AX6700S/AX6600S/AX6300S Software Manual

Configuration Command Reference Vol. 3

For Version 11.7

AX63S-S005X-C0

■ Relevant products

This manual applies to the models in the AX6700S, AX6600S, and AX6300S series of switches. It also describes the functionality of version 11.7 of the software for the AX6700S, AX6600S, and AX6300S series switches. The described functionality is that supported by the OS-S/ OS-SE basic software and optional licenses.

■ Export restrictions

In the event that any or all ALAXALA products (including technologies, programs and services) described or contained herein are controlled under any of applicable export control laws and regulations (including the Foreign Exchange and Foreign Trade Law of Japan and United States export control laws and regulations), such products shall not be exported without obtaining the required export licenses from the authorities concerned in accordance with the above laws.

■ Trademarks

Cisco is a registered trademark of Cisco Systems, Inc. in the United States and other countries.

Ethernet is a registered trademark of Xerox Corporation.

Internet Explorer is either a registered trademark or trademark of Microsoft Corporation in the United States and other countries.

IPX is a trademark of Novell, Inc.

Microsoft is either a registered trademark or trademark of Microsoft Corporation in the United States and other countries.

Octpower is a registered trademark of NEC Corporation.

sFlow is a registered trademark of InMon Corporation in the United States and other countries.

UNIX is a registered trademark of The Open Group in the United States and other countries.

VitalQIP and VitalQIP Registration Manager are trademarks of Lucent Technologies.

VLANaccessClient is a trademark of NEC Soft, Ltd.

VLANaccessController and VLANaccessAgent are trademarks of NEC Corporation.

Windows is a registered trademark of Microsoft Corporation in the United States and other countries.

Other company and product names in this document are trademarks or registered trademarks of their respective owners.

■ Reading and storing this manual

Before you use the equipment, carefully read the manual and make sure that you understand all safety precautions.

After reading the manual, keep it in a convenient place for easy reference.

■ Notes

Information in this document is subject to change without notice.

■ Editions history

January 2012 (Edition 13) AX63S-S005X-C0

■ Copyright

All Rights Reserved, Copyright(C), 2006, 2012, ALAXALA Networks, Corp.

History of Amendments

[For version 11.7]

Summary of amendments

Location and title	Changes
5 Policy-based Routing	• This chapter was added.
15 IPv4 Multicast Routing Protocol Information	• The `ip pim nonstop-forwarding` command was added.
31 Error Messages Displayed When Editing the Configuration	• The subsection *Policy-based routing information* was added.

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

[For version 11.5]

Summary of amendments

Item	Changes
IPv4, ARP, and ICMP	• The `arp discard-unresolved-packets` command was added.
IPv4 Multicast Routing Protocol Information	• The following commands were added: ip igmp router ip multicast protocol ip pim accept-bootstrap ip pim dense-mode • A description related to PIM-DM was added to the following commands: ip multicast-routing ip pim max-interface ip pim sparse-mode
Error Messages Displayed When Editing the Configuration	• A description related to IGMP interface was added to the error messages for *IPv4 multicast routing protocol information*

[For version 11.4]

Summary of amendments

Item	Changes
IPv6 DHCP Relays	• This chapter was added.
IPv6 Multicast Routing Protocol Information	• The `ipv6 pim vrf-gateway` command was added. • A description related to VRF was added to the following commands: ipv6 pim assert-metric ipv6 pim assert-preference
VRFs	• The following commands were added: ipv6 import multicast inter-vrf
Error Messages Displayed When Editing the Configuration	• The subsection *IPv6 DHCP relay information* was added.

[For version 11.3]

Content that was in the manual Configuration Command Reference Vol. 2 up to version 11.2 was moved to this manual (Configuration Command Reference Vol.3) and titles were changed.

Summary of amendments

Item	Changes
IPv6 Multicast Routing Protocol Information	• The `ipv6 pim mcache-limit` command was added. • A description related to VRF was added to the following commands: ipv6 mld group-limit (global) ipv6 mld query-interval (global) ipv6 mld source-limit (global) ipv6 mld ssm-map enable ipv6 mld ssm-map static ipv6 multicast-routing ipv6 pim bsr candidate bsr ipv6 pim bsr candidate rp ipv6 pim deletion-delay-time ipv6 pim hello-interval (global) ipv6 pim join-prune-interval (global) ipv6 pim keep-alive-time ipv6 pim mroute-limit ipv6 pim negative-cache-time ipv6 pim register-probe-time ipv6 pim rp-address ipv6 pim rp-mapping-algorithm ipv6 pim ssm

[For version 11.2]

Summary of amendments

Item	Changes
RIP	• Deletion of information was added to the `address-family ipv4` command.
OSPF	• The `point-to-point` parameter was added to the `ip ospf network` command.

Item	Changes
BGP4	• Deletion of information was added to the following commands: address-family ipv4 address-family ipv6 • A description related to VRF was added to the following commands: address-family ipv6 bgp always-compare-med bgp bestpath compare-routerid bgp client-to-client reflection bgp cluster-id bgp confederation identifier bgp confederation peers bgp dampening bgp default local-preference bgp graceful-restart mode bgp graceful-restart restart-time bgp graceful-restart stalepath-time bgp nexthop bgp router-id default-information originate default-metric disable distance bgp exit-address-family maximum-paths neighbor activate neighbor always-nexthop-self neighbor as-override neighbor description neighbor ebgp-multihop neighbor maximum-prefix neighbor next-hop-self neighbor password neighbor peer-group (assigning members) neighbor peer-group (creating) neighbor permit-asloop neighbor remote-as neighbor remove-private-as neighbor route-reflector-client neighbor send-community neighbor set-nexthop-peer neighbor shutdown neighbor soft-reconfiguration neighbor timers neighbor update-source neighbor weight network router bgp timers bgp
Route Filtering (IPv4 and IPv6)	• A description related to VRF was added to the following commands: distribute-list in (BGP4+) distribute-list out (BGP4+) distribute-list out (OSPFv3) distribute-list out (RIPng) neighbor in (BGP4+) neighbor out (BGP4+) redistribute (BGP4+) redistribute (OSPFv3) redistribute (RIPng)

Item	Changes
IPv4 Multicast Routing Protocol Information	• The `ip pim vrf-gateway` command was added.
IPv6, NDP, and ICMPv6	• The following commands were added: nd-limit vrf forwarding
Loopback Interfaces (IPv6)	• The `vrf forwarding` (loopback) command was added.
Route Aggregation (IPv6)	• A parameter related to VRF was added to the `ipv6 summary-address` command.
Static Routing (IPv6)	• A parameter related to VRF was added to the `ipv6 route` command.
RIPng	• A parameter related to VRF was added to the `ipv6 router rip` command.
OSPFv3	• The `ipv6 ospf network` command was added. • A parameter related to VRF was added to the `ipv6 router ospf` command.
VRFs	• The following commands were added: import multicast inter-vrf ipv6 import inter-vrf ipv6 maximum routes • The following parameters were added to the `vrf mode` command: axrp-enable-ipv4-ipv6 l2protocol-disable-ipv4-ipv6 gsrp-enable-ipv4-ipv6

[For version 11.1]

Summary of amendments

Item	Changes
RIP	• The `ip rip authentication key` command was added.
IPv4 Multicast Routing Protocol Information	• The `ip pim rp-mapping-algorithm` command was added.

[For version 11.0]

Summary of amendments

Item	Changes
IPv4, ARP, and ICMP	• The descriptions on *Impact on communication* of the following commands were changed: arp max-send-count arp send-interval arp timeout ip address ip local-proxy-arp ip mtu ip proxy-arp ip redirects ip source-route ip subnet-broadcast • The following commands were added: arp-limit vrf forwarding • A note related to VRF was added to the `arp` command.

Item	Changes
Loopback Interfaces (IPv4)	• A description of how to specify a loopback ID when VRF is used was added. • A note related to VRF was added to the `ip address` (loopback) command. • The `vrf forwarding` (loopback) command was added.
Route Aggregation (IPv4)	• A parameter related to VRF was added to the `ip summary-address` command.
Static Routing (IPv4)	• A parameter related to VRF was added to the `ip route` command.
RIP	• The following commands were added: address-family ipv4 vrf exit-address-family • A description related to VRF was added to the following commands: auto-summary default-metric disable distance generate-secondary-route inherit-metric metric-offset neighbor network passive-interface timers basic version
OSPF	• A parameter related to VRF was added to the `router ospf` command.

