Interface (IPv6)

interface null

See "4 Null Interface (IPv4)".

20 RA

ipv6 hop-limit

The "ipv6 hop-limit" command specifies the initial value for the hop limit used by terminals that receive router advertisements when they send packets.

Syntax

To set or change information:

ipv6 hop-limit <Hop-Limit>

To delete information:

no ipv6 hop-limit

Input mode

```
(config-if)
```

VLAN interface

Parameters

<Hop Limit>

Specifies the hop limit.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 0 to 255 in decimal.

Default behavior

The initial value is set to 64.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

ipv6 nd dns-search-list

The "ipv6 nd dns-search-list" command specifies the DNS search list information sent in router advertisements. You can set a maximum of three entries per interface.

Syntax

To set or change information:

ipv6 nd dns-search-list <domain name> [{<lifetime> | infinite}]

To delete information:

no ipv6 nd dns-search-list <domain name>

Input mode

(config-if)

VLAN interface

Parameters

<domain name>

Specifies the domain name for DNS search list information.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   A maximum of 253 alphanumeric characters, hyphens (-), and dots (.) can be set.

   Note: Specify alphabetic characters for the first character and characters following the dot (.). The maximum number of characters up to the next dot (.) is 63.

{<lifetime> | infinite}

<lifetime>

Specify the value (in seconds) for how long the advertised domain name can be used (its lifetime). Note that if 4294967295 (in decimal) is specified, the time is specified as infinite.

infinite

The advertised domain name can be used indefinitely.

1. Default value when this parameter is omitted:

   3 times the maximum interval time to send router advertisements

2. Range of values:

   For <lifetime>, specify a value from 0 to 4294967295 in decimal. Alternatively, specify infinite.

   Note: Use the "ipv6 nd ra-interval" command to specify the maximum interval for sending router advertisements.

Default behavior

The DNS search list information is not advertised.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

ipv6 nd ra-interval

ipv6 nd dns-server

The "ipv6 nd dns-server" command specifies the DNS server information to be sent by router advertisement. You can set a maximum of seven entries per interface.

Syntax

To set or change information:

ipv6 nd dns-server <ipv6 address> [{<lifetime> | infinite}]

To delete information:

no ipv6 nd dns-server <ipv6 address>

Input mode

(config-if)

VLAN interface

Parameters

<ipv6 address>

Sets the DNS server information to be sent by router advertisement.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify an IPv6 global address or IPv6 link-local address.

{<lifetime> | infinite}

<lifetime>

Specifies the value (seconds) of the period (lifetime) during which the advertised DNS server can be used. Note that if 4294967295 (in decimal) is specified, the time is specified as infinite.

infinite

The advertised DNS server can be used indefinitely.

1. Default value when this parameter is omitted:

   3 times the maximum interval time to send router advertisements

2. Range of values:

   For <lifetime>, specify a value from 0 to 4294967295 in decimal. Alternatively, specify infinite.

   Note: Use the "ipv6 nd ra-interval" command to specify the maximum interval for sending router advertisements.

Default behavior

DNS server information is not advertised.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

ipv6 nd ra-interval

ipv6 nd link-mtu

The "ipv6 nd link-mtu" command specifies the MTU size set for the MTU option in router advertisements. If the specified value exceeds the MTU length of the relevant interface, router advertisements are not forwarded through the interface.

Syntax

To set or change information:

ipv6 nd link-mtu <MTU>

To delete information:

no ipv6 nd link-mtu

Input mode

`(config-if)`

VLAN interface

Parameters

<MTU>

Specifies the MTU value.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 0 or 1280 to 65535 in decimal.

Default behavior

The MTU length of the relevant interface 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

mtu

ipv6 nd managed-config-flag

The "ipv6 nd managed-config-flag" command sets a flag in router advertisements that tells terminals to perform address auto-configuration by using a method such as DHCPv6 rather than using router advertisements. Address auto-configuration by router advertisements is performed regardless of whether this flag is set.

Syntax

To set information:

ipv6 nd managed-config-flag

To delete information:

no ipv6 nd managed-config-flag

Input mode

```
(config-if)
```

VLAN interface

Parameters

None

Default behavior

Does not set a flag in router advertisements that tells terminals to perform address auto-configuration by using a method such as DHCPv6 rather than using router advertisements.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

ipv6 nd other-config-flag

ipv6 nd no-advertise-link-address

The "ipv6 nd no-advertise-link-address" command prohibits the link-layer addresses associated with the IP addresses of routers from being included in router advertisements.

Syntax

To set information:

ipv6 nd no-advertise-link-address

To delete information:

no ipv6 nd no-advertise-link-address

Input mode

`(config-if)`

VLAN interface

Parameters

None

Default behavior

The link-layer addresses associated with the IP addresses of routers are included in router advertisements.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

mac-address

ipv6 nd ns-interval

The "ipv6 nd ns-interval" command sets the sending interval of control packets, during communication, that are used by terminals that receive router advertisements to check the reachability of neighboring nodes.

Syntax

To set or change information:

ipv6 nd ns-interval <Milli-Seconds>

To delete information:

no ipv6 nd ns-interval

Input mode

```
(config-if)
```

VLAN interface

Parameters

<Milli-Seconds>

Sets the interval (milliseconds) for sending control packets used to check the reachability.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 0 or 1000 to 4294967295 in decimal.

Default behavior

The initial value is set to 0. (No control packets are sent.)

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

ipv6 nd ra-interval

ipv6 nd ra-lifetime

ipv6 nd reachable-time

ipv6 nd other-config-flag

The "ipv6 nd other-config-flag" command sets a flag that allows terminals to automatically obtain information other than IPv6 addresses by using methods other than router advertisements.

Syntax

To set information:

ipv6 nd other-config-flag

To delete information:

no ipv6 nd other-config-flag

Input mode

`(config-if)`

VLAN interface

Parameters

None

Default behavior

Does not set a flag in router advertisements that allows terminals to automatically obtain information other than IPv6 addresses by using methods other than router advertisements.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

ipv6 nd managed-config-flag

ipv6 nd prefix

The "ipv6 nd prefix" command specifies the IPv6 prefix information or information related to the prefix to be sent in router advertisements.

You can set a maximum of seven entries per interface.

Syntax

To set or change information:

ipv6 nd prefix <IPv6-Prefix>/<Prefix-Len> [{<Valid-Lifetime> | infinite} {<Preferred-Lifetime> | infinite}] [off-link] [no-autoconfig]

ipv6 nd prefix <IPv6-Prefix>/<Prefix-Len> no-advertise

To delete information:

no ipv6 nd prefix <IPv6-Prefix>/<Prefix-Len>

Input mode

`(config-if)`

VLAN interface

Parameters

<IPv6-Prefix>

Sets the IPv6 prefix to be sent in router advertisements.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify the IPv6 global prefix.

   Note: Set all the bits following the bits specified for <Prefix-Len> of <IPv6-Prefix> to 0.

<Prefix-Len>

Specifies the prefix length.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 128 in decimal. Usually, specify 64.

no-advertise

Prevents the prefix information from being sent.

1. Default value when this parameter is omitted:

   Sends the prefix information.

2. Range of values:

   None

{ <Valid-Lifetime> | infinite }

Specifies the value (seconds) of the valid address lifetime (expiration time of the advertised prefix information) to be sent by router advertisement.

1. Default value when this parameter is omitted:

   2592000 (30 days)

2. Range of values:

   For <Valid-Lifetime>, specify 0 or a value in the range from the maximum advertisement interval to 4294967295 in decimal. Alternatively, specify infinite.

   Specifying infinite has the same meaning as specifying 4294967295 in decimal for <Valid-Lifetime>.

   Note: Use the "ipv6 nd ra-interval" command to specify the maximum advertisement interval.

{ <Preferred-Lifetime> | infinite }

Specifies the value (seconds) of the recommended address lifetime (time elapsed before the advertised prefix information is no longer used for communication) to be sent by router advertisement.

1. Default value when this parameter is omitted:

   604800 (7 days)

2. Range of values:

   For <Preferred-Lifetime>, specify 0 or a value in the range from the maximum advertisement interval to 4294967295 in decimal. Alternatively, specify infinite.

   Specifying infinite has the same meaning as specifying 4294967295 in decimal for <Preferred-Lifetime>.

   For <Preferred-Lifetime>, specify a value equal to or smaller than the <Valid-Lifetime> value. If the specified <Preferred-Lifetime> value is greater than the <Valid-Lifetime> value, the preferred address lifetime value sent by router advertisement is the same as the <Valid-Lifetime> value.

   Note: Use the "ipv6 nd ra-interval" command to specify the maximum advertisement interval.

off-link

Specifies that the prefix sent by router advertisement does not exist in the same link.

1. Default value when this parameter is omitted:

   Specifies that the prefix exists in the link.

2. Range of values:

   None

no-autoconfig

Does not set a flag for using prefix information sent by router advertisement. Unless this flag is set, terminals that received router advertisements do not use prefix information. Usually, do not set this parameter.

1. Default value when this parameter is omitted:

   A flag for using prefix information is set.

2. Range of values:

   None

Default behavior

The following initial values are set.

- IPv6 prefix = relevant interface prefix

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

ipv6 nd ra-interval

ipv6 nd ra-interval

The "ipv6 nd ra-interval" command specifies the minimum and maximum intervals for sending router advertisements.

Actual router advertisements will be sent at a variable interval in the range between the minimum and maximum intervals you specified.

Syntax

To set or change information:

ipv6 nd ra-interval <Min-Interval> <Max-Interval>

To delete information:

no ipv6 nd ra-interval

Input mode

`(config-if)`

VLAN interface

Parameters

<Min-Interval>

Specifies the minimum interval (seconds) for sending router advertisements.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 3 to 1350 in decimal.

   Note: For <Min-Interval>, specify a value equal to or smaller than (<Max-Interval> x 0.75). If the specified value is greater than (<Max-Interval> x 0.75), an error occurs.

<Max-Interval>

Specifies the maximum interval (seconds) for sending router advertisements.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 4 to 1800 in decimal.

Default behavior

The following initial values are set.

- Minimum interval: 200 seconds
- Maximum interval: 600 seconds

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

ipv6 nd ra-lifetime

ipv6 nd reachable-time

ipv6 nd ns-interval

ipv6 nd ra-lifetime

The "ipv6 nd ra-lifetime" command specifies the lifetime of the default route for terminals set by router advertisements.

Syntax

To set or change information:

ipv6 nd ra-lifetime <Seconds>

To delete information:

no ipv6 nd ra-lifetime

Input mode

```
(config-if)
```

VLAN interface

Parameters

<Seconds>

Specifies the lifetime (seconds) of the default route for terminals set by router advertisements.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 0 or a value in the range from the maximum advertisement interval to 9000 in decimal.

   Note: Use the "ipv6 nd ra-interval" command to specify the maximum advertisement interval.

Default behavior

The initial value is set to 1800 second.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

ipv6 nd ra-interval

ipv6 nd reachable-time

ipv6 nd ns-interval

ipv6 nd reachable-time

The "ipv6 nd reachable-time" command specifies how long terminals that received router advertisements should consider that a neighboring node is reachable after they have confirmed reachability when they send packets.

Specifying a larger value reduces the number of inquiries for the reachability of neighboring nodes, but increases the possibility that the reachability information stored in terminals is different from the actual reachability.

Syntax

To set or change information:

ipv6 nd reachable-time <Milli-Seconds>

To delete information:

no ipv6 nd reachable-time

Input mode

```
(config-if)
```

VLAN interface

Parameters

<Milli-Seconds>

Specifies the validity time (milliseconds) of information about the reachability of a neighboring node.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 0 to 4294967295 in decimal.

Default behavior

The initial value is set to 0. (The reachability of a neighboring node is uncertain.)

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

ipv6 nd ra-interval

ipv6 nd ra-lifetime

ipv6 nd ns-interval

ipv6 nd router-preference

The "ipv6 nd router-preference" command specifies the priority level of a router's advertisements. When a terminal receives advertisements from multiple routers, it uses this information to determine which router advertisement it should use. If the terminal receives router advertisements having the same priority from multiple routers, the router advertisement that was received earlier is used.

Syntax

To set or change information:

ipv6 nd router-preference { high | medium | low }

To delete information:

no ipv6 nd router-preference

Input mode

`(config-if)`

VLAN interface

Parameters

{ high | medium | low }

Specifies the priority of router advertisements.

high: A priority higher than medium and low is specified.

medium: A priority higher than low and lower than high is specified.

low: A priority lower than high and medium is specified.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

Default behavior

The initial value is set to medium.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

ipv6 nd suppress-ra

The "ipv6 nd suppress-ra" command suppresses router advertisements for the specified interface.

Syntax

To set information:

ipv6 nd suppress-ra

To delete information:

no ipv6 nd suppress-ra

Input mode

`(config-if)`

VLAN interface

Parameters

None

Default behavior

Allows router advertisements.

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 IPv6 DHCP Relays

ipv6 dhcp relay destination

The "ipv6 dhcp relay destination" command specifies the relay destination of IPv6 DHCP packets.

Syntax

To set or change information:

ipv6 dhcp relay destination {<ipv6 address> [<ipv6 address>...] | all-servers vlan <vlan id>}

To delete information:

no ipv6 dhcp relay destination

Input mode

`(config-if)`

VLAN interface

Parameters

{<ipv6 address> [<ipv6 address>...] | all-servers vlan <vlan id>}

Specifies the IPv6 address or VLAN ID of the relay destination of IPv6 DHCP packets.

<ipv6 address> [<ipv6 address>...]

Specifies the IPv6 address of the IPv6 DHCP server. When this parameter is specified, packets are relayed to the unicast address of the specified IPv6 DHCP server.

all-servers vlan <vlan id>

Specifies the VLAN ID of the VLAN for which the global IPv6 address used as the relay destination of IPv6 DHCP packets has been set. When this parameter is specified, packets are relayed to the multicast address of all IPv6 DHCP servers.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <ipv6 address>, specify a global unicast address with which the Switch can communicate. You can set a maximum of four unicast addresses for one "ipv6 dhcp relay destination" command. For details on the <ipv6 address> setting, see "Specifiable values for parameters".

   For <vlan id>, specify the VLAN ID specified for the "interface vlan" 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. If a <vlan id> that has not been configured is specified for all-servers vlan <vlan id>, the <vlan id> is

set in the configuration but is ignored by the IPv6 DHCP relay program.

Related commands

None

ipv6 dhcp relay hop-limit

The "ipv6 dhcp relay hop-limit" command specifies the maximum hop count for relayed IPv6 DHCP packets.

Syntax

To set or change information:

ipv6 dhcp relay hop-limit <hop limit>

To delete information:

no ipv6 dhcp relay hop-limit

Input mode

```
(config-if)
```

VLAN interface

Parameters

<hop limit>

Specifies the maximum hop count for relayed IPv6 DHCP packets. Any IPv6 DHCP relay packet whose hop count is equal to or greater than the hop count specified for this parameter is not relayed.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 32 in decimal

Default behavior

The maximum hop count for relayed IPv6 DHCP packets is set to 4.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

ipv6 dhcp relay static-route-setting

The "ipv6 dhcp relay static-route-setting" command automatically adds a distributed prefix to the routing information table of the Switch by specifying the routing information option of an IPv6 DHCP relay.

Syntax

To set information:

ipv6 dhcp relay static-route-setting

To delete information:

no ipv6 dhcp relay static-route-setting

Input mode

```
(config)
```

Parameters

None

Default behavior

An assigned prefix is not registered in the routing information table.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If you set the routing information option after a prefix was assigned when no routing information option was set, the assigned prefix is registered in the routing information.
2. If you delete the routing information option, all routing information for the assigned prefix is deleted.
3. This command can add routing information only when IPv6 DHCP-PD clients are directly contained.

Related commands

None

service ipv6 dhcp relay

The "service ipv6 dhcp relay" command enables or disables IPv6 DHCP relaying.

Syntax

To set information:

service ipv6 dhcp relay

To delete information:

no service ipv6 dhcp relay

Input mode

```
(config)
```

Parameters

None

Default behavior

IPv6 DHCP relay is disabled.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. IPv6 DHCP relays cannot run simultaneously with the IPv6 DHCP server function. Set the "no service ipv6 dhcp" command to disable the IPv6 DHCP server function, and then use IPv6 DHCP relays.

Related commands

None

22 IPv6 DHCP Server Function

dns-server

The "dns-server" command sets the address of the DNS server provided by the IPv6 DHCP server. The DNS server address is distributed in response to requests from IPv6 DHCP clients.

Syntax

To set information:

dns-server <IPv6 Address>

To delete information:

no dns-server <IPv6 Address>

Input mode

```
(config-dhcp)
```

Parameters

<IPv6 Address>

Sets the IPv6 address of a DNS server that the client can use.

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 can be set more than once.
2. The maximum number of IP addresses that can be configured for the server is 16 per IPv6 DHCP address pool.
3. The maximum number of DNS server addresses that can be configured per device is 512.

Related commands

None

domain-name

The "domain-name" command sets the IPv6 DHCP server domain name. The domain name is distributed in response to requests from IPv6 DHCP clients.

Syntax

To set information:

domain-name <Domain Name>

To delete information:

no domain-name <Domain Name>

Input mode

```
(config-dhcp)
```

Parameters

<Domain Name>

Specifies a domain name that the client can use.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   A domain name that contains a maximum of 253 characters

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 can be set more than once.
2. The maximum number of domain names that can be configured is 16 per IPv6 DHCP address pool.
3. The maximum number of domain names that can be configured per device is 512.

Related commands

None

ipv6 dhcp pool

The "ipv6 dhcp pool" command sets information about an IPv6 DHCP address pool.

Syntax

To set information:

ipv6 dhcp pool <Pool Name>

To delete information:

no ipv6 dhcp pool <Pool Name>

Input mode

```
(config)
```

Parameters

<Pool Name>

Specifies the name used for identifying the IPv6 DHCP address pool on the IPv6 DHCP server.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Enter a name that contains a maximum of 14 characters.

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 maximum number of IPv6 DHCP address pools that can be configured is 128.
2. If <Pool Name> has been set for the "ipv6 dhcp server" command, you cannot delete the "ipv6 dhcp pool" command settings. You need to first delete the "ipv6 dhcp server" command settings, and then delete the "ipv6 dhcp pool" command settings.

Related commands

None

ipv6 dhcp server

The "ipv6 dhcp server" command sets the distribution of prefixes.