Item	Changes
BGP4	• The following commands were added: address-family ipv4 vrf neighbor as-override neighbor permit-asloop neighbor remove-private-as • A description related to VRF was added to the following commands: bgp always-compare-med bgp bestpath compare-routerid bgp client-to-client reflection bgp cluster-id bgp confederation peers bgp default local-preference bgp nexthop bgp router-id default-information originate default-metric disable distance bgp exit-address-family maximum-paths neighbor always-nexthop-self neighbor description neighbor ebgp-multihop neighbor maximum-prefix neighbor next-hop-self neighbor password neighbor peer-group (assigning members) neighbor peer-group (creating) neighbor remote-as neighbor route-reflector-client neighbor send-community neighbor set-nexthop-peer neighbor shutdown neighbor soft-reconfiguration neighbor timers neighbor update-source neighbor weight network router bgp timers bgp
Route Filtering (IPv4 and IPv6)	• The `match vrf` command was added. • A description related to VRF was added to the following commands: distribute-list in (BGP4) distribute-list in (RIP) distribute-list out (BGP4) distribute-list out (OSPF) distribute-list out (RIP) match interface match protocol neighbor in (BGP4) neighbor out (BGP4) redistribute (BGP4) redistribute (OSPF) redistribute (RIP)

Item	Changes
IPv4 Multicast Routing Protocol Information	• The `ip pim mcache-limit` command was added. • A description related to VRF was added to the following commands: ip igmp group-limit (global) ip igmp source-limit (global) ip igmp ssm-map enable ip igmp ssm-map static ip multicast-routing ip pim bsr-candidate ip pim deletion-delay-time ip pim keep-alive-time ip pim message-interval (global) ip pim mroute-limit ip pim negative-cache-time ip pim query-interval (global) ip pim register-checksum ip pim register-probe-time ip pim rp-address ip pim rp-candidate ip pim ssm
IPv6, NDP, and ICMPv6	• The descriptions on *Impact on communication* of the following commands were changed: ipv6 address ipv6 redirects
VRFs	• This chapter was added.
Error Messages Displayed When Editing the Configuration	• The subsection *VRF information* was added.

[For version 10.6]

Summary of amendments

Item	Changes
IPv4, ARP, and ICMP	• The `ip local-proxy-arp` command was added.
OSPF	• The `no-summary` and `no-redistribution` parameters were added to the `area nssa` command. • The `no-summary` parameter was added to the `area stub` command.
IPv6, NDP, and ICMPv6	• The `ipv6 source-route` command was added.
OSPFv3	• The `no-summary` parameter was added to the `area stub` command.

[For version 10.5]

Summary of amendments

Item	Changes
RIP	• The `auto-summary` command was added.
RA	• `0` was added to the specifiable values of the <*MTU*> parameter of the `ipv6 nd link-mtu` command.

[For version 10.4]

Summary of amendments

Item	Changes
BGP4	• The description of the `neighbor activate` command was changed. • The description of the `neighbor always-nexthop-self` command was changed. • The description of the `neighbor description` command was changed. • The description of the `neighbor ebgp-multihop` command was changed. • The description of the `neighbor maximum-prefix` command was changed. • The description of the `neighbor next-hop-self` command was changed. • The description of the `neighbor password` command was changed. • The `neighbor peer-group` (assigning members) command was added. • The `neighbor peer-group` (creating) command was added. • The description of the `neighbor remote-as` command was changed. • The description of the `neighbor route-reflector-client` command was changed. • The description of the `neighbor send-community` command was changed. • The description of the `neighbor set-nexthop-peer` command was changed. • The description of the `neighbor shutdown` command was changed. • The description of the `neighbor soft-reconfiguration` command was changed. • The description of the `neighbor timers` command was changed. • The description of the `neighbor update-source` command was changed. • The description of the `neighbor weight` command was changed.
Route Filtering (IPv4 and IPv6)	• The description of the `neighbor in` (BGP4) command was changed. • The description of the `neighbor in` (BGP4+) command was changed. • The description of the `neighbor out` (BGP4) command was changed. • The description of the `neighbor out` (BGP4+) command was changed.

[For version 10.3]

Summary of amendments

Item	Changes
Routing Options (IPv4)	• The `routing options graceful-restart time-limit` command was added.
OSPF	• The description of the `area authentication` command was changed. • The description of the `area default-cost` command was changed. • The description of the `area nssa` command was changed. • The description of the `area nssa translate` command was changed. • The description of the `area range` command was changed. • The description of the `area stub` command was changed. • The description of the `area virtual-link` command was changed. • The `areaid-format` command was added. • A parameter was added to the `graceful-restart mode` command. • The `graceful-restart restart-time` command was added. • The `graceful-restart strict-lsa-checking` command was added. • The description of the `ip ospf area` command was changed. • The description of the `network` command was changed.
BGP4	• The `bgp bestpath compare-routerid` command was added. • A parameter was added to the `bgp graceful-restart mode` command. • The description of the `bgp graceful-restart restart-time` command was changed. • The description of the `bgp graceful-restart stalepath-time` command was changed. • The `bgp nexthop` command was added.

Item	Changes
IPv4 Multicast Routing Protocol Information	• The `ip igmp group-limit` (global) command was added. • The `ip igmp group-limit` (interface) command was added. • The `ip igmp source-limit` (global) command was added. • The `ip igmp source-limit` (interface) command was added. • The `ip igmp static-group` command was added. • The `ip igmp version` command was added. • The `ip pim mroute-limit` command was added. • The `ip pim rate-limit cache-misshit` command was added. • The `ip pim rate-limit register-receive` command was added. • The `ip pim rate-limit register-request` command was added. • The `ip pim rate-limit wrong-incoming-interface` command was added.
IPv6, NDP, and ICMPv6	• The description of the `ipv6 address` command was changed.
OSPFv3	• The description of the `area default-cost` command was changed. • The description of the `area range` command was changed. • The description of the `area stub` command was changed. • The description of the `area virtual-link` command was changed. • The `areaid-format` command was added. • A parameter was added to the `graceful-restart mode` command. • The `graceful-restart restart-time` command was added. • The `graceful-restart strict-lsa-checking` command was added. • The description of the `ipv6 ospf area` command was changed.
IPv6 Multicast Routing Protocol Information	• The `ipv6 pim nonstop-forwarding` command was added. • The `ipv6 pim rate-limit cache-misshit` command was added. • The `ipv6 pim rate-limit register-receive` command was added. • The `ipv6 pim rate-limit register-request` command was added. • The `ipv6 pim rate-limit wrong-incoming-interface` command was added.

Preface

Applicable products and software versions

This manual applies to the models in the AX6700S, AX6600S, and AX6300S series of switches. It also describes the functionality of version 11.7 of the software for the AX6700S, AX6600S, and AX6300S series switches. The described functionality is that supported by the OS-S/OS-SE basic software and optional licenses.

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

Unless otherwise noted, this manual describes functionality applicable to AX6700S, AX6600S, and AX6300S series switches. Functionality specific to a model is indicated as follows:

[AX6700S]:

The description applies to the AX6700S series.

[AX6600S]:

The description applies to the AX6600S series.

[AX6300S]:

The description applies to the AX6300S series.

Unless otherwise noted, this manual describes functionality applicable to the basic software OS-S/OS-SE. Functionality specific to an optional license is indicated as follows:

[OP-BGP]:

The description applies to the OP-BGP optional license.

[OP-DH6R]:

The description applies to the OP-DH6R optional license.

[OP-MBSE]:

The description applies to the OP-MBSE optional license.

[OP-NPAR]:

The description applies to the OP-NPAR optional license.

[OP-VAA]:

The description applies to the OP-VAA optional license.

Corrections to the manual

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

Intended readers

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

Readers must have an understanding of the following:

- The basics of network system management

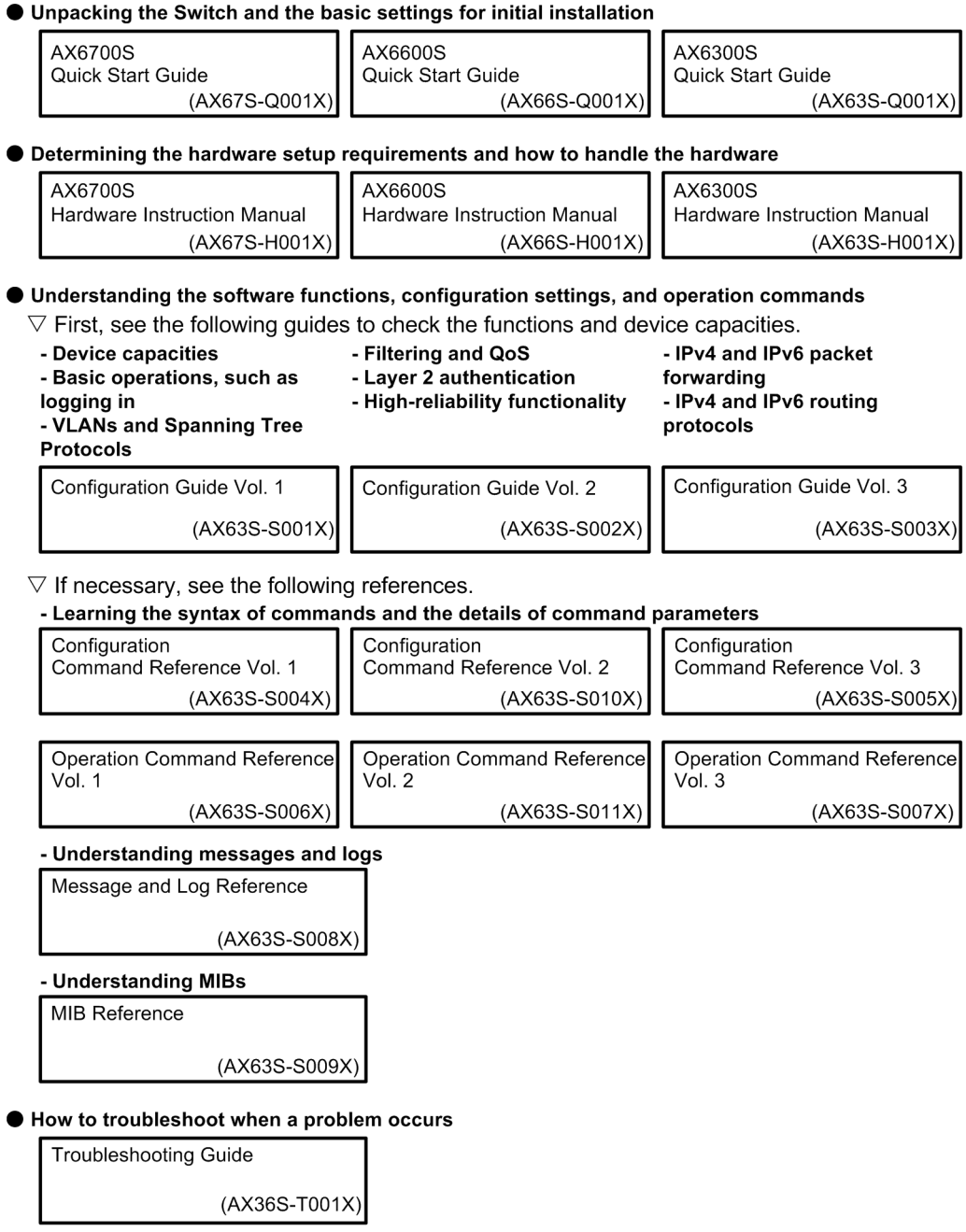
Manual URL

You can view this manual on our website at:

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

Reading sequence of the manuals

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



Conventions: The terms "Switch" and "switch"

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

AX6700S series switch

AX6600S series switch

AX6300S 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
ALG	Application Level Gateway
ANSI	American National Standards Institute
ARP	Address Resolution Protocol
AS	Autonomous System
AUX	Auxiliary
BCU	Basic Control Unit
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
BSU	Basic Switching Unit
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
CSU	Control and Switching Unit
DA	Destination Address
DC	Direct Current
DCE	Data Circuit terminating Equipment
DHCP	Dynamic Host Configuration Protocol
DIS	Draft International Standard/Designated Intermediate System
DNS	Domain Name System
DR	Designated Router
DSAP	Destination Service Access Point
DSCP	Differentiated Services Code Point
DTE	Data Terminal Equipment
DVMRP	Distance Vector Multicast Routing Protocol
E-Mail	Electronic Mail
EAP	Extensible Authentication Protocol
EAPOL	EAP Over LAN
EFM	Ethernet in the First Mile
ES	End System
FAN	Fan Unit
FCS	Frame Check Sequence
FDB	Filtering DataBase
FTTH	Fiber To The Home
GBIC	GigaBit Interface Converter
GSRP	Gigabit Switch Redundancy Protocol
HMAC	Keyed-Hashing for Message Authentication
IANA	Internet Assigned Numbers Authority
ICMP	Internet Control Message Protocol
ICMPv6	Internet Control Message Protocol version 6
ID	Identifier
IEC	International Electrotechnical Commission

IEEE	Institute of Electrical and Electronics Engineers, Inc.
IETF	the Internet Engineering Task Force
IGMP	Internet Group Management Protocol
IP	Internet Protocol
IPCP	IP Control Protocol
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6
IPV6CP	IP Version 6 Control Protocol
IPX	Internetwork Packet Exchange
ISO	International Organization for Standardization
ISP	Internet Service Provider
IST	Internal Spanning Tree
L2LD	Layer 2 Loop Detection
LAN	Local Area Network
LCP	Link Control Protocol
LED	Light Emitting Diode
LLC	Logical Link Control
LLDP	Link Layer Discovery Protocol
LLPQ	Low Latency Priority Queueing
LLQ+3WFQ	Low Latency Queueing + 3 Weighted Fair Queueing
LLRLQ	Low Latency Rate Limited Queueing
LSP	Label Switched Path
LSP	Link State PDU
LSR	Label Switched Router
MA	Maintenance Association
MAC	Media Access Control
MC	Memory Card
MD5	Message Digest 5
MDI	Medium Dependent Interface
MDI-X	Medium Dependent Interface crossover
MEP	Maintenance association End Point
MIB	Management Information Base
MIP	Maintenance domain Intermediate Point
MRU	Maximum Receive Unit
MSTI	Multiple Spanning Tree Instance
MSTP	Multiple Spanning Tree Protocol
MSU	Management and Switching Unit
MTU	Maximum Transfer Unit
NAK	Not AcKnowledge
NAS	Network Access Server
NAT	Network Address Translation
NCP	Network Control Protocol
NDP	Neighbor Discovery Protocol
NET	Network Entity Title
NIF	Network Interface
NLA ID	Next-Level Aggregation Identifier
NPDU	Network Protocol Data Unit
NSAP	Network Service Access Point
NSSA	Not So Stubby Area
NTP	Network Time Protocol
OADP	Octpower Auto Discovery Protocol
OAM	Operations, Administration, and Maintenance
OSPF	Open Shortest Path First
OUI	Organizationally Unique Identifier
packet/s	packets per second (can also appear as pps)
PAD	PADding
PAE	Port Access Entity
PC	Personal Computer
PCI	Protocol Control Information
PDU	Protocol Data Unit
PICS	Protocol Implementation Conformance Statement
PID	Protocol IDentifier
PIM	Protocol Independent Multicast
PIM-DM	Protocol Independent Multicast-Dense Mode
PIM-SM	Protocol Independent Multicast-Sparse Mode
PIM-SSM	Protocol Independent Multicast-Source Specific Multicast
PRI	Primary Rate Interface

PS	Power Supply
PSNP	Partial Sequence Numbers PDU
PSP	Packet Switching Processor
QoS	Quality of Service
RA	Router Advertisement
RADIUS	Remote Authentication Dial In User Service
RDI	Remote Defect Indication
REJ	REJect
RFC	Request For Comments
RGQ	Rate Guaranteed Queueing
RIP	Routing Information Protocol
RIPng	Routing Information Protocol next generation
RMON	Remote Network Monitoring MIB
RPF	Reverse Path Forwarding
RQ	ReQuest
RSTP	Rapid Spanning Tree Protocol
SA	Source Address
SD	Secure Digital
SDH	Synchronous Digital Hierarchy
SDU	Service Data Unit
SEL	NSAP SELector
SFD	Start Frame Delimiter
SFP	Small Form factor Pluggable
SMTP	Simple Mail Transfer Protocol
SNAP	Sub-Network Access Protocol
SNMP	Simple Network Management Protocol
SNP	Sequence Numbers PDU
SNPA	Subnetwork Point of Attachment
SOP	System Operational Panel
SPF	Shortest Path First
SSAP	Source Service Access Point
STP	Spanning Tree Protocol
TA	Terminal Adapter
TACACS+	Terminal Access Controller Access Control System Plus
TCP/IP	Transmission Control Protocol/Internet Protocol
TLA ID	Top-Level Aggregation Identifier
TLV	Type, Length, and Value
TOS	Type Of Service
TPID	Tag Protocol Identifier
TTL	Time To Live
UDLD	Uni-Directional Link Detection
UDP	User Datagram Protocol
UPC	Usage Parameter Control
UPC-RED	Usage Parameter Control - Random Early Detection
uRPF	unicast Reverse Path Forwarding
VAA	VLAN Access Agent
VLAN	Virtual LAN
VPN	Virtual Private Network
VRF	Virtual Routing and Forwarding/Virtual Routing and Forwarding Instance
VRRP	Virtual Router Redundancy Protocol
WAN	Wide Area Network
WDM	Wavelength Division Multiplexing
WFQ	Weighted Fair Queueing
WGQ	Weighted Guaranteed Queueing
WRED	Weighted Random Early Detection
WS	Work Station
WWW	World-Wide Web
XFP	10 gigabit small Form factor Pluggable

Conventions: KB, MB, GB, and TB

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

Contents

Preface i

Applicable products and software versions i
Corrections to the manual i
Intended readers i
Manual URL ii
Reading sequence of the manuals ii
Conventions: The terms "Switch" and "switch" ii
Abbreviations used in the manual iii
Conventions: KB, MB, GB, and TB v

PART 1: Reading the Manual

1. Reading the Manual 1

Command description format 2
Command mode list 3
Specifiable values for parameters 5

PART 2: Forwarding IPv4 Packets

2. IPv4, ARP, and ICMP 9

arp 10
arp discard-unresolved-packets 12
arp max-send-count 13
arp send-interval 14
arp timeout 15
arp-limit [OP-NPAR] 16
ip address 18
ip icmp rate-limit unreachable 20
ip local-proxy-arp 22
ip mtu 23
ip proxy-arp 24
ip redirects 25
ip source-route 26
ip subnet-broadcast 27
vrf forwarding [OP-NPAR] 28