Syntax

To set or change information:

ipv6 dhcp server <Pool Name> [rapid-commit] [preference <Number>]

To delete information:

no ipv6 dhcp server <Pool Name>

Input mode

```
(config-if)
```

VLAN interface

Parameters

<Pool Name>

Specifies the IPv6 DHCP address pool name set in the IPv6 DHCP address pool setting.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Enter a name that contains a maximum of 14 characters.

rapid-commit

Allows the Rapid Commit option to be accepted when a Solicit message is received from a client.

1. Default value when this parameter is omitted:

   None

2. Range of values:

   None

preference <Number>

Used to notify clients of the priority of the server. The greater the value, the higher the priority.

1. Default value when this parameter is omitted:

   None

2. Range of values:

   1 to 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. You can set this command for a maximum of 128 interfaces.
2. You cannot specify this command more than once for an interface.

Related commands

ip dhcp pool

ipv6 dhcp static-route-setting

The "ipv6 dhcp static-route-setting" command automatically adds routing information to a client in a routing information table maintained on the Switch. A prefix is distributed to this client by the IPv6 DHCP server.

Syntax

To set information:

ipv6 dhcp static-route-setting

To delete information:

no ipv6 dhcp static-route-setting

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. When a prefix is distributed after this command is set, a route for the prefix is automatically set. If the information set by this command is deleted online, all routing information for the assigned prefixes is immediately deleted. If you set this command after distributing prefixes without setting this command, all information for the distributing prefixes is registered.
2. Check the maximum number of route entries that can be handled by the device when you use this command to register routing information for assigned prefixes as static, or use a routing protocol to replace routing information.

Related commands

None

ipv6 local pool

The "ipv6 local pool" command sets a prefix to be assigned dynamically.

Syntax

To set or change information:

ipv6 local pool <Local Pool Name> <IPv6 Address>/<Prefixlen> <Assigned Length>

To delete information:

no ipv6 local pool <Local Pool Name>

Input mode

```
(config)
```

Parameters

<Local Pool Name>

Specifies the IPv6 DHCP address local pool name.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Enter a name that contains a maximum of 14 characters.

<IPv6 Address>/<Prefixlen>

Specify the prefix used for assignment.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify <IPv6 Address> in colon notation. For <Prefixlen>, specify a prefix length in the range from 1 to 64 in decimal.

<Assigned Length>

Specifies actual prefix length to be assigned.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 64

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 1024 prefixes can be configured to be distributed for a device.
2. This command cannot be set together with a static IPv6 prefix setting in the same IPv6 DHCP address pool setting.
3. Any non-zero number contained after <Assigned Length> is ignored.
4. If <Local Pool Name> has been set for the "prefix-delegation pool" command, you cannot delete the "ipv6 local pool" command settings. You need to first delete the "prefix-delegation pool" command settings, and then delete the "ipv6 local pool" command settings.

Related commands

None

prefix-delegation

The "prefix-delegation" command configures a static IPv6 prefix, IAID, and lifetime to be used in the specified IPv6 DHCP address pool setting.

Syntax

To set or change information:

prefix-delegation <IPv6 Address>/<Prefixlen> <Client DUID> [iaid <IAID>] [lifetime {<Valid Lifetime> | infinite} {<Preferred Lifetime> | infinite}]

To delete information:

no prefix-delegation <IPv6 Address>

Input mode

```
(config-dhcp)
```

Parameters

<IPv6 Address>/<Prefixlen>

Specifies a static IPv6 prefix to be used in the specified IPv6 DHCP address pool setting.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify <IPv6 Address> in colon notation. For <Prefixlen>, specify a prefix length in the range from 1 to 64 in decimal.

<Client DUID>

Specifies the DUID of a client.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a hexadecimal number, separating every two digits by a colon (:).

   You can set a maximum of 128 sets of two-digit numbers.

   Example: 00:01:00:01:aa:bb

iaid <IAID>

Specifies the IAID to be assigned to the specified IPv6 prefix setting. If this parameter is specified, the prefix that matches the IAID set for IA_PD by the client will be distributed. If you omit this parameter, the prefixes are sequentially assigned to IA_PDs whose IAID does not match.

1. Default value when this parameter is omitted:

   None

2. Range of values:

   0 to 4294967295

lifetime {<Valid Lifetime> | infinite} {<Preferred Lifetime> | infinite}

<Valid Lifetime>

Specifies the valid lifetime (in seconds) to be used for the specified IPv6 prefix setting. For this parameter, specify a value equal to or greater than the preferred lifetime.

<Preferred Lifetime>

Specifies the preferred lifetime (in seconds) to be used for the specified IPv6 prefix setting. For this parameter, specify a value equal to or smaller than the valid lifetime.

infinite

Sets an unlimited valid lifetime or preferred lifetime to be used for the specified IPv6 prefix setting. You can specify infinite for the preferred lifetime only when infinite is specified for the valid lifetime.

1. Default value when this parameter is omitted:

   The valid lifetime is set to 2592000 (30 days). The preferred lifetime is set to 604800 (7 days).

2. Range of values:

   For each of <Valid Lifetime> and <Preferred Lifetime>, specify a value in the range from 60 to 31536000. At this time, make sure that the value specified for <Valid Lifetime> is not smaller than the <Preferred Lifetime> value.

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 1024 prefixes can be configured to be distributed for a device.
2. This command cannot be set together with the IPv6 DHCP address local pool setting in the same IPv6 DHCP address pool setting.

Related commands

None

prefix-delegation pool

The "prefix-delegation pool" command configures the IAID and lifetime for the range of IPv6 prefixes specified in the IPv6 DHCP address local pool setting.

Syntax

To set or change information:

prefix-delegation pool <Local Pool Name> [iaid <IAID>] [lifetime {<Valid Lifetime> | infinite} {<Preferred Lifetime> | infinite}]

To delete information:

no prefix-delegation pool <Local Pool Name>

Input mode

```
(config-dhcp)
```

Parameters

<Local Pool Name>

Sets the IPv6 DHCP address local pool name set in the IPv6 DHCP address local pool setting.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Enter a name that contains a maximum of 14 characters.

iaid <IAID>

Specifies the IAID to be assigned for the IPv6 prefix range setting. If this parameter is specified, the prefix that matches the IAID set for IA_PD by the client will be distributed. If you omit this parameter, the prefixes are sequentially assigned to IA_PDs whose IAID does not match.

1. Default value when this parameter is omitted:

   None

2. Range of values:

   0 to 4294967295

lifetime {<Valid Lifetime> | infinite} {<Preferred Lifetime> | infinite}

<Valid Lifetime>

Specifies the valid lifetime (in seconds) to be used for the IPv6 prefix range setting. For this parameter, specify a value equal to or greater than the preferred lifetime.

<Preferred Lifetime>

Specifies the preferred lifetime (in seconds) to be used for the IPv6 prefix range setting. For this parameter, specify a value equal to or smaller than the valid lifetime.

infinite

Sets an unlimited valid lifetime or preferred lifetime to be used for the IPv6 prefix range setting. You can specify infinite for the preferred lifetime only when infinite is specified for the valid lifetime.

1. Default value when this parameter is omitted:

   The valid lifetime is set to 2592000 (30 days). The preferred lifetime is set to 604800 (7 days).

2. Range of values:

   For each of <Valid Lifetime> and <Preferred Lifetime>, specify a value in the range from 60 to 31536000. At this time, make sure that the value specified for <Valid Lifetime> is not smaller than the <Preferred Lifetime> value.

Default behavior

The IPv6 prefix range setting specified in the IPv6 DHCP address local pool setting is not configured. If a lifetime parameter is omitted, the following values are set:

- Valid lifetime: 30 days
- Preferred lifetime: 7 days

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. An IPv6 DHCP address local pool name set for any other "ipv6 dhcp pool" command setting cannot be used.

Related commands

ipv6 local pool

service ipv6 dhcp

Enables or disables an IPv6 DHCP server.

Syntax

To set information:

no service ipv6 dhcp

To delete information:

service ipv6 dhcp

Input mode

```
(config)
```

Parameters

None

Default behavior

The IPv6 DHCP server is enabled.

Impact on communication

Communication is disabled.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. Executing the "stack enable" command also configures the "no service ipv6 dhcp" command at the same time.

Related commands

None

sip-domain-name

The "sip-domain-name" command sets the SIP domain name provided by an IPv6 DHCP server. The SIP domain name is distributed in response to requests from IPv6 DHCP clients.

Syntax

To set information:

sip-domain-name <Domain Name>

To delete information:

no sip-domain-name <Domain Name>

Input mode

```
(config-dhcp)
```

Parameters

<Domain Name>

Specifies the SIP domain name that the client can use.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   A domain name that contains a maximum of 253 characters

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 can be set more than once.
2. The maximum number of domain names that can be configured is 16 per IPv6 DHCP address pool.
3. The maximum number of SIP domain names that can be configured per device is 512.

Related commands

None

sip-server

The "sip-server" command sets the IPv6 address of the SIP server provided by an IPv6 DHCP server. The IPv6 address of the SIP server is distributed in response to requests from IPv6 DHCP clients.

Syntax

To set information:

sip-server <IPv6 Address>

To delete information:

no sip-server <IPv6 Address>

Input mode

```
(config-dhcp)
```

Parameters

<IPv6 Address>

Sets the IPv6 address of the SIP server that a client can use.

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 can be set more than once.
2. The maximum number of IP addresses that can be configured for the server is 16 per IPv6 DHCP address pool.
3. The maximum number of IPv6 addresses of the SIP server that can be configured per device is 512.

Related commands

None

sntp-server

The "sntp-server" command sets the address of the SNTP server provided by the IPv6 DHCP server. The address of the SNTP server is distributed in response to requests from IPv6 DHCP clients.

Syntax

To set information:

sntp-server <IPv6 Address>

To delete information:

no sntp-server <IPv6 Address>

Input mode

```
(config-dhcp)
```

Parameters

<IPv6 Address>

Sets the IPv6 address of the SNTP server that the client can use.

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 can be set more than once.
2. The maximum number of IP addresses that can be configured for the server is 16 per IPv6 DHCP address pool.
3. The maximum number of SNTP server addresses that can be configured per device is 512.

Related commands

None

23 Routing Options (IPv6)

Routing Options (IPv6)

See "9 Routing Options (IPv4)".

24 Route Summary (IPv6)

ipv6 summary-address

The "ipv6 summary-address" command generates an IPv6 summarized route.

Syntax

To set or change information:

ipv6 summary-address [vrf <vrf id>] <IPv6-Prefix>/<Prefix-Len> [<Distance>] [as-set] [noinstall] [summary-only]

To delete information:

no ipv6 summary-address [vrf <vrf id>] <IPv6-Prefix>/<Prefix-Len>

Input mode

```
(config)
```

Parameters

vrf <vrf id> [SL-L3A]

Specifies the VRF to which the route belongs.

1. Default value when this parameter is omitted:

   The route belongs to the global network.

2. Range of values:

   For <vrf id>, specify a VRF ID.

   For details, see "Specifiable values for parameters".

<IPv6-Prefix>

Specifies an IPv6 summarized address.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specifies the IPv6 prefix.

   Note: Set all the bits following the bits specified for <Prefix-Len> of <IPv6-Prefix> to 0.

<Prefix-Len>

Specifies the prefix length.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 0 to 128 in decimal.

<Distance>

Specifies the distance value of the summarized route.

1. Default value when this parameter is omitted:

   130

2. Range of values:

   Specify 2 to 255 in decimal. 2 indicates the highest priority, and 255 indicates the lowest priority.

as-set

Specifies that AS_SET is generated when the AS_PATH attribute for a summarized route is generated.

1. Default value when this parameter is omitted:

   AS_SET is not generated when the AS_PATH attribute for a summarized route is generated.

2. Range of values:

   None

noinstall

Specifies that summarized routes will not be registered in the forwarding table. However, summarized routes can be distributed by using a routing protocol. Specify this parameter if you want to advertise summarized routes to an external destination by using another routing protocol, but do not want to discard packets via the summarized route.

1. Default value when this parameter is omitted:

   Summarized routes are registered in the forwarding table.

2. Range of values:

   None

summary-only

Suppresses advertisement of summarization source routes when summarized routes are advertised. When routes are summarized, use the summary-only parameter if you want to advertise only summarized routes while suppressing advertisement of summarization source routes.

1. Default value when this parameter is omitted:

   Advertisement of summarization source routes is not suppressed.

2. Range of values:

   None

Default behavior

Summarized routes are not generated.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. Routes for which a loopback interface or null interface is set as the next hop cannot be used as summarization source routes.

Related commands

distribute-list out (RIPng) (OSPFv4) (BGP4+)

redistribute (RIPng) (OSPFv4) (BGP4+)

neighbor out (BGP4+)

25 Static Routing (IPv6)

ipv6 route

The "ipv6 route" command generates an IPv6 static route.

Syntax

To set or change information:

ipv6 route [vrf <vrf id>] <IPv6-Prefix>/<Prefix-Len> <Nexthop-Address> [<Distance>] [weight <Weight>] [tag <Tag>] [{noinstall | reject}] [poll] [noresolve]

ipv6 route [vrf <vrf id>] <IPv6-Prefix>/<Prefix-Len> <Nexthop-Address> <interface type> <interface number> [<Distance>] [weight <Weight>] [tag <Tag>] [{noinstall | reject}] [poll] [noresolve]

ipv6 route [vrf <vrf id>] <IPv6-Prefix>/<Prefix-Len> <Nexthop-Address> {vrf <nexthop vrf id> | global} [<Distance>] [weight <Weight>] [tag <Tag>] [{noinstall | reject}] [poll] [noresolve]

ipv6 route [vrf <vrf id>] <IPv6-Prefix>/<Prefix-Len> <interface type> <interface number> [<Distance>] [weight <Weight>] [tag <Tag>]

To delete information:

no ipv6 route [vrf <vrf id>] <IPv6-Prefix>/<Prefix-Len> <Nexthop-Address>

no ipv6 route [vrf <vrf id>] <IPv6-Prefix>/<Prefix-Len> <Nexthop-Address> <interface type> <interface number>

no ipv6 route [vrf <vrf id>] <IPv6-Prefix>/<Prefix-Len> <Nexthop-Address> {vrf <nexthop vrf id> | global}

no ipv6 route [vrf <vrf id>] <IPv6-Prefix>/<Prefix-Len> <interface type> <interface number>

Input mode

```
(config)
```

Parameters

vrf <vrf id> [SL-L3A]

Specifies the VRF to which the route belongs.

1. Default value when this parameter is omitted:

   The route belongs to the global network.

2. Range of values:

   For <vrf id>, specify a VRF ID.

   For details, see "Specifiable values for parameters".

<IPv6-Prefix>

Specifies the destination IPv6 prefix.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <IPv6-Prefix>, specify an IPv6 prefix.

   Note: Set all the bits following the bits specified for <Prefix-Len> of <IPv6-Prefix> to 0.

<Prefix-Len>

Specifies the prefix length.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 0 to 128 in decimal.

<Nexthop-Address>

Specifies the IPv6 next hop address. When you specify an IPv6 link-local address, specify the interface after this parameter.

1. Default value when this parameter is omitted:

   The next hop is not specified.

2. Range of values:

   Specify an IPv6 global address, IPv6 site-local address, or IPv6 link-local address.

<interface type> <interface number>

Specifies the interface used for resolving the next hop. If the route that resolves the next hop is different from the specified interface, that route is not enabled.

If an IPv6 link-local address is specified for <Nexthop-Address>, specify the interface for this parameter.

1. Default value when this parameter is omitted:

   When <Nexthop-Address> is specified:

   The interface used for resolving the next hop is not specified.

   When <Nexthop-Address> is not specified:

   This parameter cannot be omitted.

2. Range of values:

   For <interface type> <interface number>, you can specify the interface name and interface number corresponding to the following interface type groups. For details, see "■How to specify the interface" in "Specifiable values for parameters".

   When <Nexthop-Address> is specified:

   - VLAN interface

   When <Nexthop-Address> is not specified:

   - Null interface

{vrf <nexthop vrf id> | global} [SL-L3A]

Specifies that either the VRF to which the next hop belongs, or the next hop, belongs to the global network.

<nexthop vrf id>

Specifies the VRF to which the next hop belongs.

global

Specifies that the next hop belongs to the global network.

1. Default value when this parameter is omitted:

   The next hop belongs to the same VRF as the route.

2. Range of values:

For <nexthop vrf id>, specify a VRF ID that is in the same range of values as <vrf id>.

For the setting range of <vrf id>, see "Specifiable values for parameters".

<Distance>

Specifies the distance value of the route.

1. Default value when this parameter is omitted:

   2

2. Range of values:

   Specify 2 to 255 in decimal. 2 indicates the highest priority, and 255 indicates the lowest priority.

weight <Weight>

Specifies the priority of the route. This parameter is used for determining the priority of the different routes to a destination.

1. Default value when this parameter is omitted:

   0

2. Range of values:

   For <Weight>, specify 0 to 255 in decimal. 255 indicates the highest priority, and 0 indicates the lowest priority.

tag <Tag>

Specifies the tag value to be added to the route.

1. Default value when this parameter is omitted:

   0

2. Range of values:

   For <Tag>, specify 0 to 4294967295 in decimal.

{noinstall | reject}

noinstall

Specifies that static routes will not be registered in the forwarding table. However, static routes can be distributed by using a routing protocol. Specify this parameter if you want to advertise a static route to an external destination by using another routing protocol, but do not want to use it for forwarding packets on the Switch.

reject

Specify this parameter to generate static routes as rejected routes. Specify this parameter if you want to discard packets that match the static route.

1. Default value when this parameter is omitted:

   The static route is generated as a non-reject route, and registered in the forwarding table.

2. Range of values:

   None

poll

Specifies that polling for checking reachability is enabled for the next hop. You can specify polling only when a next hop address is specified.

1. Default value when this parameter is omitted:

   Polling is disabled.

2. Range of values:

   None

noresolve

Uses only directly connected routes to resolve the next hop on static routes.

1. Default value when this parameter is omitted:

   All routes# including directly connected routes are used to resolve the next hop on static routes.

   #: A static route without a noresolve specification cannot be used as a next-hop resolution route.

2. Range of values:

   None

Default behavior

IPv6 static routes are not generated.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. You cannot configure a multipath route between next hops in different VRFs.

   The next hops that configure a multipath route are selected from among the next hops in the same VRF as the next hop with the highest weight value (that is enabled).