3. Loopback Interface (IPv4) 29

interface loopback 30
ip address (loopback) 32
vrf forwarding (loopback) [OP-NPAR] 33

4. Null Interface (IPv4) 35

interface null 36

5. Policy-based Routing 37

default (policy-list) 38
default-state 39
disable 40

failure detection 41
interval 43
policy-interface (policy-list) 44
policy-list 46
policy-list default-aging-interval 47
policy-list default-init-interval 48
policy-list resequence 49
recover (policy-list) 51
recovery detection 52
timeout 54
track-object 55
track-object default-aging-interval 56
track-object default-init-interval 57
type icmp 58

6. DHCP Relay Functionality 61

ip bootp-hops 62
ip helper-address 63
ip relay-agent-address 64

7. DHCP Server Functionality 65

client-name 66
default-router 67
dns-server 68
domain-name 69
hardware-address 70
host 71
ip dhcp dynamic-dns-update 73
ip dhcp excluded-address 74
ip dhcp key 75
ip dhcp pool 76
ip dhcp zone 77
lease 79
max-lease 81
netbios-name-server 83
netbios-node-type 84
network 85
service dhcp 87

PART 3: IPv4 Routing Protocols

8. Routing Options (IPv4) 89

ip auto-class-route 90
routing options delete-delay 91
routing options graceful-restart time-limit 92

9. Route Aggregation (IPv4) 93

ip summary-address 94

10. Static Routing (IPv4) 97

ip route 98
ip route static maximum-paths 102
ip route static poll-interval 103
ip route static poll-multiplier 104

11. RIP 107

address-family ipv4 [OP-NPAR] 108
auto-summary 109
default-metric 110
disable 112
distance 113
exit-address-family [OP-NPAR] 114
generate-secondary-route 115
inherit-metric 116
ip rip authentication key 117
ip rip v2-broadcast 119
ip rip version 120
metric-offset 122
neighbor 124
network 126
passive-interface 128
router rip 130
timers basic 131
version 133

12. OSPF 135

area authentication 136
area default-cost 138
area nssa 140
area nssa translate 142
area range 144
area stub 146
area virtual-link 148
areaid-format 151
default-metric 152
disable 153
distance ospf 154
graceful-restart mode 156
graceful-restart restart-time 157
graceful-restart strict-lsa-checking 158
ip ospf area 159
ip ospf authentication 161
ip ospf authentication-key 162
ip ospf cost 163
ip ospf dead-interval 164
ip ospf hello-interval 165
ip ospf message-digest-key 166
ip ospf network 168
ip ospf priority 170
ip ospf retransmit-interval 171
ip ospf transmit-delay 172
max-metric router-lsa 173
maximum-paths 174
neighbor 175
network 177
passive-interface 179
router-id 181
router ospf 183
suppress-fa 184
timers spf 185

13. BGP4 [OP-BGP] 187

address-family ipv4 [OP-BGP] [OP-NPAR] 188
address-family ipv6 [OP-BGP] 189
bgp always-compare-med [OP-BGP] 190
bgp bestpath compare-routerid [OP-BGP] 191
bgp client-to-client reflection [OP-BGP] 192
bgp cluster-id [OP-BGP] 193
bgp confederation identifier [OP-BGP] 195
bgp confederation peers [OP-BGP] 196
bgp dampening [OP-BGP] 198
bgp default local-preference [OP-BGP] 200
bgp graceful-restart mode [OP-BGP] 201
bgp graceful-restart restart-time [OP-BGP] 203
bgp graceful-restart stalepath-time [OP-BGP] 205
bgp nexthop [OP-BGP] 206
bgp router-id [OP-BGP] 208
default-information originate [OP-BGP] 210
default-metric [OP-BGP] 211
disable [OP-BGP] 213
distance bgp [OP-BGP] 214
exit-address-family [OP-BGP] 216
maximum-paths [OP-BGP] 217
neighbor activate [OP-BGP] 219
neighbor always-nexthop-self [OP-BGP] 221
neighbor as-override [OP-BGP] 223
neighbor description [OP-BGP] 225
neighbor ebgp-multihop [OP-BGP] 228
neighbor maximum-prefix [OP-BGP] 231
neighbor next-hop-self [OP-BGP] 234
neighbor password [OP-BGP] 236
neighbor peer-group (assigning members) [OP-BGP] 239
neighbor peer-group (creating) [OP-BGP] 242
neighbor permit-asloop [OP-BGP] 244
neighbor remote-as [OP-BGP] 246
neighbor remove-private-as [OP-BGP] 249
neighbor route-reflector-client [OP-BGP] 251
neighbor send-community [OP-BGP] 253
neighbor set-nexthop-peer [OP-BGP] 255
neighbor shutdown [OP-BGP] 257
neighbor soft-reconfiguration [OP-BGP] 259
neighbor timers [OP-BGP] 261
neighbor update-source [OP-BGP] 264
neighbor weight [OP-BGP] 267
network [OP-BGP] 269
router bgp [OP-BGP] 272
timers bgp [OP-BGP] 274

14. Route Filtering (IPv4 and IPv6) 277

distribute-list in (BGP4) [OP-BGP] 278
distribute-list in (BGP4+) [OP-BGP] 280
distribute-list in (OSPF) 281
distribute-list in (OSPFv3) 282
distribute-list in (RIP) 283
distribute-list in (RIPng) 285
distribute-list out (BGP4) [OP-BGP] 287
distribute-list out (BGP4+) [OP-BGP] 289

distribute-list out (OSPF) 291
distribute-list out (OSPFv3) 293
distribute-list out (RIP) 294
distribute-list out (RIPng) 296
ip as-path access-list [OP-BGP] 298
ip community-list [OP-BGP] 300
ip prefix-list 302
ipv6 prefix-list 305
match as-path [OP-BGP] 308
match community [OP-BGP] 309
match interface 310
match ip address 311
match ip route-source 312
match ipv6 address 313
match ipv6 route-source 314
match origin [OP-BGP] 315
match protocol 316
match route-type 317
match tag 319
match vrf [OP-NPAR] 320
neighbor in (BGP4) [OP-BGP] 321
neighbor in (BGP4+) [OP-BGP] 323
neighbor out (BGP4) [OP-BGP] 325
neighbor out (BGP4+) [OP-BGP] 327
redistribute (BGP4) [OP-BGP] 329
redistribute (BGP4+) [OP-BGP] 331
redistribute (OSPF) 333
redistribute (OSPFv3) 335
redistribute (RIP) 337
redistribute (RIPng) 339
route-map 341
set as-path prepend count [OP-BGP] 343
set community [OP-BGP] 344
set community-delete [OP-BGP] 345
set distance 346
set local-preference [OP-BGP] 347
set metric 348
set metric-type 349
set origin [OP-BGP] 350
set tag 351

PART 4: IPv4 Multicast Routing Protocols

15. IPv4 Multicast Routing Protocol Information 353

ip igmp group-limit (global) 354
ip igmp group-limit (interface) 356
ip igmp router 357
ip igmp source-limit (global) 358
ip igmp source-limit (interface) 360
ip igmp ssm-map enable 362
ip igmp ssm-map static 363
ip igmp static-group 365
ip igmp version 366
ip multicast-routing 367
ip multicast protocol 368

ip pim accept-bootstrap [OP-MBSE] 369
ip pim bsr-candidate 370
ip pim deletion-delay-time 372
ip pim dense-mode 374
ip pim keep-alive-time 375
ip pim max-interface 377
ip pim mcache-limit 379
ip pim message-interval (global) 382
ip pim message-interval (interface) 384
ip pim mroute-limit 385
ip pim negative-cache-time 387
ip pim nonstop-forwarding 388
ip pim query-interval (global) 389
ip pim query-interval (interface) 390
ip pim rate-limit cache-misshit 391
ip pim rate-limit register-receive 392
ip pim rate-limit register-request 393
ip pim rate-limit wrong-incoming-interface 394
ip pim register-checksum 395
ip pim register-probe-time 397
ip pim rp-address 398
ip pim rp-candidate 400
ip pim rp-mapping-algorithm 402
ip pim sparse-mode 404
ip pim ssm 405
ip pim vrf-gateway [OP-NPAR] 407

PART 5: Forwarding IPv6 Packets

16. IPv6, NDP, and ICMPv6 409

ipv6 address 410
ipv6 enable 412
ipv6 icmp error-interval 413
ipv6 icmp nodeinfo-query 414
ipv6 neighbor 415
ipv6 redirects 417
ipv6 source-route 418
nd-limit [OP-NPAR] 419
vrf forwarding [OP-NPAR] 421

17. Loopback Interface (IPv6) 423

interface loopback 424
ipv6 address (loopback) 425
vrf forwarding (loopback) [OP-NPAR] 426