   In the following example, the next hops that configure a multipath route are 2001:db8:1:1::1 and 2001:db8:1:3::1:

   ipv6 route vrf 10 2001:db8:1:1::/64 2001:db8:1:1::1 vrf 20 weight 30

   ipv6 route vrf 10 2001:db8:1:1::/64 2001:db8:1:2::1 vrf 10 weight 20

   ipv6 route vrf 10 2001:db8:1:1::/64 2001:db8:1:3::1 vrf 20 weight 10

Related commands

ipv6 route static poll-interval

ipv6 route static poll-multiplier

ipv6 route static maximum-paths

ipv6 route static maximum-paths

The "ipv6 route static maximum-paths" command specifies the maximum number of paths (maximum number of next hops) to be generated for static routing information.

The maximum number of paths that can be generated as a multipath static route is the value specified in this command or the upper limit of the Switch, whichever is smaller.

Syntax

To set or change information:

ipv6 route static maximum-paths <Number>

To delete information:

no ipv6 route static maximum-paths

Input mode

```
(config)
```

Parameters

<Number>

Specifies the maximum number of paths (maximum number of next hops).

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 16 in decimal.

Default behavior

The initial value is set to 6.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

If a warning-level operation message is output, then the change is applied by restarting the device.

Notes

None

Related commands

ip route

ipv6 route static poll-interval

The "ipv6 route static poll-interval" command specifies the polling interval for a next hop.

Syntax

To set or change information:

ipv6 route static poll-interval <Seconds>

To delete information:

no ipv6 route static poll-interval

Input mode

```
(config)
```

Parameters

<Seconds>

Specifies the polling interval (seconds).

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 0 to 180 (seconds) in decimal.

   If you specify 0, polling stops.

Default behavior

The initial value is set to 5 second.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

ipv6 route

ipv6 route static poll-multiplier

ipv6 route static poll-multiplier

The "ipv6 route static poll-multiplier" command specifies the number of times polling is performed for a next hop, and the number of consecutive responses.

Syntax

To set or change information:

ipv6 route static poll-multiplier <Invalid-Count> <Restore-Count>

To delete information:

no ipv6 route static poll-multiplier

Input mode

```
(config)
```

Parameters

<Invalid-Count>

Specifies the number of times polling is performed. The static route for which polling is specified is disabled if no response is received within the specified number of consecutive polls.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 65535 in decimal.

<Restore-Count>

Specifies the number of consecutive responses required to restore a route. A static route that was disabled due to no response to polling will be re-enabled (restored) if responses to the specified number of consecutive polls are received from the next hop of that static route.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 65535 in decimal.

Default behavior

The following initial values are set.

- Number of times polling is performed: 3
- Number of consecutive responses: 1

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

ipv6 route

ipv6 route static poll-interval

26 RIPng

default-metric

The "default-metric" command specifies the metric value to be used when routing information learned by another protocol is advertised by RIPng. Metric values set by the "redistribute" or "distribute-list out" command have priority over the metric information specified by this command. This command is valid for static routes, OSPFv3 routes, BGP4+ routes, and routes imported from a VRF or global network.

Syntax

To set or change information:

default-metric <Metric>

To delete information:

no default-metric

Input mode

```
(config-rtr-rip)
```

Parameters

<Metric>

Specifies a metric value.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 16 in decimal.

Default behavior

The following initial values are set.

- Static routes: Metric 1
- Routes other than static routes: Metric 16

Impact on communication

None

When the change is applied

The change is applied the next time the routes are advertised.

Notes

None

Related commands

inherit-metric

distribute-list out

redistribute

ipv6 rip metric-offset

disable

The "disable" command disables RIPng.

Syntax

To set information:

disable

To delete information:

no disable

Input mode

```
(config-rtr-rip)
```

Parameters

None

Default behavior

RIPng is 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

distance

The "distance" command specifies the distance value for routing information learned by RIPng. A distance value specified by the "distribute-list in" command has priority over that specified by the "distance" command.

Syntax

To set or change information:

distance <Distance>

To delete information:

no distance

Input mode

```
(config-rtr-rip)
```

Parameters

<Distance>

Specifies the distance value for RIPng.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 2 to 255 in decimal. 2 indicates the highest priority, and 255 indicates the lowest priority.

Default behavior

The initial value is set to 120.

Impact on communication

None

When the change is applied

The change is applied the next time the routes are learned.

Notes

None

Related commands

None

generate-secondary-route

The "generate-secondary-route" command registers a secondary route in the routing table.

Syntax

To set information:

generate-secondary-route

To delete information:

no generate-secondary-route

Input mode

```
(config-rtr-rip)
```

Parameters

None

Default behavior

A secondary route is not registered in the routing table.

Impact on communication

None

When the change is applied

The change is applied the next time the routes are learned.

Notes

None

Related commands

None

inherit-metric

The "inherit-metric" command specifies that the metric value is to be inherited when routing information learned by another routing protocol is advertised by RIPng.

Syntax

To set information:

inherit-metric

To delete information:

no inherit-metric

Input mode

```
(config-rtr-rip)
```

Parameters

None

Default behavior

The metric value is not inherited.

Impact on communication

None

When the change is applied

The change is applied the next time the routes are advertised.

Notes

None

Related commands

default-metric

distribute-list out

redistribute

ipv6 rip metric-offset

ipv6 rip enable

The "ipv6 rip enable" command enables RIPng on the specified interface.

Syntax

To set information:

ipv6 rip enable

To delete information:

no ipv6 rip enable

Input mode

```
(config-if)
```

VLAN interface, loopback interface

Parameters

None

Default behavior

RIPng is disabled on the specified interface.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

ipv6 router rip

ipv6 rip metric-offset

The "ipv6 rip metric-offset" command specifies the metric value increment when RIPng packets are sent or received via the interface.

Syntax

To set or change information:

ipv6 rip metric-offset <Metric> { in | out }

To delete information:

no ipv6 rip metric-offset [<Metric>] { in | out }

Input mode

```
(config-if)
```

VLAN interface

Parameters

<Metric>

Specifies a metric value.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 0 to 16 in decimal.

{ in | out }

in

Specify this to add the metric when packets are received.

out

Specify this to add the metric when packets are sent.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

Default behavior

- The metric value increment when packets are received is set to 1.
- The metric value increment when packets are sent is set to 0.

Impact on communication

None

When the change is applied

The change is applied the next time the routes are learned or advertised.

Notes

None

Related commands

default-metric

inherit-metric

distribute-list in

distribute-list out

ipv6 router rip

The "ipv6 router rip" command configures router settings related to the RIPng routing protocol.

After this command is entered, the mode changes to config-rtr-rip mode.

Syntax

To set information:

ipv6 router rip [vrf <vrf id>]

To delete information:

no ipv6 router rip [vrf <vrf id>]

Input mode

```
(config)
```

Parameters

vrf <vrf id> [SL-L3A]

Specifies the VRF to which RIPng belongs.

1. Default value when this parameter is omitted:

   Belongs to the global network.

2. Range of values:

   For <vrf id>, specify a VRF ID.

   For details, see "Specifiable values for parameters".

Default behavior

RIPng 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

ipv6 rip enable

passive-interface

The "passive-interface" command disables a specified interface from sending routing information in RIPng packets. Use this command if you do not want to notify other routers of routing information (for example, when the remote router is using static routing). This command can control only the interfaces enabled for sending RIPng packets.

Syntax

To set information:

passive-interface {default | vlan <vlan id>}

To delete information:

no passive-interface {default | vlan <vlan id>}

Input mode

```
(config-rtr-rip)
```

Parameters

{default | vlan <vlan id>}

Specifies the interface to be prevented from sending RIPng packets.

default

Prevents all interfaces from sending RIPng packets.

vlan <vlan id>

Specifies the interface to be prevented from sending RIPng packets.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <vlan id>, specify the VLAN ID set by the "interface vlan" command.

Default behavior

Routing information is sent in RIPng packets.

Impact on communication

None

When the change is applied

The change is applied the next time the routes are advertised.

Notes

1. Specify the "passive-interface default" command to suppress all interfaces that can send RIPng packets from sending the packets. In this state, if you specify the "no passive-interface vlan <vlan id>" command, the specified interface becomes available for sending the packets. A configuration example is shown below.

Example 1

(1) To suppress only vlan 2 from sending the packets, enter the following command:

(config-rtr-rip)# passive-interface vlan 2

(2) To enable vlan 2 for sending the packets in the above state, enter the following command:

(config-rtr-rip)# no passive-interface vlan 2

Note: Entering the above command deletes the setting.

Example 2

(1) To suppress all interfaces from sending the packets, enter the following command:

(config-rtr-rip)# passive-interface default

(2) To enable only vlan 3 for sending the packets in the above state, enter the following command:

(config-rtr-rip)# no passive-interface vlan 3

Note: The above command does not delete settings.

(3) To enable all interfaces for sending the packets in the state (2) above, enter the following command:

(config-rtr-rip)# no passive-interface default

Note: Entering the above command deletes the setting.

Related commands

distribute-list out

timers basic

The "timers basic" command specifies the values of the various RIPng timers.

Syntax

To set or change information:

timers basic <Update> <Aging> <Garbage-Collection>

To delete information:

no timers basic

Input mode

```
(config-rtr-rip)
```

Parameters

<Update>

Specifies the value of the periodic advertisement timer in seconds.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 60 in decimal.

<Aging>

Specifies the value of the aging timer in seconds.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 360 in decimal.

<Garbage-Collection>

Specifies the time (seconds) that can elapse after the route is disabled until it is deleted from the routing table. During the specified period of time, the route is advertised with Metric 16 to the RIPng destination.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 480 in decimal.

Default behavior

The following initial values are set.

- <Update>: 30 seconds
- <Aging>: 180 seconds
- <Garbage-Collection>: 120 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

27 OSPFv3

[SL-L3A]

area default-cost

The "area default-cost" command specifies the cost value of the default route that an area boundary router advertises to a stub area.

Syntax

To set or change information:

area <Area-ID> default-cost <Cost>

To delete information:

no area <Area-ID> default-cost

To delete areas (all areas specified in the "stub", "virtual-link", and "range" commands are deleted):

no area <Area-ID>

Input mode

```
(config-rtr)
```

Parameters

<Area-ID>

Specifies the area ID of a stub area. If an area that is not a stub area is specified, this command is invalid.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 4294967295 (in decimal) or an IPv4 address (except 0.0.0.0).

<Cost>

Specifies the cost value.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 65535 in decimal.

Default behavior

The initial value is set to 1.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

area stub

area range

The "area range" command specifies networks in an area. A maximum of 1024 networks can be specified.

Use this command to configure route summary on an area boundary router. This command is useful for reducing the amount of routing information transmitted between areas.

Syntax

To set or change information:

area <Area-ID> range <IPv6-prefix>/<PrefixLen> [{advertise | not-advertise}]

To delete information:

no area <Area-ID> range <IPv6-prefix>/<PrefixLen>

To delete areas (all areas specified in the "stub", "virtual-link", and "range" commands are deleted):

no area <Area-ID>

Input mode

```
(config-rtr)
```

Parameters

<Area-ID>

Specifies the area to which the Switch belongs.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 0 to 4294967295 (in decimal) or an IPv4 address.

<IPv6-prefix>

Specifies the IPv6 prefix.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specifies the IPv6 prefix.

   Note: Set all the bits following the bits specified for <PrefixLen> of <IPv6-Prefix> to 0.

<PrefixLen>

Specifies the prefix length.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 128 in decimal.

{advertise | not-advertise}

Specifies whether to advertise inter-area routes. All of the routing information that matches the range of the network indicated by the specified IPv6 prefix and prefix length is not advertised to other areas as inter-area routes. Instead, this command allows you to advertise only a specified range as inter-area

routes to other areas. However, if you specify not-advertise, nothing will be advertised.

1. Default value when this parameter is omitted:
   advertise (Information is advertised as inter-area routes.)
2. Range of values:
   None

Default behavior

Individual routes connecting the areas are advertised without being summarized.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

area stub

The "area stub" command allows areas other than area 0 to function as stub areas.

In a stub area, external AS routes are suppressed from being advertised.

Syntax

To set or change information:

area <Area-ID> stub [no-default-summary] [no-summary]

To delete information:

no area <Area-ID> stub

To delete areas (all areas specified in the "stub", "virtual-link", and "range" commands are deleted):

no area <Area-ID>

Input mode

```
(config-rtr)
```

Parameters

<Area-ID>

Specifies the area to which the Switch belongs.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 4294967295 (in decimal) or an IPv4 address (except 0.0.0.0).

no-default-summary

Specifies that the area boundary router does not advertise the default route to the stub area.

1. Default value when this parameter is omitted:

   The default route is advertised to the stub area.

2. Range of values:

   None

no-summary

Suppresses routes from other areas from being advertised to the stub area.

1. Default value when this parameter is omitted:

   Routes from other areas (inter-area routing information) are advertised.

2. Range of values:

   None

Default behavior

Areas other than area 0 do not function as stub areas.

Impact on communication

Adjacency with neighboring routers within the area is briefly disconnected.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

area virtual-link

The "area virtual-link" command specifies a virtual link. The virtual link is used for connecting an area boundary router that is not directly connected to area 0 (backbone area) to area 0. A virtual link is identified by a transit area and the remote router ID.

Syntax

To set or change information:

area <Area-ID> virtual-link <Router-ID> [hello-interval <Seconds>] [retransmit-interval <Seconds>] [transmit-delay <Seconds>] [dead-interval <Seconds>]

To delete virtual links

no area <Area-ID> virtual-link <Router-ID>

To delete areas (all areas specified in the "stub", "virtual-link", and "range" commands are deleted):

no area <Area-ID>

Input mode

```
(config-rtr)
```

Parameters

<Area-ID>

Specifies a transit area. Stub areas cannot be specified.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 4294967295 (in decimal) or an IPv4 address (except 0.0.0.0).

<Router-ID>

Specifies the ID of the remote router on the virtual link.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify an IPv4 address.

hello-interval <Seconds>

Specifies, in seconds, the sending interval for hello packets.

1. Default value when this parameter is omitted:

   10

2. Range of values:

   Specify 1 to 255 (seconds) in decimal.

retransmit-interval <Seconds>

Specifies the retransmission interval in seconds.

1. Default value when this parameter is omitted:

   5

2. Range of values:

   Specify 1 to 65535 (seconds) in decimal.

transmit-delay <Seconds>

Specifies the delay time in seconds.

1. Default value when this parameter is omitted:

   1

2. Range of values:

   Specify 1 to 65535 (seconds) in decimal.

dead-interval <Seconds>

Specifies the number of seconds that can elapse before the neighboring router is deemed to be down.

1. Default value when this parameter is omitted:

   Four times as large as the hello-interval value.

2. Range of values:

   Specify 1 to 65535 (seconds) in decimal.

Default behavior

There are no virtual links.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. A virtual link must be configured in both routers that serve as the endpoints. For each endpoint router, the router ID of the remote router must be set. Therefore, use a method such as setting the "router-id" command in config-rtr mode to define the router ID.

Related commands

None

areaid-format

The "areaid-format" command specifies the display format of an area ID that is displayed by the "show ipv6 ospf" operation command (displaying OSPFv3 protocol information).

Syntax

To set or change information:

areaid-format {decimal | ipv4-address}

To delete information:

no areaid-format

Input mode

```
(config-rtr)
```

Parameters

{decimal | ipv4-address}

Specifies display format for an area ID.

Specify decimal to display the area ID as a decimal number. Specify ipv4-address to display it as an IPv4 address.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

Default behavior

The area ID is displayed as a decimal number.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

default-metric

The "default-metric" command specifies the metric value of a route to be advertised as an external AS route. This command does not apply to directly connected routes. Metric settings specified by the "redistribute" command have priority over the information specified by this command.

Syntax

To set or change information:

default-metric <Metric>

To delete information:

no default-metric

Input mode

```
(config-rtr)
```

Parameters

<Metric>

Specifies a metric value.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 0 to 65535 in decimal.

Default behavior

Metric 1 is set for a BGP route. Metric 20 is set for other routes.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

redistribute

disable

The "disable" command disables OSPFv3.

Syntax

To set information:

disable

To delete information:

no disable

Input mode

```
(config-rtr)
```

Parameters

None

Default behavior

OSPFv3 is enabled.

Impact on communication

OSPFv3 stops working.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

distance ospf

The "distance ospf" command sets the distance value for OSPFv3. You can specify different distance values for each route type.

Syntax

To set or change information:

You can use either of the following two formats. Whichever is used, the results are the same.

Individual setting

distance [ospf {external | inter-area | intra-area}] <distance>

Note: You cannot specify both settings without route type specifications (distance <distance>) and settings with route type specifications. (If specified, the settings are overwritten.)

Concurrent setting of multiple parameters

distance ospf [intra-area <distance>] [inter-area <distance>] [external <distance>]

To delete information (delete all):

no distance

Input mode

```
(config-rtr)
```

Parameters

{external | inter-area | intra-area}

Specifies the type of route to which the <distance> parameter setting applies.

Specify external (external AS route), inter-area (inter-area route), or intra-area (intra-area route). Note that an inter-area route refers to a route from another area that is not directly connected.

1. Default value when this parameter is omitted:

   The setting applies to all routes.

   If you set <distance> with this parameter omitted to change information, other settings (information set by this parameter) will be deleted.

2. Range of values:

   None

<distance>

Specifies a distance value.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 2 to 255 in decimal. 2 indicates the highest priority, and 255 indicates the lowest priority.

Default behavior

The initial value is set to 110 for all OSPFv3 routes.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

distribute-list in

graceful-restart mode

The "graceful-restart mode" command specifies the use of graceful restart and the running mode of graceful restart.

Graceful restart has the restart function and helper function. To execute the restart function, the helper function must be executed by all neighboring routers.

Syntax

To set or change information:

graceful-restart mode { restart | helper | both }

To delete information:

no graceful-restart mode

Input mode

```
(config-rtr)
```

Parameters

{ restart | helper | both }

Specifies that the restart function or helper function is executed.

If "both" is specified, both the restart function and helper function are executed.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

Default behavior

The restart function and helper function are disabled.

Impact on communication

None

When the change is applied

The change is applied from the next graceful restart. The trigger of enabling the helper function is when the neighboring router executes a graceful restart.

Notes

1. When using the restart function, either set the "router-id" command to fix the router ID, or set an IPv4 address for the loopback interface. If these are not set, the router ID may change before and after the commencement of graceful restart. If the router ID changes, graceful restart will fail.

Related commands

graceful-restart restart-time

graceful-restart strict-lsa-checking

routing options graceful-restart time-limit

graceful-restart restart-time

The "graceful-restart restart-time" command specifies the allowable time for reconnection with the helper router after restart when the restart function of graceful restart is executed in OSPFv3.

Syntax

To set or change information:

graceful-restart restart-time <Seconds>

To delete information:

no graceful-restart restart-time

Input mode

```
(config-rtr)
```

Parameters

<Seconds>

Specifies the allowable graceful restart time (in seconds).

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 3600 in decimal.

Default behavior

The initial value is 60 seconds.

Impact on communication

None

When the change is applied

The change is applied from the next graceful restart.

Notes

None

Related commands

graceful-restart mode

graceful-restart strict-lsa-checking

routing options graceful-restart time-limit

graceful-restart strict-lsa-checking

The "graceful-restart strict-lsa-checking" command allows the helper router to stop the helper process if the LSA database is no longer synchronized with that of the restart router.

If you set this command, the helper process stops when either of the following conditions exists:

- During LSA advertisement, a graceful-restart start notification is received from a neighboring router that has not completed its response.
- After the helper process has started, a new LSA other than periodic advertisement is generated or learned, and then advertised to the restart router.

Syntax

To set information:

graceful-restart strict-lsa-checking

To delete information:

no graceful-restart strict-lsa-checking

Input mode

```
(config-rtr)
```

Parameters

None

Default behavior

Graceful restart continues even if the LSA databases are not synchronized.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. Specify the same information in this command for all helper routers. This is because if at least one helper stops the graceful restart function, the restart router stops the graceful restart function with all helpers.

Related commands

graceful-restart mode

ipv6 ospf area

The "ipv6 ospf area" command enables OSPFv3. OSPFv3 works on a specified domain.

Syntax

To set or change information:

ipv6 ospf <Domain-No> area <Area-ID> [instance <Instance-id>]

To delete information:

no ipv6 ospf [<Domain-No>] area

Input mode

```
(config-if)
```

VLAN interface, loopback interface

Parameters

<Domain-No>

Specifies a domain number. Set the same value as the domain number specified for the "ipv6 router ospf" command. If you set a different value, the domain will work as a different domain.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 65535 in decimal.

<Area-ID>

Specifies the area to which the interface belongs.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 0 to 4294967295 (in decimal) or an IPv4 address.

instance <Instance-id>

Specifies the identifier for the group to which the router belongs in the target interface. Adjacency can be established only between routers that have the same identifier.

1. Default value when this parameter is omitted:

   0

2. Range of values:

   Specify 0 to 255 in decimal.

Default behavior

OSPFv3 is disabled.

Impact on communication

If the domain number or area ID is changed, adjacency is briefly disconnected.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. You can configure only one domain. If the domain number is changed, adjacency is briefly disconnected.
2. Before setting this command, you need to set the "router-id" command. Even if OSPFv3 has not been configured in config-rtr mode, OSPFv3 will be used for the interface for which this command is set. In this case, the router ID is automatically selected. Therefore, if you manually set the router ID later, the router ID being used is changed.
3. When this command is set for the global network, if you use the "no ipv6 router ospf" command with <Domain-No> specified to delete the domain that has the specified domain number, this command is also deleted. In addition, when this command is set for the VRF, if you use the "no ipv6 router ospf" command with <Domain-No> and <vrf id> specified to delete the domain whose VRF and domain number match the specification, this command is also deleted.

Related commands

ipv6 address

ipv6 ospf cost

The "ipv6 ospf cost" command specifies the cost value for an interface.

Syntax

To set or change information:

ipv6 ospf cost <Cost>

To delete information:

no ipv6 ospf cost

Input mode

```
(config-if)
```

VLAN interface, loopback interface

Parameters

<Cost>

Specifies the cost value.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 65535 in decimal.

Default behavior

The initial value is set to 1. However, 0 is set for the loopback interface.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

ipv6 ospf dead-interval

The "ipv6 ospf dead-interval" command specifies the length of time that the router maintains adjacency after receiving no hello packets from a neighboring router. When the specified time has elapsed since the last hello packet was received, the neighboring router is deemed to be down.

Syntax

To set or change information:

ipv6 ospf dead-interval <Seconds>

To delete information:

no ipv6 ospf dead-interval

Input mode

```
(config-if)
```

VLAN interface, loopback interface

Parameters

<Seconds>

Specifies the length of time that adjacency is to be maintained.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 65535 (seconds) in decimal.

Default behavior

The initial value is set to be four times as large as the hello-interval value.

Impact on communication

None. However, if the value of dead-interval is different among the routers connected to the same network, adjacency will be disconnected after the time set for dead-interval has elapsed.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. The value set for dead-interval must be the same for the routers connected to the same network.

Related commands

ipv6 ospf hello-interval

ipv6 ospf hello-interval

The "ipv6 ospf hello-interval" command specifies the sending interval for hello packets.

Syntax

To set or change information:

ipv6 ospf hello-interval <Seconds>

To delete information:

no ipv6 ospf hello-interval

Input mode

```
(config-if)
```

VLAN interface

Parameters

<Seconds>

Specifies the sending interval.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 255 (seconds) in decimal.

Default behavior

The initial value is 10 seconds.

Impact on communication

None. However, if the value of hello-interval is different among the routers connected to the same network, adjacency will be disconnected after the time set for dead-interval has elapsed.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. The same sending interval for hello packets must be set for routers connected to the same network. Neighboring routers with different sending intervals cannot connect.

Related commands

ipv6 ospf dead-interval

ipv6 ospf network

The "ipv6 ospf network" command specifies the OSPFv3 network type.

The following describes the OSPFv3 network types.

- Broadcast

  Multiple neighboring routers on an interface are managed in an integrated manner by using multicast packets.
- Point-to-point

  A single neighboring router is managed per IPv6 interface.

Syntax

To set or change information:

ipv6 ospf network {broadcast | point-to-point}

To delete information:

no ipv6 ospf network

Input mode

```
(config-if)
```

VLAN interface

Parameters

{broadcast | point-to-point}

Specifies the network type for the OSPFv3 interface.

broadcast

Broadcast is used.

point-to-point

Point-to-point is used.

1. Default value when this parameter is omitted:

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

   None

Default behavior

Broadcast is used.

Impact on communication

Adjacency is briefly disconnected.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. Make sure that the specified network type matches that of the neighboring device.

Related commands

None

ipv6 ospf priority

The "ipv6 ospf priority" command specifies the priority for determining a designated router. A router with the highest priority in the network will be the designated router, and a router with the second-highest priority will be the backup designated router. However, if the designated router and the backup designated router have already been determined, they are not changed even if a router that has a higher priority is started.

Note that when the network type is point-to-point, a designated router is not selected because only one neighboring router is used.

Syntax

To set or change information:

ipv6 ospf priority <Priority>

To delete information:

no ipv6 ospf priority

Input mode

```
(config-if)
```

VLAN interface

Parameters

<Priority>

Specifies the priority.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 0 to 255 in decimal. The value of 0 makes the router ineligible to become a designated router.

   The highest priority is 255, and the lowest priority is 1.

Default behavior

For broadcast, the initial value is set to 1. For point-to-point, 0 is always set irrespective of the setting value.

Impact on communication

None. However, if you specify 0 when the local router is the designated router, adjacency is briefly disconnected.

When the change is applied

If you set 0, the setting takes effect immediately.

If you set 1 or a greater value, the setting takes effect from the next establishment of adjacency with the neighboring router.

Notes

None

Related commands

None

ipv6 ospf retransmit-interval

The "ipv6 ospf retransmit-interval" command specifies the retransmission interval for OSPFv3 packets.

Syntax

To set or change information:

ipv6 ospf retransmit-interval <Seconds>

To delete information:

no ipv6 ospf retransmit-interval

Input mode

```
(config-if)
```

VLAN interface

Parameters

<Seconds>

Specifies the retransmission interval.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 65535 (seconds) in decimal.

Default behavior

The initial value is set to 5 second.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

ipv6 ospf transmit-delay

The "ipv6 ospf transmit-delay" command specifies the delay time required to send an OSPFv3 packet. Set this command if you want to perform OSPFv3 aging correctly.

Syntax

To set or change information:

ipv6 ospf transmit-delay <Seconds>

To delete information:

no ipv6 ospf transmit-delay

Input mode

```
(config-if)
```

VLAN interface

Parameters

<Seconds>

Specifies a delay time.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 65535 (seconds) in decimal.

Default behavior

The initial value is set to 1 second.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

ipv6 router ospf

The "ipv6 router ospf" command configures router settings related to the OSPFv3 routing protocol.

After this command is entered, the mode changes to config-rtr mode.

Syntax

To set information:

ipv6 router ospf <Domain-No> [vrf <vrf id>]

To delete information:

no ipv6 router ospf <Domain-No> [vrf <vrf id>]

Input mode

```
(config)
```

Parameters

<Domain-No>

Specifies the OSPFv3 domain number.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 65535 in decimal.

vrf <vrf id>

Specifies the VRF to which OSPFv3 belongs.

1. Default value when this parameter is omitted:

   Belongs to the global network.

2. Range of values:

   For <vrf id>, specify a VRF ID.

   For details, see "Specifiable values for parameters".

Default behavior

The behavior specified by the "ipv6 ospf area" command in config-if mode is performed.

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 information by this command, the area setting in the domain (set by the "ipv6 ospf area" command) is also deleted.

Related commands

ipv6 ospf area

max-metric router-lsa

The "max-metric router-lsa" command specifies that the switch uses the maximum cost value for advertisements and works as a stub router.

Syntax

To set or change information:

max-metric router-lsa [on-startup <Seconds>]

To delete information:

no max-metric router-lsa

Input mode

```
(config-rtr)
```

Parameters

on-startup

The switch works as a stub router after startup or restart.

1. Default value when this parameter is omitted:

   The function is always enabled.

2. Range of values:

   None

<Seconds>

Specifies the length of time that the switch works as a stub router after startup or restart.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted if you specify the on-startup parameter.

2. Range of values:

   Specify 5 to 86400 (seconds) in decimal.

Default behavior

The switch does not work as a stub router.

Impact on communication

None

When the change is applied

- When the function is always enabled, the change is applied immediately after setting values are changed.
- If you specify the on-startup parameter, the change takes effect after the restart. Note that if the switch is always running as a stub router, adding the on-startup parameter immediately terminates the stub router.

Notes

1. If a stub router setting is added or deleted while the helper function for graceful restarts is working, the graceful restart fails.

Related commands

None

maximum-paths

The "maximum-paths" command specifies the maximum number of paths in the route to be generated when multipaths (next hop) of equal cost exist for an OSPFv3-generated route.

The maximum number of paths that can be generated as a multipath OSPFv3 route is the value specified in this command or the upper limit of the Switch, whichever is smaller.

Syntax

To set or change information:

maximum-paths <Number>

To delete information:

no maximum-paths

Input mode

```
(config-rtr)
```

Parameters

<Number>

Specifies the maximum number of paths.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 16 in decimal.

Default behavior

The initial value is set to 4.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

If a warning-level operation message is output, then the change is applied by restarting the device.

Notes

None

Related commands

None

passive-interface

The "passive-interface" command specifies that the OSPFv3 network (connected to the interface for which ipv6 ospf area is specified in config-if mode) will be used as a stub network, which does not send or receive OSPFv3 packets.

Syntax

To set information:

passive-interface {default | vlan <vlan id> }

To delete information:

no passive-interface {default | vlan <vlan id> }

Note: Use the following procedure to specify default:

(1) Specify as follows to set default (set all interfaces as passive interfaces):
(config-rtr)# passive-interface default

(2) Specify as follows to configure an individual interface to not be set as a passive interface:
(config-rtr)# no passive-interface vlan <vlan id>

Input mode

```
(config-rtr)
```

Parameters

{default | vlan <vlan id>}

Sets all interfaces or the specified interface as a passive interface.

default

Sets all OSPFv3 networks as a passive interface.

vlan <vlan id>

Specifies the interface in the OSPFv3 network.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <vlan id>, specify the VLAN ID set by the "interface vlan" command.

3. Note on using this parameter:

   If you add or delete the default parameter, all other information set by the "passive-interface" command is deleted.

Default behavior

An interface that is not specified will not be used as a passive interface (stub network).

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

ipv6 ospf area

router-id

The "router-id" command specifies a router ID (to identify a specific router).

Syntax

To set or change information:

router-id <IP Address>

To delete information:

no router-id

Input mode

```
(config-rtr)
```

Parameters

<IP Address>

Specifies the router ID.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify an IPv4 address other than 0.0.0.0.

Default behavior

When OSPFv3 starts working, the router ID is automatically selected in the following order from the VRF or global network to which OSPFv3 belongs. However, after OSPFv3 starts working, the automatically selected router ID is not changed.

1. IPv4 address assigned to the loopback interface
2. Largest IPv4 address in the IPv4 interface

Impact on communication

If the setting is changed while OSPFv3 is working and a different value from the router ID being used is set, adjacency is briefly disconnected.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. If you omit this command and an interface that has an IPv4 address assigned does not exist in the VRF or global network to which OSPFv3 belongs, OSPFv3 is disabled.
2. Note the following if you omit this command to allow the router IDs to be automatically selected:
   - The largest IPv4 address might not be selected depending on the order in which configuration settings are made. For example, if you specify the "ipv6 ospf area" command, OSPFv3 starts working as soon as the command is specified. The router ID will not be changed even if an IPv4 address with higher priority is subsequently set.

- After OSPFv3 starts working, the router ID is not automatically changed when the information set by this command is deleted or when the loopback address is changed.
- The router ID might be changed because, for example, the device is restarted.

3. In OSPFv3, the router ID and network address of each router are used to learn the network configuration and perform route calculations. Therefore, if an invalid router ID is specified (that is, the same router ID is set for different routers), the network configuration cannot be learned correctly.

Related commands

ip address (interface loopback)

disable

timers spf

The "timers spf" command specifies the delay time for SPF calculations and the execution interval. The delay time is the time between when SPF calculations are scheduled due to changes in the OSPFv3 topology information and when the calculations actually start.

The execution interval is the period of time to suppress SPF calculations after the previous SPF calculations are performed.

Syntax

To set or change information:

timers spf <Delay> <Interval>

To delete information:

no timers spf

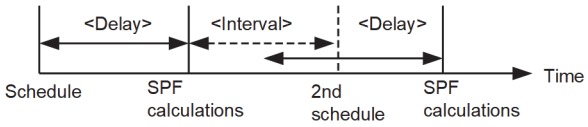
Input mode

```
(config-rtr)
```

Parameters

<Delay>

Specifies the delay time for SPF calculations. Second and subsequent SPF calculations are performed after the delay time or after the execution interval from the previous SPF calculations (<Interval>), whichever is later.



1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 1 to 10 (seconds) in decimal.

<Interval>

Specifies the minimum interval between consecutive SPF calculations.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 2 to 10 (seconds) in decimal.

Default behavior

The initial value is 2 seconds for <Delay> and 5 seconds for <Interval>.

Impact on communication

None

When the change is applied

The change is applied when the next set of SPF calculations is performed.

Notes

None

Related commands

None

28 BGP4+

[SL-L3A]

BGP4+

See "14 BGP4".

29 Route Filtering (IPv6)

Route Filtering (IPv6)

See "15 Route Filtering (IPv4 and IPv6)".

30 IPv6 Multicast Routing Protocol Information

ipv6 mld fast-leave

When a group or source quits (an MLD Listener Done message is received in MLDv1, or a State Change Report message is received in MLDv2), this function deletes the group or source without checking for other users in the corresponding interface.

Syntax

To set information:

ipv6 mld fast-leave

To delete information:

no ipv6 mld fast-leave

Input mode

```
(config-if)
```

VLAN interface

Parameters

None

Default behavior

When a group or source quits (an MLD Listener Done message is received in MLDv1, or a State Change Report message is received in MLDv2), this function checks for other users in the corresponding interface, and then deletes the group or source.

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

1. This function can be used when one operation terminal is connected on an interface. Do not use this function when multiple operation terminals are connected.

Related commands

ipv6 mld router

ipv6 mld group-limit

The "ipv6 mld group-limit" command specifies the maximum number of groups in which each MLD interface can join.

When this command is set in global configuration mode, the settings for this command are applied to all MLD interfaces belonging to the target VRF or the global network. However, if this command is set for the MLD interface in config-if mode, the settings for the MLD interface take precedence.

Syntax

To set or change information:

For global configuration mode

ipv6 mld [vrf <vrf id>] group-limit <number>

For config-if mode

ipv6 mld group-limit <number>

To delete information:

For global configuration mode

no ipv6 mld [vrf <vrf id>] group-limit

For config-if mode

no ipv6 mld group-limit

Input mode

```
(config)
```

```
(config-if)
```

VLAN interface

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

This command is valid only for the interface of the specified VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

2. Range of values:

   See "Specifiable values for parameters".

<number>

Specifies the maximum number of groups in which each MLD interface can join.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 256

Default behavior

In group participation, there is no limit on the maximum number of groups in which each MLD interface can join. However, you must operate multicast routing entries within the described capacity limits.

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

1. Values specified by using this command set a limit to the number of groups in which each interface can join, but do not guarantee the normal behavior with the specified value.

   If a change in configuration would cause the number of currently managed groups to exceed the limit that is set by this command, the current managed groups are retained until they are removed from the group. However, the removed groups cannot be added again until the number of managed groups on the interface falls below the limit that is set by this command.
2. This function does not limit group participation due to changes in the configuration (when static groups are added). Because the number of static groups is counted in the total number of groups, however, if the number of groups exceeds the limit due to the addition of static groups, additional group participation from hosts is limited.

Related commands

ipv6 mld router

ipv6 mld query-interval

The "ipv6 mld query-interval" command sets the sending interval of query messages that are sent regularly by IPv6 MLD of the Switch.

When this command is set in global configuration mode, the settings for this command are applied to all MLD interfaces belonging to the target VRF or the global network. However, if this command is set for the MLD interface in config-if mode, the settings for the MLD interface take precedence.

Syntax

To set or change information:

For global configuration mode

ipv6 mld [vrf <vrf id>] query-interval <seconds>

For config-if mode

ipv6 mld query-interval <seconds>

To delete information:

For global configuration mode

no ipv6 mld [vrf <vrf id>] query-interval

For config-if mode

no ipv6 mld query-interval

Input mode

```
(config)
```

```
(config-if)
```

VLAN interface

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

This command is valid only for the interface of the specified VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

2. Range of values:

   See "Specifiable values for parameters".