18. Null Interface (IPv6) 427

interface null 428

19. RA 429

ipv6 hop-limit 430
ipv6 nd link-mtu 431
ipv6 nd managed-config-flag 432
ipv6 nd no-advertise-link-address 433
ipv6 nd ns-interval 434
ipv6 nd other-config-flag 435

ipv6 nd prefix 436
ipv6 nd ra-interval 439
ipv6 nd ra-lifetime 441
ipv6 nd reachable-time 442
ipv6 nd router-preference 443
ipv6 nd suppress-ra 444

20. IPv6 DHCP relays [OP-DH6R] 445

ipv6 dhcp relay destination [OP-DH6R] 446
ipv6 dhcp relay hop-limit [OP-DH6R] 447
ipv6 dhcp relay static-route-setting [OP-DH6R] 448
service ipv6 dhcp relay [OP-DH6R] 449

21. IPv6 DHCP Server Functionality 451

dns-server 452
domain-name 453
ipv6 dhcp pool 454
ipv6 dhcp server 455
ipv6 dhcp static-route-setting 457
ipv6 local pool 458
prefix-delegation 460
prefix-delegation pool 462
service ipv6 dhcp 464
sip-domain-name 465
sip-server 466
sntp-server 467

PART 6: IPv6 Routing Protocols

22. Routing Options (IPv6) 469

Routing Options (IPv6) 470

23. Route Aggregation (IPv6) 471

ipv6 summary-address 472

24. Static Routing (IPv6) 475

ipv6 route 476
ipv6 route static maximum-paths 480
ipv6 route static poll-interval 481
ipv6 route static poll-multiplier 482

25. RIPng 485

default-metric 486
disable 487
distance 488
generate-secondary-route 489
inherit-metric 490
ipv6 rip enable 491
ipv6 rip metric-offset 492
ipv6 router rip 494
passive-interface 495
timers basic 497

26. OSPFv3 499

area default-cost 500

area range 501
area stub 503
area virtual-link 505
areaid-format 507
default-metric 508
disable 509
distance ospf 510
graceful-restart mode 512
graceful-restart restart-time 513
graceful-restart strict-lsa-checking 514
ipv6 ospf area 515
ipv6 ospf cost 517
ipv6 ospf dead-interval 518
ipv6 ospf hello-interval 519
ipv6 ospf network 520
ipv6 ospf priority 521
ipv6 ospf retransmit-interval 522
ipv6 ospf transmit-delay 523
ipv6 router ospf 524
max-metric router-lsa 525
maximum-paths 526
passive-interface 527
router-id 529
timers spf 531

27. BGP4+ [OP-BGP] 533

BGP4+ [OP-BGP] 534

28. Route Filters (IPv6) 535

Route Filters (IPv6) 536

PART 7: IPv6 Multicast Routing Protocols

29. IPv6 Multicast Routing Protocol Information 537

ipv6 mld fast-leave 538
ipv6 mld group-limit (global) 539
ipv6 mld group-limit (interface) 541
ipv6 mld query-interval (global) 542
ipv6 mld query-interval (interface) 543
ipv6 mld router 544
ipv6 mld source-limit (global) 545
ipv6 mld source-limit (interface) 547
ipv6 mld ssm-map enable 548
ipv6 mld ssm-map static 549
ipv6 mld static-group 551
ipv6 mld version 552
ipv6 multicast-routing 553
ipv6 pim 554
ipv6 pim assert-metric 555
ipv6 pim assert-preference 557
ipv6 pim bsr candidate bsr 559
ipv6 pim bsr candidate rp 561
ipv6 pim deletion-delay-time 563
ipv6 pim direct 565
ipv6 pim hello-interval (global) 566

ipv6 pim hello-interval (interface) 567
ipv6 pim join-prune-interval (global) 568
ipv6 pim join-prune-interval (interface) 569
ipv6 pim keep-alive-time 570
ipv6 pim max-interface 572
ipv6 pim mcache-limit 575
ipv6 pim mroute-limit 577
ipv6 pim negative-cache-time 579
ipv6 pim nonstop-forwarding 580
ipv6 pim rate-limit cache-misshit 581
ipv6 pim rate-limit register-receive 582
ipv6 pim rate-limit register-request 583
ipv6 pim rate-limit wrong-incoming-interface 584
ipv6 pim register-probe-time 585
ipv6 pim rp-address 586
ipv6 pim rp-mapping-algorithm 588
ipv6 pim ssm 590
ipv6 pim vrf-gateway [OP-NPAR] 592

30. VRF [OP-NPAR] 593

import inter-vrf [OP-NPAR] 594
import multicast inter-vrf [OP-NPAR] 595
ipv6 import inter-vrf [OP-NPAR] 597
ipv6 import multicast inter-vrf [OP-NPAR] 598
ipv6 maximum routes [OP-NPAR] 600
maximum routes [OP-NPAR] 602
vrf definition [OP-NPAR] 604
vrf mode [OP-NPAR] 605

PART 8: Configuration Error Messages

31. Error Messages Displayed When Editing the Configuration 607

31.1 Error messages displayed when editing the configuration 608
31.1.1 Common 608
31.1.2 IPv4, ARP, and ICMP information 608
31.1.3 Policy-based routing information 609
31.1.4 DHCP relay functionality 610
31.1.5 DHCP server functionality 610
31.1.6 Route summarization (IPv4) information 611
31.1.7 Static routing (IPv4) information 611
31.1.8 RIP information 611
31.1.9 OSPF information 612
31.1.10 BGP4 information [OP-BGP] 612
31.1.11 Route filtering information 614
31.1.12 IPv4 multicast routing protocol information 616
31.1.13 IPv6, NDP, and ICMPv6 information 616
31.1.14 RA information 618
31.1.15 IPv6 DHCP relay information [OP-DH6R] 618
31.1.16 IPv6 DHCP server functionality 619
31.1.17 Route summarization (IPv6) information 619
31.1.18 Static routing (IPv6) information 619
31.1.19 OSPFv3 information 620
31.1.20 BGP4+ information [OP-BGP] 620
31.1.21 IPv6 multicast routing protocol information 622
31.1.22 VRF information [OP-NPAR] 622

Chapter 1. Reading the Manual

Command description format
Command mode list
Specifiable values for parameters

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 switch.

Notes

Provides cautionary information on using the command.

Related commands

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

Command mode list

The following table lists the command modes.

Table 1-1: Command mode list

#	Prompt displayed for the command mode	Description	Command for mode transition
1	(config)	Global configuration mode	# enable # configure
2	(config-line)	Configures remote login and console.	(config)# line vty (config)# line console
3	(config-if)	Configures an interface.	(config)# interface
4	(config-if-range)	Configures multiple interfaces.	(config)# interface range
5	(config-vlan)	Configures VLAN.	(config)# vlan
6	(config-mst)	Configures Multiple Spanning Tree	(config)# spanning-tree mst configuration
7	(config-axrp)	Configures the Ring Protocol.	(config)# axrp
8	(config-gsrp)	Configures GSRP.	(config)# gsrp
9	(config-adv-acl)	Configures an Advance filter.	(config)# advance access-list
10	(config-ext-nacl)	Configures an IPv4 packet filter.	(config)# ip access-list extended
11	(config-std-nacl)	Configures an IPv4 address filter.	(config)# ip access-list standard
12	(config-ipv6-acl)	Configures an IPv6 filter.	(config)# ipv6 access-list
13	(config-ext-macl)	Configures a MAC filter.	(config)# mac access-list extended
14	(config-adv-qos)	Configures Advance QoS.	(config)# advance qos-flow-list
15	(config-ip-qos)	Configures IPv4 QoS.	(config)# ip qos-flow-list
16	(config-ipv6-qos)	Configures IPv6 QoS.	(config)# ipv6 qos-flow-list
17	(config-mac-qos)	Configures MAC QoS.	(config)# mac qos-flow-list
18	(dhcp-config)	Configures DHCP	(config)# ip dhcp pool
19	(config-dhcp)	Configures IPv6 DHCP (PD).	(config)# ipv6 dhcp pool
20	(config-route-map)	Configures a route map.	(config)# route-map
21	(config-rtr-rip)	Configures RIPng.	(config)# ipv6 router rip
22	(config-router)	Configures RIP.	(config)# router rip
		Configures OSPF.	(config)# router ospf
		Configures BGP4/BGP4+.	(config)# router bgp
23	(config-rtr)	Configures OSPFv3.	(config)# ipv6 router ospf
24	(config-router-af)	Configures RIP for each VRF.	(config)# router rip (config-router)# address-family ipv4 vrf
		Configures BGP4 for each VRF. (config-router-af)(ipv4 vrf) mode	(config)# router bgp (config-router)# address-family ipv4 vrf

#	Prompt displayed for the command mode	Description	Command for mode transition
		Configures BGP4+ global network. (config-router-af)(ipv6) mode	(config)# router bgp (config-router)# address-family ipv6
		Configures BGP4+ for each VRF. (config-router-af)(ipv6 vrf) mode	(config)# router bgp (config-router)# address-family ipv6 vrf
25	(config-auto-cf)	Configures auto-config.	(config)# auto-config
26	(config-netconf)	Configures netconf.	(config)# netconf.
27	(config-view)	Configures view.	(config)# parser view
28	(config-sh-nif)	Configures shaper mode.	(config)# shaper nif
29	(config-vrf)	Configures config-vrf.	(config)# vrf definition
30	(config-ether-cfm)	Configures the domain name and MA.	(config)# ethernet cfm domain
31	(config-track-object)	Configures the policy-based routing tracking functionality.	(config)# track-object
32	(config-pol)	Configures policy-based routing list information.	(config)# policy-list
33	(config-pol-sw)	Configures policy-based switching list information.	(config)# policy-switch-list