<seconds>

Sets the sending interval (in seconds) of query messages that are sent regularly by MLD.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   60 to 3600

Default behavior

The sending interval of query messages that are sent regularly by IPv6 MLD of the Switch is 125 seconds.

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

None

Related commands

ipv6 mld router

ipv6 mld router

The "ipv6 mld router" command runs MLD on the specified interface.

Syntax

To set information:

ipv6 mld router

To delete information:

no ipv6 mld router

Input mode

```
(config-if)
```

VLAN interface

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 you use MLD on the corresponding interface, this setting is required.

Related commands

ipv6 multicast-routing

ipv6 pim

ipv6 mld source-limit

The "ipv6 mld source-limit" command specifies the maximum total number of sources belonging to all groups that can run per MLD interface.

When this command is set in global configuration mode, the settings for this command are applied to all MLD interfaces belonging to the target VRF or the global network. However, if this command is set for the MLD interface in config-if mode, the settings for the MLD interface take precedence.

Syntax

To set or change information:

For global configuration mode

ipv6 mld [vrf <vrf id>] source-limit <number>

For config-if mode

ipv6 mld source-limit <number>

To delete information:

For global configuration mode

no ipv6 mld [vrf <vrf id>] source-limit

For config-if mode

no ipv6 mld source-limit

Input mode

```
(config)
```

```
(config-if)
```

VLAN interface

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

2. Range of values:

   See "Specifiable values for parameters".

<number>

Specifies the maximum total number of sources belonging to all groups that can run per interface.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 256

Default behavior

There is no limit on source participation in groups. However, you must operate multicast routing entries

within the described capacity limits.

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

1. This function does not limit source participation due to changes in the configuration (when static groups are added and ssm-join settings are added). Because this source participation is counted in the total number of sources, however, if the number of sources exceeds the limit due to changes in the configuration, additional source participation from hosts in groups is limited.

Related commands

ipv6 mld router

ipv6 mld ssm-map enable

The "ipv6 mld ssm-map enable" command runs PIM-SSM with MLDv1 or MLDv2 (EXCLUDE mode).

Syntax

To set information:

ipv6 mld [vrf <vrf id>] ssm-map enable

To delete information:

no ipv6 mld [vrf <vrf id>] ssm-map enable

Input mode

```
(config)
```

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

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 the setting value is changed.

Notes

None

Related commands

ipv6 mld router

ipv6 mld ssm-map static

ipv6 mld ssm-map static

The "ipv6 mld ssm-map static" command sets the source address for the group address for which PIM-SSM works in MLDv1 or MLDv2 EXCLUDE mode.

Syntax

To set information:

ipv6 mld ssm-map [vrf <vrf id>] static <access list name> <source address>

To delete information:

no ipv6 mld ssm-map [vrf <vrf id>] static <access list name> <source address>

Input mode

```
(config)
```

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

This command is valid only for the interface of the specified VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

2. Range of values:

   See "Specifiable values for parameters".

<access list name>

Specifies an access list for the group addresses to be used for PIM-SSM.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a name that is no more than 31 characters long.

   For details, see "Specifiable values for parameters".

<source address>

Specifies the source address for the multicast to be used for PIM-SSM.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

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. This command is enabled when the "ipv6 mld ssm-map enable" command is specified.
2. Specify an address for <access list name> within the range of the multicast group addresses specified by using the "ipv6 pim ssm" command.
3. For <access list name>, specify access lists that have been set by using the "ipv6 access-list" command. Access lists that have been set by using commands other than this command cannot be specified.
4. If an access list that has not been set is specified, this command is not valid.
5. For the address specified in <access list name>, use the destination IPv6 address of the corresponding access list.

Related commands

ipv6 mld router

ipv6 mld ssm-map enable

ipv6 access-list

ipv6 mld static-group

The "ipv6 mld static-group" command sets static additions to mld groups.

Syntax

To set information:

ipv6 mld static-group <access list name>

To delete information:

no ipv6 mld static-group <access list name>

Input mode

```
(config-if)
```

VLAN interface

Parameters

<access list name>

Specifies an access list for the static group.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a name that is no more than 31 characters long.

   For details, 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. The mask length for the access list is fixed at 128 (bits). Do not specify a mask length that is 127 (bits) or less for the access list. If the mask length is specified as 127 (bits) or less, the corresponding address is ignored.
2. For the addresses specified in the access list, see "Configuration Guide Vol. 3, 31.3.1 Addresses subject to forwarding".
3. For <access list name>, specify access lists that have been set by using the "ipv6 access-list" command. Access lists that have been set by using commands other than this command cannot be specified.
4. If an access list that has not been set is specified, this command is not valid.
5. For the address specified in <access list name>, use the destination IPv6 address of the corresponding access list.

Related commands

ipv6 mld router

ipv6 access-list

ipv6 mld version

The "ipv6 mld version" command specifies the MLD version to be used by the corresponding interface.

Syntax

To set or change information:

ipv6 mld version { 1 | 2 [only] }

To delete information:

no ipv6 mld version

Input mode

`(config-if)`

VLAN interface

Parameters

{1 | 2 [only]}

The following table describes the version of the MLD interface that works corresponding to the specified value of this parameter.

Table 30-1: List of MLD interface versions

Setting value	Version	MLD running mode
version 1	1	version 1 fixed
version 2	2	version 1, 2 mixed
version 2 only		version 2 fixed

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

Default behavior

MLD version 1, 2 mixed mode is used by the corresponding interface.

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

None

Related commands

ipv6 mld router

ipv6 multicast-routing

The "ipv6 multicast-routing" command enables the IPv6 multicast function.

Syntax

To set information:

ipv6 multicast-routing [vrf <vrf id>]

To delete information:

no ipv6 multicast-routing [vrf <vrf id>]

Input mode

```
(config)
```

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

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 the setting value is changed.

Notes

1. If you use the IPv6 multicast function on the Switch, this setting is required.
2. If you use the IPv6 multicast function on the Switch, you must set the loopback address for the global network or target VRF.
3. If you use the IPv6 multicast function on the Switch, you must also specify the IPv6 PIM (ipv6 pim) setting for one or more interfaces on the global network or each VRF.

Related commands

interface loopback

ipv6 pim

The "ipv6 pim" command runs IPv6 PIM on the specified interface.

Syntax

To set information:

ipv6 pim

To delete information:

no ipv6 pim

Input mode

```
(config-if)
```

VLAN interface

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 you use IPv6 PIM on the corresponding interface, this setting is required.

Related commands

ipv6 multicast-routing

ipv6 mld router

ipv6 pim assert-metric

The "ipv6 pim assert-metric" command specifies the metric information to be used in IPv6 PIM assert messages.

Syntax

To set or change information:

ipv6 pim [vrf <vrf id>] assert-metric {<metric> | unicast-routing}

To delete information:

no ipv6 pim [vrf <vrf id>] assert-metric

Input mode

```
(config)
```

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

2. Range of values:

   See "Specifiable values for parameters".

{<metric> | unicast-routing}

Specifies the metric information used in assert messages.

<metric>

Specifies a metric value.

unicast-routing

Metric 1 of the unicast routing protocol is used.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <metric>, a numeric value from 0 to 65535 or the string unicast-routing can be specified.

Default behavior

The metric value used in assert messages is 0 for directly connected source addresses, or 1024 for indirectly connected source addresses.

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

None

Related commands

ipv6 pim

ipv6 pim assert-preference

The "ipv6 pim assert-preference" command specifies the preference information to be used for IPv6 PIM assert messages.

Syntax

To set or change information:

ipv6 pim [vrf <vrf id>] assert-preference {<preference> | unicast-routing}

To delete information:

no ipv6 pim [vrf <vrf id>] assert-preference

Input mode

```
(config)
```

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

2. Range of values:

   See "Specifiable values for parameters".

{<preference> | unicast-routing}

Specifies the preference information to be used in assert messages.

<preference>

Specifies the preference value.

unicast-routing

Uses the first distance value of the unicast routing protocols.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <preference>, a numeric value from 0 to 255 or the string unicast-routing can be specified.

Default behavior

The preference value used in assert messages is 0 for directly connected source addresses, or 101 for indirectly connected source addresses.

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

None

Related commands

ipv6 pim

ipv6 pim bsr candidate bsr

The "ipv6 pim bsr candidate bsr" command sets the Switch as a BSR candidate.

Syntax

To set or change information:

ipv6 pim [vrf <vrf id>] bsr candidate bsr <ipv6 address> [priority <value>]

To delete information:

no ipv6 pim [vrf <vrf id>] bsr candidate bsr <ipv6 address> [priority <value>]

Input mode

```
(config)
```

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

2. Range of values:

   Set the same value as the VRF ID to which the target loopback interface belongs.

<ipv6 address>

Specifies the loopback address of the Switch.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Set the same loopback address as that assigned to the target loopback interface.

priority <value>

Specify the priority for determining the BSR. The router that has the highest priority becomes the BSR.

1. Default value when this parameter is omitted:

   0

2. Range of values:

   0 to 255

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. Specify the same address for all of the loopback addresses of the Switch that is specified in the "ipv6 pim bsr candidate bsr" or "ipv6 pim bsr candidate rp" command.

Related commands

ipv6 pim

interface loopback

ipv6 pim bsr candidate rp

The "ipv6 pim bsr candidate rp" command sets the Switch as a rendezvous point candidate.

Syntax

To set or change information:

ipv6 pim [vrf <vrf id>] bsr candidate rp <ipv6 address> [priority <value>] [group-list <access list name>]

To delete information:

no ipv6 pim [vrf <vrf id>] bsr candidate rp <ipv6 address> [priority <value>] [group-list <access list name>]

Input mode

```
(config)
```

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

2. Range of values:

   Set the same value as the VRF ID to which the target loopback interface belongs.

<ipv6 address>

Specifies the loopback address of the Switch.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Set the same loopback address as that assigned to the target loopback interface.

priority <value>

Specify the priority for determining the rendezvous point. The router that has the lowest priority becomes the rendezvous point.

1. Default value when this parameter is omitted:

   255

2. Range of values:

   0 to 255 in decimal

group-list <access list name>

Specifies an access list for the IPv6 multicast group addresses to be managed at the rendezvous point.

1. Default value when this parameter is omitted:

   ff00::/8 (all multicast addresses)

2. Range of values:

   Specify a name that is no more than 31 characters long.

For details, 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. Specify the same address for all of the loopback addresses of the Switch that is specified in the "ipv6 pim bsr candidate bsr" or "ipv6 pim bsr candidate rp" command.
2. For the addresses specified in the access list, see "Configuration Guide Vol. 3, 31.3.1 Addresses subject to forwarding".
3. For <access list name>, specify access lists that have been set by using the "ipv6 access-list" command. Access lists that have been set by using commands other than this command cannot be specified.
4. If an access list that has not been set is specified, this command is not valid.
5. For the address specified in <access list name>, use the destination IPv6 address of the corresponding access list.
6. To use this command, set an IPv6 address for the loopback interface.

Related commands

ipv6 pim

interface loopback

ipv6 access-list

ipv6 pim deletion-delay-time

The "ipv6 pim deletion-delay-time" command sets the remaining time until routing information is deleted after prune message reception when using IPv6 PIM join/prune messages.

Syntax

To set or change information:

ipv6 pim [vrf <vrf id>] deletion-delay-time <seconds>

To delete information:

no ipv6 pim [vrf <vrf id>] deletion-delay-time

Input mode

```
(config)
```

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

2. Range of values:

   See "Specifiable values for parameters".

<seconds>

Sets the remaining time (in seconds) until routing information is deleted after prune message reception when using IPv6 PIM join/prune messages.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 300 (seconds)

Default behavior

Calculates remaining time until routing information is deleted from information included in received IPv6 PIM join/prune messages.

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

1. When multiple routers exist on the same link, if you set the remaining time shorter than the interval at which the downstream router sends IPv6 PIM join/prune messages, data relaying might be temporarily disconnected. This is because, after prune message reception, data relaying is stopped without waiting

for join reception from other downstream routers. After that, the data relaying resumes when a join message is received.

Related commands

ipv6 pim

ipv6 pim direct

The "ipv6 pim direct" command treats remote multicast server addresses as direct-connect servers.

Syntax

To set information:

ipv6 pim direct <access list name>

To delete information:

no ipv6 pim direct <access list name>

Input mode

```
(config-if)
```

VLAN interface

Parameters

<access list name>

Specifies the access list for addresses of the multicast data sources to be treated as direct-connect servers by the Switch. A maximum of 128 source addresses is valid per interface.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a name that is no more than 31 characters long.

   For details, 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. For <access list name>, specify access lists that have been set by using the "ipv6 access-list" command. Access lists that have been set by using commands other than this command cannot be specified.
2. If an access list that has not been set is specified, this command is not valid.
3. For the address specified in <access list name>, use the source IPv6 address of the corresponding access list.
4. If the same IPv6 source address is used for multiple interfaces on the global network or VRF, some of the settings will become invalid.

5. The maximum number of source IPv6 addresses that are valid in the specified access list is the upper limit per interface (128).
6. An error occurs if the total number of source IPv6 addresses set in the access list specified by this command exceeds the upper limit per device (256), regardless of whether the addresses are valid.
7. Source IPv6 addresses in the access list become valid in the order in which they are specified. If you use the "ppupdate" operation command to update software or use the "copy" operation command to copy configuration entries on the target device, source IPv6 addresses become valid in the order of the sequence numbers in the access list.

Related commands

ipv6 pim

ipv6 access-list

ipv6 pim hello-interval

The "ipv6 pim hello-interval" command sets the sending interval of Hello messages that are sent regularly by IPv6 PIM of the Switch.

When this command is set in global configuration mode, the settings for this command are applied to all interfaces belonging to the target VRF or the global network. However, if this command is set for the interface in config-if mode, the settings for the interface take precedence.

Syntax

To set or change information:

For global configuration mode

ipv6 pim [vrf <vrf id>] hello-interval <seconds>

For config-if mode

ipv6 pim hello-interval <seconds>

To delete information:

For global configuration mode

no ipv6 pim [vrf <vrf id>] hello-interval

For config-if mode

no ipv6 pim hello-interval

Input mode

```
(config)
```

```
(config-if)
```

VLAN interface

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

This command is valid only for the interface of the specified VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

2. Range of values:

   See "Specifiable values for parameters".

<seconds>

Sets the interval (in seconds) for sending Hello messages that are sent regularly by IPv6 PIM.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   5 to 3600 (seconds)

Default behavior

The sending interval of Hello messages that are sent regularly by IPv6 PIM is 30 seconds.

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

None

Related commands

ipv6 pim

ipv6 pim join-prune-interval

The "ipv6 pim join-prune-interval" command sets the sending interval of join/prune messages that are sent regularly by IPv6 PIM of the Switch.

When this command is set in global configuration mode, the settings for this command are applied to all interfaces belonging to the target VRF or the global network. However, if this command is set for the interface in config-if mode, the settings for the interface take precedence.

Syntax

To set or change information:

For global configuration mode

ipv6 pim [vrf <vrf id>] join-prune-interval <seconds>

For config-if mode

ipv6 pim join-prune-interval <seconds>

To delete information:

For global configuration mode

no ipv6 pim [vrf <vrf id>] join-prune-interval

For config-if mode

no ipv6 pim join-prune-interval

Input mode

```
(config)
```

```
(config-if)
```

VLAN interface

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

2. Range of values:

   See "Specifiable values for parameters".

<seconds>

Sets the interval (in seconds) for sending join/prune messages that are sent regularly by IPv6 PIM of the Switch.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   30 to 3600 (seconds)

Default behavior

The sending interval of join/prune messages that are sent regularly by IPv6 PIM is 60 seconds.

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

None

Related commands

ipv6 pim

ipv6 pim keep-alive-time

The "ipv6 pim keep-alive-time" command sets the retention time for non-communication in IPv6 PIM-SM.

Syntax

To set or change information:

ipv6 pim [vrf <vrf id>] keep-alive-time <seconds>

To delete information:

no ipv6 pim [vrf <vrf id>] keep-alive-time

Input mode

```
(config)
```

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

2. Range of values:

   See "Specifiable values for parameters".

<seconds>

Sets the retention time (in seconds) for non-communication in IPv6 PIM-SM. If a data packet is not relayed even once during the retention time, the corresponding forwarded entry is deleted.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0, or 60 to 43200 (The value is in seconds. 0 means infinite.)

Default behavior

The retention time of forwarded entries for non-communication in IPv6 PIM-SM is 210 seconds.

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

1. Even during the retention time (even when it is infinite), the forwarded entry might be deleted depending on the protocol. For example, if multicast routing information is deleted, the corresponding forwarded entry is deleted at the same time.
2. The deletion of forwarded entries caused by non-communication might lag behind this setting value for up to 90 seconds.

3. The retention time for non-communication in PIM-SSM is infinite.

Related commands

ipv6 pim

ipv6 pim max-interface

The "ipv6 pim max-interface" command specifies the maximum number of interfaces that can run IPv6 PIM or MLD to adjust memory efficiency.

Syntax

To set or change information:

ipv6 pim max-interface { 32 | 64 | 128 }

To delete information:

no ipv6 pim max-interface

Input mode

```
(config)
```

Parameters

{ 32 | 64 | 128 }

Specifies the number of interfaces that can run IPv6 PIM or MLD. Note that, the number of interfaces that can be set will be one less than the specified value because a protocol reserves one interface.

When the value of this command is changed, the IPv6 multicast routing program restarts automatically.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

Default behavior

IPv6 PIM or MLD runs with a maximum of 128 interfaces.

Impact on communication

When the value of this command is changed, the IPv6 multicast routing program restarts automatically. Therefore, IPv6 multicast routing stops temporarily.

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

None

Related commands

ipv6 pim

ipv6 mld router

ipv6 pim mcache-limit

The "ipv6 pim mcache-limit" command sets the maximum total number of IPv6 PIM-SM/SSM multicast forwarding entries and negative cache entries.

Syntax

To set or change information:

ipv6 pim [vrf <vrf id>] mcache-limit <number>

To delete information:

no ipv6 pim [vrf <vrf id>] mcache-limit

Input mode

```
(config)
```

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

2. Range of values:

   See "Specifiable values for parameters".

<number>

Specifies the maximum total number of IPv6 PIM-SM/SSM multicast forwarding entries and negative cache entries.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 1024

Default behavior

There is no limit on the maximum total number of IPv6 PIM-SM/SSM multicast forwarding entries and negative cache entries. However, you must operate multicast routing entries within the described capacity limits.