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, IPv4 subnet mask	Specify these 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
Specification of multiple interfaces	Set the information about multiple interfaces. Specifiable interfaces are gigabitethernet, tengigabitethernet, vlan, and port-channel. You can specify gigabitethernet and tengigabitethernet at the same time, but cannot specify any other interfaces at the same time. The following are the input formats: • For gigabitethernet interface range gigabitethernet <*nif no.*>/<*port no.*> [- <*port no.*>] • For tengigabitethernet interface range tengigabitethernet <*nif no.*>/<*port no.*> [- <*port no.*>] • For vlan interface range vlan <*vlan id*> [- <*vlan id*>] • For port-channel interface range port-channel <*channel group number*> [- <*channel group number*>] You can specify no more than 16 of the above input formats, separating each by a comma (,).	interface range gigabitethernet 1/1-3 interface range gigabitethernet 1/1-3, tengigabitethernet 3/1 interface range vlan 1-100
add/remove specification	Add to or delete from the information when multiple interfaces have been specified. The add specification adds information to the current information. The remove specification deletes information from the current information.	switchport trunk allowed vlan add 100200-210 switchport trunk allowed vlan remove 100200-210

Any 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
%	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 <*nif no.*> and <*port no.*> values

The following tables list the range of parameter <*nif no.*> and <*port no.*> values.

Table 1-5: Range of <*nif no.*> values

#	Model	Range of <*nif no.*> values
1	AX6708S	1 to 8
2	AX6604S	1 to 4
3	AX6608S	1 to 8
4	AX6304S	1 to 4
5	AX6308S	1 to 8

Table 1-6: Range of <*port no.*> values [AX6700S] [AX6600S]

#	NIF type name abbreviation	Range of <*port no.*> values
1	NK1G-24T	1 to 24
2	NK1G-24S	1 to 24
3	NK1GS-8M	1 to 8
4	NK10G-4RX	1 to 4
5	NK10G-8RX	1 to 8

Table 1-7: Range of <*port no.*> values [AX6300S]

#	NIF type name abbreviation	Range of <*port no.*> values
1	NH1G-16S	1 to 16
2	NH1G-24T	1 to 24
3	NH1G-24S	1 to 24
4	NH1G-48T	1 to 48
5	NH1GS-6M	1 to 6
6	NH10G-1RX	1
7	NH10G-4RX	1 to 4
8	NH10G-8RX	1 to 8

Range of values that can be set for <*channel group number*>

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

Table 1-8: Range of <*channel group number*> values

#	Model	Range of values
1	AX6304S/AX6604S	1 to 48
2	AX6308S/AX6608S/AX6708S	1 to 63

Range of values that can be set for <*vlan id*>

The following table lists the range of <*vlan id*> values.

Table 1-9: Range of <*vlan id*> values

#	Range of values
1	1 to 4095

How to specify <*vlan id list*> and the range of specifiable values

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

1-3,5,10

Example of a specification displayed in multiple lines:

switchport trunk allowed vlan 100200300...

switchport trunk allowed vlan add 400500...

How to specify <*interface id list*> and the range of specifiable values

If <*interface id list*> is written in parameter input format, use a hyphen (-) or commas (,) as delimiters to specify multiple interfaces of the type gigabitethernet or tengigabitethernet. You can also specify just one interface of the type gigabitethernet or tengigabitethernet. The following are the input formats for gigabitethernet and tengigabitethernet interfaces:

- For gigabitethernet

  gigabitethernet <*nif no.*>/<*port no.*> `[-` <*port no.*>`]`

- For tengigabitethernet

  tengigabitethernet <*nif no.*>/<*port no.*> `[-` <*port no.*>`]`

The ranges of specifiable values for <*nif no.*> and <*port no.*> in <*nif no.*>/<*port no.*> `[-` <*port no.*>`]` are the same as the ranges of <*nif no.*> and <*port no.*> values in the above tables.

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

gigabitethernet 1/1-2,gigabitethernet 1/5,tengigabitethernet 3/1

Range of values that can be set for <*vrf id*> [OP-NPAR]

The following table lists the range of <*vrf id*> values.

Table 1-10: Range of <*vrf id*> values

#	VRF operation mode	Range of values
1	Not specified	Not configurable
2	axrp-enable axrp-enable-ipv4-ipv6	2 to 64
3	l2protocol-disable l2protocol-disable-ipv4-ipv6	2 to 250
4	gsrp-enable-ipv4-ipv6	2 to 125

Chapter 2. IPv4, ARP, and ICMP

arp
arp discard-unresolved-packets
arp max-send-count
arp send-interval
arp timeout
arp-limit [OP-NPAR]
ip address
ip icmp rate-limit unreachable
ip local-proxy-arp
ip mtu
ip proxy-arp
ip redirects
ip source-route
ip subnet-broadcast
vrf forwarding [OP-NPAR]

arp

Creates a static ARP table. If a product that does not support ARP is connected, an IPv4 address cannot be converted to 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. 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 ARP entries that have the same next-hop IPv4 address. [OP-NPAR]

Related commands

None

arp discard-unresolved-packets

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)`

Parameters

<*seconds*>

Specify the period of time during which hardware discards IPv4 relay packets whose address cannot be resolved.

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 relay packets whose address cannot be resolved 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 relayed or spontaneously sent to a route that uses the relevant address.

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 address resolution 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 an 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. If this command is used in a dual configuration, some of the communications might be disrupted for more than several minutes after the system is switched even in an environment where addresses can be resolved. If this happens, execute the `clear arp-cache` operation command on the interface to remove ARP entries.

Related commands

interface vlan

arp max-send-count

Specifies the maximum number of times an ARP request frame 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)

Parameters

<*count*>

Specifies the maximum number of times an ARP request frame 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

interface vlan

arp send-interval

Specifies the retry interval for sending an ARP request frame.

Syntax

To set or change information:

arp send-interval <*seconds*>

To delete information:

no arp send-interval

Input mode

(config-if)

Parameters

<*seconds*>

Specifies the retry interval for sending an ARP request frame.

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 frame 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

interface vlan

arp timeout

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)`

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

interface vlan

arp-limit [OP-NPAR]

Configures 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 24576

Default behavior

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

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 exceeded the maximum value set by the command, a warning log 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 the command, but the capacity limit of the entire Switch has been exceeded, a warning log 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 the 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 log message also remains.
4. Even if you use the 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

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)`

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 port.

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 multi-homed interface.

This parameter cannot be set for the management port.

1. Default value when this parameter is omitted:

The primary setting is specified. Even if a multi-homed 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

None

Related commands

interface vlan

interface mgmt

ip subnet-broadcast

ip icmp rate-limit unreachable

Specifies the interval for sending an ICMP error message. You can separately specify the `df` parameter to set the interval for sending 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 interval for sending 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 interval for sending an ICMP error message for code 4.

1. Default value when this parameter is omitted:

   The interval for sending 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 interval for sending an ICMP error message for code 4 is the same as the interval for sending error messages for other codes.
- If you set only `ip icmp rate-limit unreachable df`, the interval for sending 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

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)

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 operate 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 ICMP redirection functionality.

Related commands

ip redirects

ip mtu

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)`

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 *mtu* in the manual *Configuration Command Reference Vol. 1 For Version 11.7*.

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. However, the maximum value is 9216.

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.

Related commands

interface vlan

mtu

ip proxy-arp

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)

Parameters

None

Default behavior

Proxy ARP replies are enabled.

Specify `no ip proxy-arp` to disable 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

interface vlan

ip redirects

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 state, 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)
```

Parameters

None

Default behavior

ICMP Redirect messages are sent.

Specify `no ip redirects` to disable 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

None

Related commands

interface vlan

ip source-route

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)

Parameters

None

Default behavior

IPv4 packets with the Source Route option are forwarded.

Specify `no ip source-route` to disable 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

interface vlan

ip subnet-broadcast

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 Switch. 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)`

Parameters

None

Default behavior

Forwarding of subnet broadcast IPv4 packets is enabled.

Specify `no ip subnet-broadcast` to disable 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

interface vlan

ip address

vrf forwarding [OP-NPAR]

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)`

Parameters

<*vrf id*>

Specify the 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 `ipv6 address` command.

Related commands

interface vlan

ip address

ipv6 address

ipv6 enable

Chapter

3. Loopback Interface (IPv4)

interface loopback
ip address (loopback)
vrf forwarding (loopback) [OP-NPAR]

interface loopback

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.
[OP-NPAR]

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   None

<*loopback id*> [OP-NPAR]

Specifies a loopback interface ID.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 250

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)

Specifies an IP address for a loopback interface.

Syntax

To set information:

ip address <*ip address*>

To delete information:

no ip address

Input mode

`(config-if)`

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 loopback address in this command.

Related commands

interface loopback

vrf forwarding (loopback) [OP-NPAR]

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)`

Parameters

<*vrf id*>

Specifies the 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` for the `interface loopback` command, you cannot specify a VRF ID by using this command. If you specify a value other than `0`, you need to specify the 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

interface loopback

Chapter

4. Null Interface (IPv4)

interface null

interface null

Enables 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 *3. Capacity Limit* in the manual *Configuration Guide Vol. 1 For Version 11.7*.

Related commands

ip route

ipv6 route

Chapter

5. Policy-based Routing

default (policy-list)
default-state
disable
failure detection
interval
policy-interface (policy-list)
policy-list
policy-list default-aging-interval
policy-list default-init-interval
policy-list resequence
recover (policy-list)
recovery detection
timeout
track-object
track-object default-aging-interval
track-object default-init-interval
type icmp

default (policy-list)

Sets 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

The command discards packets.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify `permit` or `deny`.

Default behavior

The command discards packets.

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

policy-list

default-state

Sets the default state 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 state for a track.

up

Sets the default state for the track to Up.

down

Sets the default state for a track to Down.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Up or Down

Default behavior

The command sets the default state for a track 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

Disables the monitoring of tracks. 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 command does not disable the monitoring of tracks.

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 tracking state 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 (`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 value of the `interval` parameter is automatically changed to 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 (`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 6 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 (policy-list)

The policy-interface command sets route 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 route information for policy-based routing, `10` is set as the initial value.

   If route 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 details about the VLAN ID, 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:

   Specifies 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 route 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 route 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 functionality 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

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 switch.

Syntax

To set or change information:

policy-list <*policy list no.*>

To delete information:

action 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 (advance access-list)

permit (ip access-list extended)

policy-interface (policy-list)

default (policy-list)

recover (policy-list)

policy-list resequence

policy-list default-aging-interval

Sets the interval over which the monitoring of the forward ability of policy-based routing is temporarily stopped during system switching in the BCU, CSU, or MSU. During the interval, the state before system switching is applied to the forwarding destination routes of policy-based routing.

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 functionality of policy-based routing.
2. While the monitoring of the forward ability is stopped, if you use this command to change the interval, monitoring restarts when the new period minus the elapsed time has passed.

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 switch 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 functionality of policy-based routing.
2. While the monitoring of the forward ability is stopped, if you use this command to change the interval, monitoring 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 (policy-list)

recover (policy-list)

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:

   Either `on` or `off` can be specified.

Default behavior

Executes switchbacks.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

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.

Related commands

policy-list

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 tracking state 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 (`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 tracks monitored by IPv4 ICMP polling.

Syntax

To set or change information:

timeout <*seconds*>

To delete information:

no timeout

Input mode

`(config-track-object)`

Parameters

<*seconds*>

Specify 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 functionality 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

Sets the interval for which the monitoring by the tracking functionality of policy-based routing is temporarily stopped during system switching in the BCU, CSU, or MSU. During the interval, the state before system switching is applied to the objects to be tracked.

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 of the forward ability is stopped 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 tracking state is switched, if you use this command to change the interval (in seconds) after performing any of the following operations, monitoring starts after the new time set for the interval ends and 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 functionality

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 functionality of policy-based routing when, for example, the switch 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 tracking state 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 functionality

Related commands

track-object default-aging-interval

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*> [OP-NPAR]

Specifies the VRF.

1. Default value when this parameter is omitted:

   Monitors the global network.

2. Range of values:

   Specify the 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 route 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 details about the tos names that can be set, see *Table 4-6 tos names that can be specified* in the manual *Configuration Command Reference Vol. 2 For Version 11.7*.

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 details about the precedence names that can be set, see *Table 4-7 precedence names that can be specified* in the manual *Configuration Command Reference Vol. 2 For Version 11.7*.

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

Chapter

6. DHCP Relay Functionality

ip bootp-hops
ip helper-address
ip relay-agent-address

ip bootp-hops

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)

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

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)`

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 set the `directed-broadcast` parameter in the `ip address` command to allow forwarding of the packets, both layer 3 forwarding and the DHCP relay agent perform forwarding when IPv4 DHCP broadcast packets addressed to the subnet on your IPv4 network are received.

Related commands

None

ip relay-agent-address

Sets the address of the relay agent interface to which a DHCP/BOOTP client connects (`giaddr`).

Syntax

To set or change information:

ip relay-agent-address <*IP Address*>

To delete information:

no ip relay-agent-address

Input mode

`(config-if)`

Parameters

<*IP Address*>

Specifies the address of the relay agent interface to which a DHCP/BOOTP client connects (`giaddr`).

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 multi-homed environment.

Related commands

None

Chapter

7. DHCP Server Functionality

client-name
default-router
dns-server
domain-name
hardware-address
host
ip dhcp dynamic-dns-update
ip dhcp excluded-address
ip dhcp key
ip dhcp pool
ip dhcp zone
lease
max-lease
netbios-name-server
netbios-node-type
network
service dhcp

client-name

Specifies the host name for a client (optional information). The host name specified by this command is used by the client when the client is assigned a static IP address by the DHCP server.

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 RFC1035.

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

Specifies a router option to distribute to a client. From this list, the server selects the IP address of the default router available for the client on the subnet and distributes it to the client.

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). Specify the router with the highest priority, starting from 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 pool.

Related commands

None

dns-server

Specifies a list of IP addresses of DNS servers for a client (optional information). From this list, the server selects the IP address of a DNS server available for the client and distributes it to the client.

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. Specify the address of the server with the highest priority first.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   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 pool.

Related commands

None

domain-name

Specifies the domain name for a client (optional information). 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 assigned 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 pool name.

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 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

None

Related commands

None

hardware-address

Specifies the MAC address of a client when a static IP address is assigned 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

Specifies the static IP address to be assigned to a 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:

   <*Mask*> or /<*Masklen*>

   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 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 IP 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

Specifies whether to link dynamic DNS when assigning 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

Specifies the range of IP addresses in the IP address pool specified by using the network command that are to be excluded from assignment.

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. The maximum number of IP addresses that can be set is 8192.
2. If the number of IP address pools exceeds the maximum number when the setting for excluded addresses is deleted, you cannot delete the setting.

Related commands

None

ip dhcp key

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

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 the commands to the sum of the maximum number of managed subnets and the maximum number of static IP addresses.

Related commands

None

ip dhcp zone

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

Specifies the default lease time for the IP address assigned 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:

   <*time day*> [<*time hour*> [<*time min*> [<*time sec*>]]] or infinite

   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 precedence.
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 pool has precedence.

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. Also, make sure the client can operate reliably if a short lease time is set.

Related commands

None

max-lease

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*>]]]

Specify 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:

   <*time day*> [<*time hour*> [<*time min*> [<*time sec*>]]] or infinite

   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 address, the maximum lease time for that pool has precedence.

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. Also, make sure the client can operate reliably if a short lease time is set.

Related commands

None

netbios-name-server

Specifies a NetBIOS name server option for a client. The NetBIOS name server option specified in this command is a list of IP addresses for NetBIOS name servers (NBNS or WINS servers) available to 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). Specify the address of the server with the highest priority first.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   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 pool.

Related commands

None

netbios-node-type

Specifies the NetBIOS node type for a client (optional information). 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:

   `b-node`, `p-node`, `m-node`, or `h-node`

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

Specifies the subnet of the network to which an IP address is dynamically assigned 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:

   <*Mask*> or /<*Masklen*>

   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 IP 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 assigned.
2. This command cannot be set together with the `host` and `hardware-address` commands in the same pool setting.
3. 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

Specifies the interface on which a DHCP server is enabled. Only the interface specified by using this command 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

interface vlan

Chapter 8. Routing Options (IPv4)

ip auto-class-route
routing options delete-delay
routing options graceful-restart time-limit

ip auto-class-route

Specifies the automatic generation of natural routes for a subnetted broadcast 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

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 functionality, or specify a value from 5 to 4294967295 in decimal (seconds).

Default behavior

The route deletion delay functionality 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

Specifies the maximum time that the Switch can retain routes after a graceful restart begins.

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 time (seconds) to retain routes.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 to 3600 in decimal

Default behavior

180 seconds is set.

Impact on communication

None

When the change is applied

The setting takes effect immediately.

Notes

None

Related commands

graceful-restart mode (OSPF)

graceful-restart restart-time (OSPF)

graceful-restart mode (OSPFv3)

graceful-restart restart-time (OSPFv3)

bgp graceful-restart mode

bgp graceful-restart restart-time

Chapter

9. Route Aggregation (IPv4)

ip summary-address

ip summary-address

Generates an IPv4 summary 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*> [OP-NPAR]

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 of the summary 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 summary route is generated.

1. Default value when this parameter is omitted:

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

2. Range of values:

   None

noinstall

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

1. Default value when this parameter is omitted:

   Summary routes are registered in the forwarding table.

2. Range of values:

   None

summary-only

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

Summary 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 whose next hop has a loopback interface or null interface cannot be used as aggregation source routes.

Related commands

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

redistribute (RIP) (OSPF) (BGP4)

neighbor out (BGP4)

Chapter

10. Static Routing (IPv4)

ip route
ip route static maximum-paths
ip route static poll-interval
ip route static poll-multiplier

ip route

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*> [OP-NPAR]

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:

   The next hop is not specified.

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*>, the following values can be specified:

   When <*Nexthop-Address*> is specified:

   - `vlan` <*vlan id*>

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

   - `mgmt 0` (Only global network routes can be specified.)

   When <*Nexthop-Address*> is not specified:

   - null 0

{vrf <*nexthop vrf id*> | global} [OP-NPAR]

Specifies that 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:

Specify `vrf` <*nexthop vrf id*> or `global`.

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

For details about the range of values for <*vrf id*>, see *Specifiable values for parameters*.

<*Distance*>

Specifies the distance 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:

   Specify `noinstall` or `reject`.

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 a VRF in which the next hop with the highest weight exists, using that next hop as a basis.

   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 100 10.1.1.0 255.255.255.0 172.16.1.1 vrf 200 weight 30
ip route vrf 100 10.1.1.0 255.255.255.0 172.16.2.1 vrf 100 weight 20
ip route vrf 100 10.1.1.0 255.255.255.0 172.16.3.1 vrf 200 weight 10
```