For details about capacity limits, see "Configuration Guide Vol. 1, 3 Capacity limit".

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

1. Values specified by using this command set the maximum total number of IPv6 PIM-SM/SSM multicast forwarding entries and negative cache entries, but do not guarantee the normal behavior with the specified value.
2. If the maximum total number of IPv6 PIM-SM/SSM multicast forwarding entries and negative cache entries exceeds the setting value of this command due to a change in the configuration, existing entries are maintained until they are deleted. If an entry is deleted in this state, it cannot be recreated until the number of entries becomes the value of this command or less.
3. When the total number of IPv6 PIM-SM/SSM multicast forwarding entries and negative cache entries exceeds the maximum number of entries in a routing table, the following actions are performed:
   - For PIM-SM, IPv6 multicast forwarding entries cannot be created.
   - For PIM-SSM, IPv6 multicast (S, G) routing information entries cannot be created.

   You must use the maximum value within the described capacity limits.

   For details about capacity limits, see "Configuration Guide Vol. 1, 3 Capacity limit".

Related commands

ipv6 pim

ipv6 pim mroute-limit

The "ipv6 pim mroute-limit" command specifies the maximum number of IPv6 PIM-SM/SSM multicast routing information entries (total of (S, G) and (*, G) entries).

Syntax

To set or change information:

ipv6 pim [vrf <vrf id>] mroute-limit <number>

To delete information:

no ipv6 pim [vrf <vrf id>] mroute-limit

Input mode

```
(config)
```

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

2. Range of values:

   See "Specifiable values for parameters".

<number>

Specifies the maximum number of IPv6 PIM-SM/SSM multicast routing information entries (total of (S, G) and (*, G) entries).

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 1024

Default behavior

There is no limit on the maximum number of IPv6 PIM-SM/SSM multicast routing information entries (total of (S, G) and (*, G) entries). However, you must operate multicast routing entries within the described capacity limits.

For details about capacity limits, see "Configuration Guide Vol. 1, 3 Capacity limit".

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

1. Values specified by using this command set the maximum number of IPv6 PIM-SM/SSM multicast routing information entries that can be created for each interface, but do not guarantee the normal behavior with the specified value. If the number of IPv6 PIM-SM/SSM multicast routing information entries exceeds the value of this parameter due to a change in the configuration, existing entries are retained until they are deleted. If an entry is deleted in this state, it cannot be recreated until the number of entries that are managed by the corresponding interface falls below or is equal to the value of this parameter.

Related commands

ipv6 pim

ipv6 pim negative-cache-time

The "ipv6 pim negative-cache-time" command sets the retention time for negative caches in IPv6 PIM-SM.

Syntax

To set or change information:

ipv6 pim [vrf <vrf id>] negative-cache-time <seconds>

To delete information:

no ipv6 pim [vrf <vrf id>] negative-cache-time

Input mode

```
(config)
```

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

1. Default value when this parameter is omitted:
   Specifies the global network.
2. Range of values:
   See "Specifiable values for parameters".

<seconds>

Sets the retention time (in seconds) for negative caches in IPv6 PIM-SM.

1. Default value when this parameter is omitted:
   This parameter cannot be omitted.
2. Range of values:
   10 to 3600 (seconds)

Default behavior

The retention time for negative caches in IPv6 PIM-SM is 210 seconds.

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

1. The retention time for negative caches in IPv6 PIM-SSM is fixed as 3600 seconds.

Related commands

ipv6 pim

ipv6 pim register-probe-time

The "ipv6 pim register-probe-time" command specifies the start time for null-Register sending based on the suppression time for Register sending.

Syntax

To set or change information:

ipv6 pim [vrf <vrf id>] register-probe-time <seconds>

To delete information:

no ipv6 [vrf <vrf id>] pim register-probe-time

Input mode

```
(config)
```

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

2. Range of values:

   See "Specifiable values for parameters".

<seconds>

Specifies the start time (in seconds) for null-Register sending based on the suppression time for Register sending.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   5 to 60 (seconds)

Default behavior

The start time for null-Register sending based on the suppression time for Register sending.

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

1. If the remaining time of Register-Suppression-Timer becomes the value specified by using this parameter or less, null-Register messages are sent every five seconds.

Related commands

ipv6 pim

ipv6 pim rp-address

The "ipv6 pim rp-address" command performs settings for the static rendezvous point.

Syntax

To set information:

ipv6 pim [vrf <vrf id>] rp-address <ipv6 address> [<access list name>]

To delete information:

no ipv6 pim [vrf <vrf id>] rp-address <ipv6 address> [<access list name>]

Input mode

```
(config)
```

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

2. Range of values:

   See "Specifiable values for parameters".

<ipv6 address>

Specifies the IPv6 address of the rendezvous point.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

<access list name>

Specifies an access list for the IPv6 multicast group addresses to be managed at the rendezvous point.

1. Default value when this parameter is omitted:

   ff00::/8 (all multicast addresses)

2. Range of values:

   Specify a name that is no more than 31 characters long.

   For details, 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. For the addresses specified in the access list, see "Configuration Guide Vol. 3, 31.3.1 Addresses subject to forwarding".
2. For <access list name>, specify access lists that have been set by using the "ipv6 access-list" command. Access lists that have been set by using commands other than this command cannot be specified.
3. If an access list that has not been set is specified, this command is not valid.
4. For the address specified in <access list name>, use the destination IPv6 address of the corresponding access list.
5. To set the Switch as a rendezvous point, specify the IPv6 address of the loopback interface.

Related commands

ipv6 pim

ipv6 access-list

ipv6 pim rp-mapping-algorithm

The "ipv6 pim rp-mapping-algorithm" command specifies the rendezvous point selection algorithm to be used by IPv6 PIM.

Syntax

To set or change information:

ipv6 pim [vrf <vrf id>] rp-mapping-algorithm { method1 | method2 }

To delete information:

no ipv6 pim [vrf <vrf id>] rp-mapping-algorithm

Input mode

```
(config)
```

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

2. Range of values:

   See "Specifiable values for parameters".

{ method1 | method2 }

Specifies the rendezvous point selection algorithm to be used by IPv6 PIM.

method1

Uses the algorithm described in RFC 2362.

method2

Uses the algorithm described in RFC 4601.

Adds the longest match for the multicast group addresses managed at the rendezvous point as the selection condition of method1.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

Default behavior

The rendezvous point selection algorithm used by IPv6 PIM is the algorithm described in RFC 4601.

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

None

Related commands

ipv6 pim

ipv6 pim ssm

The "ipv6 pim ssm" command configures IPv6 PIM-SSM.

Syntax

To set information:

ipv6 pim [vrf <vrf id>] ssm { default | range <access list name> }

To delete information:

no ipv6 pim [vrf <vrf id>] ssm { default | range <access list name> }

Input mode

```
(config)
```

Parameters

vrf <vrf id> [SL-L3A]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies the global network.

2. Range of values:

   See "Specifiable values for parameters".

default

The PIM-SSM target group address is ff30::/12 (the group address is ff30::, and the mask length is 12).

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

range <access list name>

Specifies an access list for the multicast group addresses to be used for PIM-SSM.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a name that is no more than 31 characters long.

   For details, 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. The access list specified by this command must satisfy the following conditions. If the conditions are not met, PIM-SSM may not work normally.
   - The access list must be the one that has already been created.
   - The access list must be the one created by using the "ipv6 access-list" command.
   - The filter condition must be permit.
   - The number of entries must be one.
   - The group address used by PIM-SSM must be set as the destination IPv6 address of the access list. Also, any must be set to the source IPv6 address.

     For the group addresses that can be set, see "Configuration Guide Vol. 3, 31.3.1 Addresses subject to forwarding".

Related commands

ipv6 pim

ipv6 access-list

ipv6 pim vrf-gateway [SL-L3A]

The "ipv6 pim vrf-gateway" command enables PIM-SM protocol relay between different VRFs or global networks when PIM-SM is used.

Syntax

To set information:

ipv6 pim [vrf <vrf id>] vrf-gateway

To delete information:

no ipv6 pim [vrf <vrf id>] vrf-gateway

Input mode

```
(config)
```

Parameters

vrf <vrf id>

Specifies the target VRF on the network in which the source exists.

1. Default value when this parameter is omitted:

   Specifies the global network.

2. Range of values:

   See "Specifiable values for parameters".

Default behavior

PIM-SM protocol relay between different VRFs or global networks is not possible.

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

None

Related commands

ipv6 import multicast inter-vrf

ipv6 pim

31 BFD

bfd name

The "bfd name" command configures settings for BFD. After this command is entered, the mode changes to config-bfd mode.

Syntax

To set information:

bfd name <bfd name>

To delete information:

no bfd name <bfd name>

Input mode

```
(config)
```

Parameters

<bfd name>

Specifies the BFD setting name.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a name that is no more than 31 characters long.

   For details, see "Specifiable values for parameters".

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied when the command is set.

Notes

1. If this command is deleted, the BFD session status related to this command becomes AdminDown. If you do not want the BFD-linked function to detect AdminDown, delete this command after deleting the BFD-linked settings.

Related commands

neighbor bfd

interval

The "interval" command sets the monitoring interval for BFD monitoring.

Syntax

To set or change information:

interval {[min-tx <milli seconds>] [min-rx <milli seconds>] | both <milli seconds>}

To delete information:

no interval

Input mode

```
(config-bfd)
```

Parameters

min-tx <milli seconds>

Specifies the minimum sending interval of the Switch in milliseconds.

1. Default value when this parameter is omitted:

   1000

2. Range of values:

   Specify 50 to 10000 in decimal.

min-rx <milli seconds>

Specifies the minimum receiving interval of the Switch in milliseconds.

1. Default value when this parameter is omitted:

   1000

2. Range of values:

   Specify 50 to 10000 in decimal.

both <milli seconds>

Specifies the minimum sending interval and minimum receiving interval of the Switch in milliseconds.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 50 to 10000 in decimal.

Default behavior

The minimum sending interval and minimum receiving interval of the Switch are 1000 milliseconds.

Impact on communication

None

When the change is applied

The change is applied when the command is set.

Notes

1. If the minimum sending interval and minimum receiving interval are set short with this command, failures may be detected incorrectly. Consider the network environment and decide the value to be set.

Related commands

multiplier

multihop

Set this command when the IP address to be monitored is not the address of the network directly connected to the Switch.

Syntax

To set information:

multihop

To delete information:

no multihop

Input mode

```
(config-bfd)
```

Parameters

None

Default behavior

BFD monitoring is performed for the address (single hop) of the network directly connected to the Switch. The monitoring is not performed for multi-hop targets.

Impact on communication

None

When the change is applied

The change is applied when the command is set.

Notes

1. It is necessary to set the loopback interface address as the source IP address. If the address is not set, the BFD session will not start monitoring.

Related commands

ip address (loopback)

multiplier

The "multiplier" command sets the detection multiplier for determining the monitoring time for BFD monitoring.

The result of multiplying the BFD packet sending interval from the Switch by the value set by this command is used by the remote system as the monitoring time for BFD monitoring.

Syntax

To set or change information:

multiplier <multiplier>

To delete information:

no multiplier

Input mode

```
(config-bfd)
```

Parameters

<multiplier>

Specifies the detection multiplier for the Switch.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 2 to 255 in decimal.

Default behavior

The detection multiplier for the Switch is 3.

Impact on communication

None

When the change is applied

The change is applied when the command is set.

Notes

1. If the detection multiplier is set to less than 3, the path status may become unstable because failures will be more easily be detected.
2. Specify a value within a range where the result of multiplying the detection multiplier by the minimum sending interval or minimum receiving interval does not exceed 300 seconds.

Related commands

interval

32 VRF

[SL-L3A]

import inter-vrf

The "import inter-vrf" command applies a filter to control which IPv4 routes are imported from another VRF or the global network.

Syntax

To set or change information:

import inter-vrf <route map>

To delete information:

no import inter-vrf

Input mode

```
(config-vrf)
```

Parameters

<route map>

Specifies the route-map which applies the filter conditions.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a name that is no more than 31 characters long.

   For details, see "Specifiable values for parameters".

Default behavior

IPv4 routes are not imported from another VRF or the global network.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

route-map

import multicast inter-vrf

The "import multicast inter-vrf" command applies a filter to control which multicast routes are imported from another VRF or the global network.

Syntax

To set or change information:

import multicast inter-vrf <route map>

To delete information:

no import multicast inter-vrf

Input mode

```
(config-vrf)
```

Parameters

<route map>

Specifies the route-map which applies the filter conditions.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a name that is no more than 31 characters long.

   For details, see "Specifiable values for parameters".

Default behavior

Multicast routes are not imported from another VRF or the global network.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. For the specified route-map, you can use permit only.
2. For the specified route-map, you can use only the access-list specification of the "match ip address" command and the "match vrf" command.
3. If route-map to be referenced by this command is not set, forwarding requests from another VRF or the global network are permitted.

   To prevent multicast forwarding to an unintended VRF or global network, always configure route-map first, and then configure import multicast inter-vrf.
4. For access-list to be specified by the "match ip address" command, you can use only the access lists set by the following commands.
   - "ip access-list standard" command

- "access-list" command whose specified content is the same as <access list number> specified by the "ip access-list standard" command

For details, see "Configuration Command Reference Vol. 1, access-list".

5. If the access list set by <access list name> of access-list specified by the "match ip address" command is not set, the command works with the default value (224.0.0.0/4).
6. When specifying a wildcard mask in the access list, use a consecutive bit string from the most significant bit.

Related commands

access-list

match ip address

match vrf

route-map

ipv6 import inter-vrf

The "ipv6 import inter-vrf" command applies a filter to control which IPv6 routes are imported from another VRF or the global network.

Syntax

To set or change information:

ipv6 import inter-vrf <route map>

To delete information:

no ipv6 import inter-vrf

Input mode

```
(config-vrf)
```

Parameters

<route map>

Specifies the route-map which applies the filter conditions.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a name that is no more than 31 characters long.

   For details, see "Specifiable values for parameters".

Default behavior

IPv6 routes are imported from another VRF or the global network.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

route-map

ipv6 import multicast inter-vrf

The "ipv6 import multicast inter-vrf" command applies a filter to control which multicast routes are imported from another VRF or the global network.

Syntax

To set or change information:

ipv6 import multicast inter-vrf <route map>

To delete information:

no ipv6 import multicast inter-vrf

Input mode

```
(config-vrf)
```

Parameters

<route map>

Specifies the route-map which applies the filter conditions.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify a name that is no more than 31 characters long.

   For details, see "Specifiable values for parameters".

Default behavior

Multicast routes are not imported from another VRF or the global network.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. For the specified route-map, you can use permit only.
2. For the specified route-map, you can use only the access-list specification of the "match ipv6 address" command and the "match vrf" command.
3. If route-map to be referenced by this command is not set, forwarding requests from another VRF or the global network are permitted.

   To prevent multicast forwarding to an unintended VRF or global network, always configure route-map first, and then configure ipv6 import multicast inter-vrf.
4. For access-list to be specified by the "match ipv6 address" command, you can use only the access lists set by the following commands.
   - "ipv6 access-list" command

For details, see "Configuration Command Reference Vol. 1, access-list".

5. For the address set by <access list name> of access-list specified by the "match ipv6 address" command, specify the source IPv6 address of the corresponding access list.
6. If the access list set by <access list name> of access-list specified by the "match ipv6 address" command is not set, the command works with the default value (ff00::/8).

Related commands

ipv6 access-list

match ipv6 address

match vrf

route-map

ipv6 maximum routes

The "ipv6 maximum routes" command specifies the maximum number of IPv6 routes accommodated by the target VRF.

Syntax

To set or change information:

ipv6 maximum routes <limit> {<warn threshold> | warn-only}

To delete information:

no ipv6 maximum routes

Input mode

```
(config-vrf)
```

Parameters

<limit>

Specifies the maximum number of IPv6 routes.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 4294967295 in decimal

{<warn threshold> | warn-only}

<warn threshold>

Specifies the threshold (%) for outputting warning operation messages.

If the ratio of the number of routes learned by the target VRF to the maximum number of routes exceeds this threshold, a warning message is output. Warning messages are output as the event log of the IP routing program.

Also, when this parameter is specified and the number of routes learned by the target VRF exceeds the maximum number of routes specified by <limit>, the addition of newly learned routes is suppressed.

warn-only

When the number of routes learned by the target VRF exceeds the specified maximum number of routes, only a warning message is output, and route addition is not suppressed.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <warn threshold>, specify a number from 1 to 100 (decimal).

Default behavior

The maximum number of IPv6 routes is not limited for the target VRF.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

However, when <warn threshold> is specified and then the <limit> value is reduced, and if the number of learned routes at that timing has already exceeded the maximum number of routes after the change of the <limit> value, the number of routes will not be immediately reduced to the <limit> value.

If you want to forcibly reduce the number of routes to the <limit> value, execute the "clear ipv6 route [vrf <vrf id>] *" operation command.

Notes

None

Related commands

None

maximum routes

The "maximum routes" command specifies the maximum number of IPv4 routes accommodated by the target VRF.

Syntax

To set or change information:

maximum routes <limit> {<warn threshold> | warn-only}

To delete information:

no maximum routes

Input mode

```
(config-vrf)
```

Parameters

<limit>

Specifies the maximum number of IPv4 routes.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 4294967295 in decimal

{<warn threshold> | warn-only}

<warn threshold>

Specifies the threshold (%) for outputting warning operation messages.

If the ratio of the number of routes learned by the target VRF to the maximum number of routes exceeds this threshold, a warning message is output. Warning messages are output as the event log of the IP routing program.

Also, when this parameter is specified and the number of routes learned by the target VRF exceeds the maximum number of routes specified by <limit>, the addition of newly learned routes is suppressed.

warn-only

When the number of routes learned by the target VRF exceeds the specified maximum number of routes, only a warning message is output, and route addition is not suppressed.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <warn threshold>, specify a number from 1 to 100 (decimal).

Default behavior

The maximum number of IPv4 routes is not limited for the target VRF.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

However, when <warn threshold> is specified and then the <limit> value is reduced, and if the number of learned routes at that timing has already exceeded the maximum number of routes after the change of the <limit> value, the number of routes will not be immediately reduced to the <limit> value.

If you want to forcibly reduce the number of routes to the <limit> value, execute the "clear ip route [vrf <vrf id>] *" operation command.

Notes

None

Related commands

None

vrf definition

The "vrf definition" command configures VRF-related behavior information.

After this command is entered, the mode changes to config-vrf mode.

Syntax

To set information:

vrf definition {<vrf id> | global}

To delete information:

no vrf definition {<vrf id> | global}

Input mode

```
(config)
```

Parameters

{<vrf id> | global}

Sets behavior information for a VRF or the global network.

<vrf id>

Sets behavior information for the specified VRF.

global

Displays routing information for the global network.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <vrf id>, specify a VRF ID.

   For details, 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

vrf forwarding

33 Error Messages Displayed When Editing the Configuration

33.1 Error messages displayed when editing the configuration

33.1.1 IPv4, ARP, and ICMP information

Table 33-1: IPv4, ARP, and ICMP error messages

Message	Description
Can not change IP subnetmask configuration when NTP broadcast configuration has existed.	NTP broadcast information exists. Delete the NTP broadcast information, and then change the IP subnet information.
Can not delete a primary IP address when a secondary IP address is existing.	A secondary IP address exists. Delete the secondary IP address, and then delete the primary IP address.
Can not delete IP configuration referred by Virtual Router configuration.	Virtual router information exists. Delete the virtual router information, and then delete the IP information.
Can not delete IP configuration when NTP broadcast configuration has existed.	NTP broadcast information exists. Delete the NTP broadcast information, and then delete the IP information.
Can not delete IP configuration with ARP configuration.	ARP information exists. Delete the ARP information, and then delete the IP information.
Can not set a secondary IP address on an interface which does not have a primary IP address.	An attempt is being made to set a secondary IP address on an interface on which a primary IP address is not set. Set a primary IP address first.
Cannot add, change or delete VRF ID in interface which is assigned IP address.	The VRF ID of an interface for which an IP address has been set cannot be added, changed, or deleted. Delete the IP address of the interface.
Cannot assign IP address to loopback interface which does not set VRF ID.	An IP address cannot be assigned to a loopback interface for which the VRF ID is not set. Specify the VRF ID for the loopback interface.
Cannot assign IPv4 address over maximum number for this switch mode.	The maximum number of IPv4 addresses per mode was exceeded. Change the mode or reduce the number of IPv4 addresses.
Cannot change or delete VRF ID in loopback interface which is assigned IP address.	The VRF ID of a loopback interface for which an IP address has been set cannot be changed or deleted. Delete the loopback interface IP address.
Cannot change switch mode because the number of static ARP entries exceed the maximum number for this mode.	The mode cannot be changed because the number of static ARP entries that are currently set exceeds the upper limit in the new mode. Delete static ARP entries.
Cannot delete static ARP because entry assigned same IP address exists.	The static ARP entry cannot be deleted because a static ARP entry that has the same IP address exists. When a static ARP entry that has the same IP address exists, specify the static ARP entry to be deleted including the interface.

Message	Description
Cannot set static ARP entry over maximum number for this mode.	The number of static ARP entries exceeded the upper limit in the mode. Change the mode or delete static ARP entries.
Duplicate IP address.	The same IP address has been set. Make sure that all IP addresses are unique.
Duplicate network address.	The same IP address of the network address has been set. Set the IP address so that all network addresses are unique.
Duplicate VRF ID to other loopback interface.	The VRF ID already belongs to another loopback interface. Specify a unique VRF ID.
Inconsistency has occurred in a setting of IP address and ARP.	There is an inconsistency between the network addresses of an address set in the IP information and an address set in the ARP information. Specify the network addresses correctly.
IP address is duplicate between interface and static ARP entry.	An address set by using IP information and an address set by using ARP information are the same. Set the addresses that do not duplicate one another.
Maximum number of IP address are already defined.	No more IP addresses can be set. Check the network configuration again.
Maximum number of primary IP address are already defined.	No more primary IP addresses can be set. Check the network configuration again.
Relations between IP address and igmp snooping is inconsistent.	Seven or more IP addresses cannot be set because ip igmp snooping is set for the interface. Remove ip igmp snooping from the interface.
Relations between ip address and local address are inconsistent.	The relation between the IP address and the local address is inconsistent. Specify an IP address that is different from the local address.
Relations between IP address and multicast interface is inconsistent.	Seven or more IP addresses cannot be set because ip pim sparse-mode or ip igmp router is set for the interface. Remove ip pim sparse-mode or ip igmp router from the interface.
Relations between IP address and target address in VirtualRouter configuration are inconsistent.	The relation between the IP address and the virtual IP address of the virtual router is inconsistent. Check the specified address again.
Relations between peer default IP address and IP address are inconsistent.	The relation between the IP address and the destination IP address is inconsistent. Check the specified address again.
The IP address cannot be deleted because a UDP broadcast relay configuration has been set on the interface.	The IP address cannot be deleted because the UDP broadcast relay configuration is set for the interface. Remove the UDP broadcast relay configuration from the interface.

33.1.2 Policy-based routing information [SL-L3A]

Table 33-2: Policy-based routing error messages

Message	Description
Cannot change IP address because there is an inconsistency between IP address and policy based routing configuration.	The IP address cannot be changed for the following reasons: • When the IP address is changed, the changed IP address and the next hop IPv4 address that is set in the policy-based routing are not on the same network. • When the IP address is changed, the next hop IPv4 address that is set for the policy-based routing becomes the direct broadcast address of the network connecting to the specified destination interface.
Cannot change the configuration because there is an inconsistency between flow detection mode and policy based routing.	A conflict occurred between the policy-based routing setting and the flow detection mode setting. To apply policy-based routing, set the flow detection mode to any of the following modes: • layer3-6 • layer3-mirror-3 • layer3-mirror-4 • layer3-mirror-5 • layer3-suppress-2 • layer3-suppress-mirror-2 • custom
Cannot delete IP address because policy based routing is set.	The IP address cannot be deleted.
Cannot set policy based routing entry because specified interface is invalid.	Policy-based routing cannot be set for the following reasons: • The specified destination interface does not exist. • No IP address is specified for the specified destination interface. Check for the above problems, fix the problems, and then set policy-based routing.
Cannot set policy based routing entry because specified next-hop address is invalid.	The entry cannot be set because policy-based routing does not support the specified next-hop IP address. If you use IPv4 policy-based routing, for the next-hop IP address, specify an IP address that satisfies the following conditions: • The address of a network connected to the specified destination interface • Not the direct broadcast address of a network connected to the specified destination interface • Not the address set for the specified destination interface An IPv6 address cannot be specified.
Can't execute command it because data is not corresponding.	The list number specified by using the "policy-list resequence" command is not found.
The list number specified by resequence of policy base routing does not have the target route.	The list number specified by using the "policy-list resequence" command does not have the target route.
Trial count should be more than failure count.	The number of times polling is attempted for DOWN state judgment must be larger than the threshold value of the polling failure count for the state to be judged DOWN.

Message	Description
Trial count should be more than success count.	The number of times polling is attempted for UP state judgment must be larger than the threshold value of the polling success count for the state to be judged UP.

33.1.3 DHCP relay function

Table 33-3: DHCP relay error messages

Message	Description
Duplicate helper address.	The same helper address has been set. Set a different helper address.
IP interface is not defined.	An attempt is being made to set a helper address for an interface in which IP routing does not exist. Set an IP address, and then set a helper address.
Relations between relay agent address and IP address are inconsistent.	The relation between the relay agent address and the IP address of the corresponding interface is inconsistent. Make sure that the IP address is the same as the relay agent address.
The total count of IP addresses assigned to a helper address exceeds maximum capacity.	An attempt is being made to add IP addresses exceeding the maximum number to a helper address. Delete unnecessary IP addresses of the helper address, and then add a desired IP address.

33.1.4 DHCP server function

Table 33-4: DHCP server error messages

Message	Description
'<Interface Name>' is already used by other definitions.	The specified interface name has already been used by another conflicting function. Specify another interface name.
<The unique key> overlaps with other entries.	network and host/hardware-address cannot be specified at the same time in the same pool. Delete one of them, and then set the other.
Cannot delete the definition because referred to by <value 1>.	This configuration cannot be deleted because it is referred to by <value 1>. Delete the configuration that refers to this configuration, and then retry the deletion.
Exceeded the number of maximums that it was managed with IP dhcp pool.	The maximum number of managed subnets was exceeded. Revise the network configuration and the host configuration.
Host is already used.	The host which has the same IP address has already been used. Specify a different IP address.
Interface not found at '<Interface Name>'.	The interface of the specified interface name cannot be found. Specify the interface with the set interface name.
Invalid time value.	The specified time is invalid. Specify valid time.

Message	Description
It exceeded maximum number of IP-address pool.	The maximum number of IP address pools has been exceeded. Revise the network configuration and the excluded-address settings.
network conflicts.	The network is inconsistent. Check other network settings and host settings, and then enter a correct network.
The key name of the zone isn't found.	The key information name specified in the zone information cannot be found. Check the key information.

33.1.5 UDP broadcast relay information

Table 33-5: UDP broadcast relay error messages

Message	Description
A forwarding address of the UDP boradcast relay is already configured on the interface.	The forwarding destination IPv4 address of the UDP broadcast relay of the interface is duplicated. Set a different IPv4 address for each forwarding destination of the UDP broadcast relay of the interface.
A port number of the UDP broadcast relay is already configured on the interface.	The port number of the UDP broadcast relay of the interface is duplicated. Set a different number for each port number of the UDP broadcast relay of the interface.
No IP address is configured on the interface.	No IP address is set for the interface. Set the IP address of the interface.

33.1.6 Route summary (IPv4) information

Table 33-6: Route summary (IPv4) error messages

Message	Description
Inconsistent ipv4-prefix and mask. Non-masked bits should be zero.	1 is set for the unmasked bits of the specified prefix. Set 0 for the unmasked bits.

33.1.7 Static routing (IPv4) information

Table 33-7: Static routing (IPv4) error messages

Message	Description
Inconsistent ipv4-prefix and mask. Non-masked bits should be zero.	1 is set for the unmasked bits of the specified prefix. Set 0 for the unmasked bits.

33.1.8 RIP information

Table 33-8: List of RIP error messages

Message	Description
Inconsistent ipv4-prefix and wildcard. Masked bits should be zero.	1 is set for the wildcard mask bits of the specified prefix. Set 0 for the wildcard mask bits.

33.1.9 OSPF information [SL-L3A]

Table 33-9: OSPF error messages

Message	Description
area is configured as NSSA already.	The area is configured as an NSSA. Perform the setting of a stub area after deleting the NSSA by using the "no area nssa" command.
area is configured as stub area already.	The area is configured as a stub area. Perform the setting of an NSSA after deleting the stub area by using the "no area stub" command.
Domain entries configured shall not exceed 4.	Domain entries cannot be specified for the global network beyond the limit of four. Specify the existing domain number in the "router ospf" command.
Domain entries of VRF <value> configured shall not exceed 4.	Domain entries whose VRF ID is <value> cannot be specified beyond the limit of four. Specify the existing domain number in the "router ospf" command.
	<value>: VRF ID
Inconsistent ipv4-prefix and mask. Non-masked bits should be zero.	1 is set for the unmasked bits of the specified prefix. Set 0 for the unmasked bits.
Inconsistent ipv4-prefix and wildcard. Masked bits should be zero.	1 is set for the wildcard mask bits of the specified prefix. Set 0 for the wildcard mask bits.
invalid range <IPv4-Prefix>/<Mask>.	An invalid value (0.0.0.0) is specified for the network range of the area. Make sure that the <Mask> range of <IPv4-Prefix> is not 0.0.0.0.
	<IPv4-Prefix>: Specified network <Mask>: Specified mask
The source router ID and the neighbor router ID belonging to a virtual link must be different.	The source router ID and the neighboring router ID of a virtual link must be different. Specify a different value from the source router ID.

Message	Description
Virtual links can not be assigned to the NSSA.	Because an NSSA is set, the area cannot be specified as an area through which a virtual link passes. Do not specify the area as an area through which a virtual link passes.
Virtual links can not be assigned to the stub area.	Because a stub area is set, the area cannot be specified as an area through which a virtual link passes. Do not specify the area as an area through which a virtual link passes.

33.1.10 BGP4 information [SL-L3A]

Table 33-10: BGP4 error messages

Message	Description
Inconsistent ipv4-prefix and prefix-len. Non-masked bits should be zero.	1 is set for the unmasked bits of the specified prefix. Set 0 for the unmasked bits.
Invalid KeepAlive timer. Set KeepAlive smaller than HoldTime.	The sending interval for KEEPALIVE messages is larger than the hold timer. Specify a value which is smaller than the hold timer for the sending interval for KEEPALIVE messages.
Invalid mask length. The mask length specified with "le" must be equal to or longer than that of a specified prefix. The mask length specified with "ge" must not be longer than that specified with "le".	The range specification of the mask length of the "network" command is invalid. • Make sure that the mask length specified with le is equal to or longer than that of the specified prefix. • Make sure that the mask length specified with ge is equal to or shorter than that of the mask length specified with le.
Invalid Max-suppress-time. Set the Max-suppress-time greater than the Half-life.	The Max-suppress-time value is equal to or smaller than the Half-life value. Specify the Max-suppress-time value with a value which is larger than the Half-life value.
Invalid Suppress value. Set the Suppress value greater than the Reuse value.	The Suppress value is equal to or smaller than the Reuse value. Specify the Suppress value as larger than the Reuse value.
Members of a peer group must be all BGP4 or BGP4+.	BGP4 and BGP4+ cannot be set to the same peer group. Set BGP4 and BGP4+ to each different peer group.
Members of a peer group must be all internal peer or all external peer.	Internal peers and external peers cannot be set in the same group. Set internal peers and external peers in different groups.
Only one side of KeepAlive or HoldTime is being specified to 0. Set both of KeepAlive and HoldTime to 0.	Only one side of the sending interval for KEEPALIVE messages and the hold time value is specified to 0. If you specify 0, specify both of the values as 0.
Specified member AS number is the same as the AS number of confederation.	The specified member AS number is the same as the AS number of a confederation. Do not specify the AS number of a confederation for the member AS number.
Specified member AS number is the same as the self member AS number.	The specified member AS number is the same as the self member AS number. Do not specify the self member AS number for the member AS number.

Message	Description
The always-nexthop-self is being specified to external peer or peer group. The always-nexthop-self can be specified to only internal peer or peer group.	The "neighbor always-nexthop-self" command is specified for an external peer or a peer between member ASs, or a peer group of external peers and peers between member ASs. Specify the "neighbor always-nexthop-self" command for an internal peer or a peer group of internal peers.
The as-override is not supported for this peer or peer group type.	The "neighbor as-overrides" command is specified for an internal peer or the peer group of internal peers. Specify the "neighbor as-override" command for an external peer or a peer between member ASs, and the peer group of external peers or the peer group of peers between member ASs.
The ebgp-multihop is not supported for this peer or peer group type.	The "neighbor ebgp-multihop" command is specified for an internal peer or a peer group of internal peers. Specify the "neighbor ebgp-multihop" command for an external peer or a peer between member ASs, and the peer group of external peers and peers between member ASs.
The graceful-restart is not set. Specify the restart-time after set the graceful-restart.	The "bgp graceful-restart mode" command is not set. Set the "bgp graceful-restart mode" command, and then the "bgp graceful-restart restart-time" command.
The graceful-restart is not set. Specify the stalepath-time after set the graceful-restart.	The "bgp graceful-restart mode" command is not set. Set the "bgp graceful-restart mode" command, and then the "bgp graceful-restart stalepath-time" command.
The maximum-paths (all-as) must be set bgp always-compare-med.	To specify multipath by using the "maximum-paths" command with the all-as parameter, you need to set the "bgp always-compare-med" command first. To specify multipath by using the "maximum-paths" command with the all-as parameter, set the "bgp always-compare-med" command first.
The permit-asloop is not supported for this peer or peer group type.	The "neighbor permit-asloop" command is specified for an internal peer or the peer group of internal peers. Specify the "neighbor permit-asloop" command for an external peer or a peer between member ASs, and the peer group of external peers or the peer group of peers between member ASs.
The remote-as cannot be set, because it is already being set for peer or peer group.	The "neighbor remote-as" command cannot be set. It is already being set for a peer group or a peer belonging to a peer group.
The remove-private-as is not supported for this peer or peer group type.	The "neighbor remove-private-as" command is specified for an internal peer or the peer group of internal peers. Specify the "neighbor remove-private-as" command for an external peer or a peer between member ASs, and the peer group of external peers or the peer group of peers between member ASs.
The route-reflector-client is being specified to external peer or peer group. The route-reflector-client can be specified to only internal peer or peer group.	The "neighbor route-reflector-client" command is specified for an external peer or a peer between member ASs, or the peer group of external peers and peers between member ASs. Specify the "neighbor route-reflector-client" command for an internal peer or a peer group of internal peers.

33.1.11 Route filtering information

Table 33-11: Route filtering error messages

Message	Description
already configured as different type.	The specified ip community-list type is different from the type that has already been specified. Make sure that the ip community-list type matches the type that has already been specified.
Can not change permit/deny.	The permit/deny setting cannot be changed. Delete the entry, and then add the new entry.
Inconsistent ipv4-prefix and prefix-len. Non-masked bits should be zero.	1 is set for the unmasked bits of the specified prefix. Set 0 for the unmasked bits.
Inconsistent ipv6-prefix and prefix-len. Non-masked bits should be zero.	1 is set for the unmasked bits of the specified prefix. Set 0 for the unmasked bits.
Invalid mask length. The mask length specified with "ge" must not be longer than that specified with "le".	The range specification of the mask length is invalid. Make sure that the mask length specified with ge is equal to or shorter than that of the mask length specified with le.
	The range specification of the prefix length is invalid. Make sure that the prefix length specified with ge is equal to or shorter than that of the prefix length specified with le.
Invalid mask length. The mask length specified with "le" must be equal to or longer than that of a specified prefix.	The range specification of the mask length is invalid. Make sure that the mask length specified with le is equal to or longer than that of the specified prefix.
	The range specification of the prefix length is invalid. Make sure that the prefix length specified with le is equal to or longer than that of the specified prefix.
Sequence number is beyond the upper limit. Specify a sequence number.	Because the sequence number exceeds the upper limit, it cannot be omitted. Do not omit the sequence number.
Tag is specified beyond the limit of 16.	Tag values cannot be specified for match tag beyond the limit of 16. Tag values to be specified for match tag must be within 16.
the combined use of access-list and prefix-list are not permitted.	Both access-list and prefix-list cannot be specified for match ip address. Specify either access-list or prefix-list for match ip address.
	Both access-list and prefix-list cannot be specified for match ipv6 address. Specify either access-list or prefix-list for match ipv6 address.
	Both access-list and prefix-list cannot be specified for match ip route-source. Specify either access-list or prefix-list for match ip route-source.
	Both access-list and prefix-list cannot be specified for match ipv6 route-source. Specify either access-list or prefix-list for match ipv6 route-source.

Message	Description
total access-list and prefix-list configured shall not exceed 16.	access-list or prefix-list cannot be specified for match ip address beyond the limit of 16. Make sure that a total of access-list or prefix-list specified for match ip address does not exceed the limit of 16.
	access-list or prefix-list cannot be specified for match ipv6 address beyond the limit of 16. Make sure that a total of access-list or prefix-list specified for match ipv6 address does not exceed the limit of 16.
	access-list or prefix-list cannot be specified for match ip route-source beyond the limit of 16. Make sure that a total of access-list or prefix-list specified for match ip route-source does not exceed the limit of 16.
	access-list or prefix-list cannot be specified for match ipv6 route-source beyond the limit of 16. Make sure that a total of access-list or prefix-list specified for match ipv6 route-source does not exceed the limit of 16.
total interfaces specified shall not exceed 16.	Interfaces cannot be specified for match interface beyond the limit of 16. Interfaces to be specified for match interface must be within 16.
total ip as-path access-list specified shall not exceed 16.	The number of ip as-path access-list specified for match as-path exceeds the limit of 16. Make sure that the number of ip as-path access-list specified for match as-path does not exceed the limit of 16.
total ip community-list specified shall not exceed 16.	The number of ip community-list specified for match community exceeds the limit of 16. Make sure that the number of ip community-list specified for match community does not exceed the limit of 16.
total protocols specified shall not exceed 16.	Protocols cannot be specified for match protocol beyond the limit of 16. Protocols to be specified for match protocol must be within 16.
total VRF specified shall not exceed 16.	You cannot specify more than 16 VRFs for match vrf. The number of VRFs specified for match vrf must be within 16.

33.1.12 IPv4 multicast routing protocol information

Table 33-12: IPv4 multicast routing protocol error messages

Message	Description
<group list> has already been set. When set priority, specify the group-list of specification.	The group list has already been set. To set priority, specify the specified group list.
Interface not found at '<Interface Name>'.	The interface of the specified interface name cannot be found.
Relations between IP address and multicast interface is inconsistent.	ip pim sparse-mode or ip igmp router cannot be set because seven or more IP addresses are set for the interface. Reduce the number of IP addresses set for the interface to 6 or less.

Message	Description
The number of multicast interfaces exceeds the limit specified by max-interface.	The total number of multicast interfaces exceeds the configurable number of interfaces that the max-interface value defines. Review the total number of multicast interfaces so that it is within the range# of the configurable number of interfaces that the max-interface value defines.

#: The following table shows the number of interfaces on which IPv4 PIM or IGMP can be configured.

Table 33-13: Maximum number of interfaces for which IPv4 PIM/IGMP can be set

No.	Specified max-interface value	Configurable number of interfaces	
		PIM	IGMP
1	32	31	31
2	64	63	63
3	128	127	127
4	512	511	511

33.1.13 IPv6, NDP, and ICMPv6 information

Table 33-14: IPv6, NDP, and ICMPv6 error messages

Message	Description
Can not delete IP configuration referred by Virtual Router configuration.	Virtual router information exists. Delete the virtual router information, and then delete the IP information.
Can not delete IP configuration with NDP configuration.	NDP information exists. Delete the NDP information, and then delete the IP information.
Cannot add, change or delete VRF ID in interface which is assigned IPv6 address.	The VRF ID of an interface for which an IPv6 address has been set cannot be added, changed, or deleted. Delete the "ipv6 enable" and "ipv6 address" commands of the interface.
Cannot assign IPv6 address to loopback interface which does not set VRF ID.	An IPv6 address cannot be assigned to a loopback interface for which the VRF ID is not set. Specify the VRF ID for the loopback interface.
Cannot change or delete VRF ID in loopback interface which is assigned IPv6 address.	The VRF ID of a loopback interface for which an IPv6 address has been set cannot be changed or deleted. Delete the IPv6 address of the loopback interface.
Cannot delete static NDP because entry assigned same IPv6 address exists.	The static NDP entry cannot be deleted because a static NDP entry that has the same IP address exists. When a static NDP entry that has the same IP address exists, specify the static NDP entry to be deleted including the interface.
Duplicate IPv6 address.	The same IPv6 address has been set. Make sure that all IPv6 addresses are unique.

Message	Description
Duplicate prefix.	An IP address with the same prefix has been set. Make sure that prefixes are unique.
Inconsistency has occurred in a setting of IPv6 address and NDP.	There is an inconsistency between the address prefixes of an address set in the IP information and an address set in the NDP information. Specify the address prefixes correctly.
IP address is duplicate between interface and static NDP entry.	An address set by using IP information and an address set by using NDP information are the same. Set the addresses that do not duplicate one another.
Maximum number of interfaces that can use IPv6 are already defined.	No more IPv6 addresses can be set for the interface. Check the network configuration again.
Maximum number of IP address are already defined.	No more IP addresses can be set. Check the network configuration again.
Maximum number of IPv6 address are already defined.	No more IPv6 addresses can be set. Check the network configuration again.
Maximum number of linklocal address are already defined.	No more link-local addresses can be set. Check the network configuration again.
Relations between IP address and target address in VirtualRouter configuration are inconsistent.	The relation between the IP address and the virtual IP address of the virtual router is inconsistent. Check the relation with the specified address again.
Relations between IPv6 address and local address are inconsistent.	The relation between the IPv6 address and the local address is inconsistent. Specify an IPv6 address that is different from the local address.

33.1.14 RA information

Table 33-15: RA error messages

Message	Description
Inconsistent ipv6-prefix and prefix-len. Non-masked bits should be zero.	1 is set for the unmasked bits of the specified prefix. Set 0 for the unmasked bits.
The maximum value of a ra-interval(<second>) must not exceed a preferred-lifetime(<second>).	The preferred lifetime value sent by router advertisement is set to a smaller value than the maximum RA sending interval. Adjust the preferred lifetime value sent by router advertisement so that it is larger than the maximum RA sending interval.
The maximum value of a ra-interval(<second>) must not exceed a valid-lifetime(<second>).	The valid lifetime value sent by router advertisement is set to a smaller value than the maximum RA sending interval. Adjust the valid lifetime value sent by router advertisement so that it is larger than the maximum RA sending interval.
The maximum value of a ra-interval(<second>) must not exceed the period of validity of Router Advertisement(<second>).	The valid time of the default route for terminals sent by router advertisement is set to a smaller value than the maximum RA sending interval. Adjust the valid time of the default route for terminals sent by router advertisement so that it is larger than the maximum RA sending interval.

Message	Description
The minimum value of a ra-interval(<second>) must not exceed 75% of the maximum value of a ra-interval(<second>).	The minimum value of the RA sending interval exceeded 75% of the maximum value.
The number of RA DNS search-lists exceeds the permitted maximum (3).	The number of specified DNS search lists exceeds the permitted maximum number. Make sure that the number of DNS search lists is within the limit of three.
The number of RA DNS servers exceeds the permitted maximum (7).	The number of specified DNS severs exceeds the permitted maximum number. Make sure that the number of DNS severs is within the limit of seven.
Too many RA prefix on this interface (should be less than 7).	The number of specified prefixes exceeds the permitted maximum number. Make sure that the number of prefixes is within the limit of seven.

33.1.15 IPv6 DHCP relay information

Table 33-16: IPv6 DHCP relay error messages

Message	Description
Cannot change the definition because defined to by ipv6 dhcp relay destination or ipv6 dhcp relay hop-limit.	This setting cannot be changed because ipv6 dhcp relay destination or ipv6 dhcp relay hop-limit is specified. Delete ipv6 dhcp relay destination or ipv6 dhcp relay hop-limit, and then retry the change.
Duplicate IPv6 Address.	The same IPv6 address exists. Set a unique IPv6 address.
ipv6 dhcp relay destination or ipv6 dhcp relay hop-limit is specified in the interface which an IPv6 address doesn't exist in.	An attempt is being made to set ipv6 dhcp relay destination or ipv6 dhcp relay hop-limit for an interface in which no IPv6 address exist. Set an IPv6 address, and then set ipv6 dhcp relay destination or ipv6 dhcp relay hop-limit.
IPv6 DHCP server and IPv6 DHCP relay cannot be set up at the same time.	IPv6 DHCP relays cannot run simultaneously with the IPv6 DHCP server function. Set the "no service ipv6 dhcp" command to disable the IPv6 DHCP server function, and then use IPv6 DHCP relays.

33.1.16 IPv6 DHCP server function

Table 33-17: IPv6 DHCP server function error messages

Message	Description
Cannot delete the definition because referred to by <value 1>.	This configuration cannot be deleted because it is referred to by <value 1>. Delete the configuration that refers to this configuration, and then retry the deletion.
Exceeded the number of maximums of the prefix which it can be distributed to.	The maximum number of distributable prefixes was exceeded. Reduce the settings of Prefix-delegation or Prefix-delegation pool.

Message	Description
ipv6 dhcp server is specified in the interface which an IPv6 address doesn't exist in.	An attempt is being made to set ipv6 dhcp server for an interface in which no IPv6 address exist. Set an IPv6 address, and then set ipv6 dhcp server.
Ipv6 local pool not found at <Local Pool Name>.	The ipv6 local pool of the specified local pool name cannot be found. Specify the local pool name of the ipv6 local pool that has been set.
preferred-lifetime is bigger than valid-lifetime.	A value which is larger than the valid lifetime is specified for the preferred lifetime. Specify a value which is equal to or smaller than the valid lifetime for the preferred lifetime.
prefixlen is bigger than assigned length.	A value which is larger than the assigned prefix length is specified for the prefix length. Specify a value which is equal to or smaller than the assigned prefix length for the prefix length.
Same prefix is used.	The specified IPv6 prefix has already been set. Check the specified IPv6 prefix again.
The number of maximum definition of the DNS server definition is exceeded.	The maximum number of DNS server settings was exceeded. Delete unnecessary DNS server settings.
The number of maximum definition of the Domain name definition is exceeded.	The maximum number of domain name settings was exceeded. Delete unnecessary domain name settings.
The number of maximum definition of the SIP Domain name definition is exceeded.	The maximum number of SIP domain name settings was exceeded. Delete unnecessary SIP domain name settings.
The number of maximum definition of the SIP server definition is exceeded.	The maximum number of SIP server settings was exceeded. Delete unnecessary SIP server settings.
The number of maximum definition of the SNTP server definition is exceeded.	The maximum number of SNTP server settings was exceeded. Delete unnecessary SNTP server settings.

33.1.17 Route summary (IPv6) information

Table 33-18: Route summary (IPv6) error messages

Message	Description
Inconsistent ipv6-prefix and prefix-len. Non-masked bits should be zero.	1 is set for the unmasked bits of the specified prefix. Set 0 for the unmasked bits.

33.1.18 Static routing (IPv6) information

Table 33-19: Static routing (IPv6) error messages

Message	Description
Inconsistent ipv6-prefix and prefix-len. Non-masked bits should be zero.	1 is set for the unmasked bits of the specified prefix. Set 0 for the unmasked bits.

33.1.19 OSPFv3 information [SL-L3A]

Table 33-20: OSPFv3 error messages

Message	Description
Domain entries configured shall not exceed 4.	Domain entries cannot be specified for the global network beyond the limit of four. Specify the existing domain number for the "ipv6 router ospf" command.
Domain entries of VRF <value> configured shall not exceed 4.	Domain entries whose VRF ID is <value> cannot be specified beyond the limit of four. Specify the existing domain number for the "ipv6 router ospf" command.
	<value>: VRF ID
Inconsistent ipv6-prefix and prefix-len. Non-masked bits should be zero.	1 is set for the unmasked bits of the specified prefix. Set 0 for the unmasked bits.
invalid range <Prefix>/<Prefixlen>.	An invalid value (::/0) is specified for the network range of the area. Make sure that the <Prefixlen> range of <Prefix> is not ::/0.
	<Prefix>: Specified prefix <Prefixlen>: Specified prefix length
The source router ID and the neighbor router ID belonging to a virtual link must be different.	The source router ID and the neighboring router ID of a virtual link must be different. Specify a different value from the source router ID.
Virtual links can not be assigned to the stub area.	Because a stub area is set, the area cannot be specified as an area through which a virtual link passes. Do not specify the area as an area through which a virtual link passes.

33.1.20 BGP4+ information [SL-L3A]

Table 33-21: BGP4+ error messages

Message	Description
Inconsistent ipv6-prefix and prefix-len. Non-masked bits should be zero.	1 is set for the unmasked bits of the specified prefix. Set 0 for the unmasked bits.
Invalid KeepAlive timer. Set KeepAlive smaller than HoldTime.	The sending interval for KEEPALIVE messages is larger than the hold timer. Specify a value which is smaller than the hold timer for the sending interval for KEEPALIVE messages.

Message	Description
Invalid mask length. The mask length specified with "le" must be equal to or longer than that of a specified prefix. The mask length specified with "ge" must not be longer than that specified with "le".	The range specification of the mask length of the "network" command is invalid. • Make sure that the mask length specified with le is equal to or longer than that of the specified prefix. • Make sure that the mask length specified with ge is equal to or shorter than that of the mask length specified with le.
Invalid Max-suppress-time. Set the Max-suppress-time greater than the Half-life.	The Max-suppress-time value is smaller than the Half-life value. Specify the Max-suppress-time value with a value which is larger than the Half-life value.
Invalid Suppress value. Set the Suppress value greater than the Reuse value.	The Suppress value is equal to or smaller than the Reuse value. Specify the Suppress value as larger than the Reuse value.
Members of a peer group must be all BGP4 or BGP4+.	BGP4 and BGP4+ cannot be set to the same peer group. Set BGP4 and BGP4+ to each different peer group.
Members of a peer group must be all internal peer or all external peer.	Internal peers and external peers cannot be set in the same group. Set internal peers and external peers in different groups.
Only one side of KeepAlive or HoldTime is being specified to 0. Set both of KeepAlive and HoldTime to 0.	Only one side of the sending interval for KEEPALIVE messages and the hold time value is specified to 0. If you specify 0, specify both of the values as 0.
The always-nexthop-self is being specified to external peer or peer group. The always-nexthop-self can be specified to only internal peer or peer group.	The "neighbor always-nexthop-self" command is specified for an external peer or a peer between member ASs, or a peer group of external peers and peers between member ASs. Specify the "neighbor always-nexthop-self" command for an internal peer or a peer group of internal peers.
The as-override is not supported for this peer or peer group type.	The "neighbor as-overrides" command is specified for an internal peer or the peer group of internal peers. Specify the "neighbor as-override" command for an external peer or a peer between member ASs, and the peer group of external peers or the peer group of peers between member ASs.
The ebgp-multihop is not supported for this peer or peer group type.	The "neighbor ebgp-multihop" command is specified for an internal peer or a peer group of internal peers. Specify the "neighbor ebgp-multihop" command for an external peer or a peer between member ASs, and the peer group of external peers and peers between member ASs.
The maximum-paths (all-as) must be set bgp always-compare-med.	To specify multipath by using the "maximum-paths" command with the all-as parameter, you need to set the "bgp always-compare-med" command first. To specify multipath by using the "maximum-paths" command with the all-as parameter, set the "bgp always-compare-med" command first.
The peer option is link-local address, but the internal peer is not supported link-local address peering.	A link-local address is set for the peer address of the internal peer. Set a global address or site-local address for the peer address of the internal peer.

Message	Description
The permit-asloop is not supported for this peer or peer group type.	The "neighbor permit-asloop" command is specified for an internal peer or the peer group of internal peers. Specify the "neighbor permit-asloop" command for an external peer or a peer between member ASs, and the peer group of external peers or the peer group of peers between member ASs.
The remote-as cannot be set, because it is already being set for peer or peer group.	The "neighbor remote-as" command cannot be set. It is already being set for a peer group or a peer belonging to a peer group.
The remove-private-as is not supported for this peer or peer group type.	The "neighbor remove-private-as" command is specified for an internal peer or the peer group of internal peers. Specify the "neighbor remove-private-as" command for an external peer or a peer between member ASs, and the peer group of external peers or the peer group of peers between member ASs.
The route-reflector-client is being specified to external peer or peer group. The route-reflector-client can be specified to only internal peer or peer group.	The "neighbor route-reflector-client" command is specified for an external peer or a peer between member ASs, or the peer group of external peers and peers between member ASs. Specify the "neighbor route-reflector-client" command for an internal peer or the peer group of internal peers.

33.1.21 IPv6 multicast routing protocol information

Table 33-22: IPv6 multicast routing protocol information error messages

Message	Description
<group list> has already been set. When set priority, specify the group-list of specification.	The group list has already been set. To set priority, specify the specified group list.
The number of multicast interfaces exceeds the limit specified by max-interface.	The total number of multicast interfaces exceeds the configurable number of interfaces that the max-interface value defines. Review the total number of multicast interfaces so that it is within the range# of the configurable number of interfaces that the max-interface value defines.

#: The following table shows the number of interfaces on which IPv6 PIM or MLD can be configured.

Table 33-23: Maximum number of interfaces on which IPv6 PIM or MLD can be configured

No.	Specified max-interface value	Configurable number of interfaces	
		PIM	MLD
1	32	31	31
2	64	63	63
3	128	63	127

33.1.22 BFD information

Table 33-24: BFD error messages

Message	Description
The failure detection time exceeds the maximum.	The failure detection time has exceeded the maximum value. Specify a value within a range where the result of multiplying the detection multiplier by the minimum sending interval or minimum receiving interval does not exceed 300 seconds.

33.1.23 VRF information [SL-L3A]

Table 33-25: VRF error messages

Message	Description
Cannot change VRF ID, because the reference to this interface exists in other configuration.	The VRF cannot be changed because a reference to this interface exists in other configurations. Delete all references to this interface that exist in other configurations.
Cannot set <command>, because VRF ID configuration exists in specified VLAN.	<command> cannot be set because the VRF configuration exists in the specified VLAN. Delete the VRF settings.
	<command>: Configuration command
Cannot set <command>, because VRF ID configuration exists in this interface.	<command> cannot be set because the VRF configuration exists in this interface. Delete the VRF settings.
	<command>: Configuration command