Related commands

ip route static poll-interval

ip route static poll-multiplier

ip route static maximum-paths

ip route static maximum-paths

Specifies the maximum number of paths (maximum number of next hops) to be generated for static route information.

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.

   Note, however, that if `ip urpf` has been set, you cannot set 9 or a greater value for <*Number*>.

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.

Notes

None

Related commands

ip route

ip route static poll-interval

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 seconds.

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

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

Chapter 11. RIP

address-family ipv4 [OP-NPAR]
auto-summary
default-metric
disable
distance
exit-address-family [OP-NPAR]
generate-secondary-route
inherit-metric
ip rip authentication key
ip rip v2-broadcast
ip rip version
metric-offset
neighbor
network
passive-interface
router rip
timers basic
version

address-family ipv4 [OP-NPAR]

Switches to `config-router-af` mode to configure 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:

   Specify the 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

Enables automatic summarization for RIP advertisement routes.

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

This functionality 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 summarization for RIP advertisement 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

Specifies the metric to be used when routing information learned by another protocol is advertised by RIP. Metrics set by the `redistribute` or `distribute-list out` command have precedence over the metric information specified by this command. This command applies to static routes, OSPF routes, and BGP4 routes.

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.

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 route: Metric 1
- OSPF route: Metric 16
- BGP4 route: 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

Disables 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:

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

Specifies the distance value for routing information learned by RIP. A distance 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 [OP-NPAR]

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

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

Specifies that the metric 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 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

Specifies the authentication method and authentication key for RIP version 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. 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)`

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:

   text or md5

<*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

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)`

Parameters

None

Default behavior

The transmission 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

Specifies the RIP version and the type of message destination IP address used for the interface. The specified value has precedence 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 11-1: RIP version and type of destination IP address

#	Value set	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)`

Parameters

{ 1 | 2 }

Specifies the version.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   1 or 2

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

Specifies the metric 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*> <*interface type*> <*interface number*> { in | out }

To delete information:

no metric-offset [<*Metric*>] <*interface type*> <*interface number*> { in | out }

Input mode

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

Parameters

<*Metric*>

Specifies a metric increment.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify 0 to 16 in decimal.

<*interface type*> <*interface number*>

Specifies the interface to which the metric will be added.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For <*interface type*> <*interface number*>, the following values can be specified:

   - `vlan` <*vlan id*>

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

   - `mgmt 0` (Only global network routes can be specified.)

{ 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:

   in or out

Default behavior

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

Specifies the neighboring router to which RIP packets are forwarded.

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 transfer operations (broadcast interface) for the `neighbor` command.

Table 11-2: Packet transfer operations (broadcast interface) for the neighbor command

#	Conditions	Operation
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.
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.

#	Conditions	Operation
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

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 11-3: Wildcard masks that are automatically generated

#	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

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 RIP packet transmission 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 | <*interface type*> <*interface number*>}

To delete information:

no passive-interface {default | <*interface type*> <*interface number*>}

Input mode

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

Parameters

{default | <*interface type*> <*interface number*>}

Specifies the interface to be prevented from sending RIP packets.

default

Prevents all interfaces from sending RIP packets.

<*interface type*> <*interface number*>

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:

   `default` or <*interface type*> <*interface number*>

   For <*interface type*> <*interface number*>, the following values can be specified:

   - `vlan` <*vlan id*>

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

   - `mgmt 0` (this can be specified only in `config-router` mode)

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 disable transmission for all interfaces

available for RIP packet transmission. In this state, if you specify the `no passive-interface` <*interface type*> <*interface number*> command, the specified interface becomes available for transmission. The following shows a configuration example.

Example 1

(1) To disable only `vlan 2` for transmission, enter the following command:

(config-router)# passive-interface vlan 2

(2) To enable `vlan 2` for transmission 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 disable all interfaces for transmission, enter the following command:

(config-router)# passive-interface default

(2) To enable only `vlan 3` for transmission 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 transmission 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

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 details about RIP packet transmission and reception, see *network*.

Related commands

network

timers basic

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.

Note:

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 largest multiple of the 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

Specifies the RIP version and the type of message destination IP address. The version specified for a specific interface has precedence 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 11-4: RIP version and type of destination IP address

#	Value set	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:

   1 or 2

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

Chapter

12. OSPF

area authentication
area default-cost
area nssa
area nssa translate
area range
area stub
area virtual-link
areaid-format
default-metric
disable
distance ospf
graceful-restart mode
graceful-restart restart-time
graceful-restart strict-lsa-checking
ip ospf area
ip ospf authentication
ip ospf authentication-key
ip ospf cost
ip ospf dead-interval
ip ospf hello-interval
ip ospf message-digest-key
ip ospf network
ip ospf priority
ip ospf retransmit-interval
ip ospf transmit-delay
max-metric router-lsa
maximum-paths
neighbor
network
passive-interface
router-id
router ospf
suppress-fa
timers spf

area authentication

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 precedence 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

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

Allows areas other than area 0 to function as NSSAs. In an NSSA, external AS routes learned by other areas are prevented 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 external AS route information (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 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 does not advertise any routes from other areas, and instead advertises the default route as inter-area route information (Type 3 LSA).

1. Default value when this parameter is omitted:

   Routes from other areas (inter-area route 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 prevented from being advertised.

1. Default value when this parameter is omitted:

   Routes learned by other protocols (external AS route information) 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

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 the 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

Specifies networks in an area. A maximum of 1024 networks can be specified.

Use this command to configure route summarization on an area boundary router. This command is useful for reducing the amount of route 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 route 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:

   Specify `advertise` or `not-advertise`.

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

Allows areas other than area 0 to function as stub areas.

In a stub area, external AS routes are prevented 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

Prevents 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 route 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

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 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*.

1. Default value when this parameter is omitted:

   MD5 is not disabled.

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.
2. Use the same MD5 transmission 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

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:

   `decimal` or `ipv4-address`

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

Specifies the metric of a route to be advertised as an external AS route. This command does not apply to directly connected routes. Metrics specified by the `redistribute` command have precedence 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.

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

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 operation stops.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

distance ospf

Sets the distance for OSPF. You can specify different distances 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.

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:

   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.

<*distance*>

Specifies a distance.

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

Specifies whether to enable graceful restart functionality for OSPF.

There is both the restart router functionality and the helper router functionality for graceful restarts. To use the restart router functionality, the helper router functionality must be enabled for all the 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 the restart functionality or helper functionality.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify `restart`, `helper`, or `both`.

   If you specify `both`, the restart functionality and helper functionality are enabled.

Default behavior

The restart router functionality and helper router functionality are disabled.

Impact on communication

None

When the change is applied

The change is applied when the next graceful restart is performed. The helper functionality is activated when a neighboring router starts a graceful restart.

Notes

1. To use the restart functionality, set the `router-id` command to specify the router ID, or set an IPv4 address for the loopback interface. If you do not specify these settings, the router ID might be changed before or after the graceful restart is started. If the router ID is changed, graceful restart fails.

Related commands

graceful-restart restart-time

graceful-restart strict-lsa-checking

routing options graceful-restart time-limit

graceful-restart restart-time

Specifies the time allowed for re-connection after restarting when the restart router functionality for graceful restart is used in 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 time allowed for graceful restart re-connection 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

60 seconds is set.

Impact on communication

None

When the change is applied

The change is applied when the next graceful restart is performed.

Notes

None

Related commands

graceful-restart mode

graceful-restart strict-lsa-checking

routing options graceful-restart time-limit

graceful-restart strict-lsa-checking

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 functionality, the restart router stops the graceful restart functionality with all helpers.

Related commands

graceful-restart mode

ip ospf area

Enables OSPF. OSPF operates 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)`

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 operate 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 precedence).

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.
5. If you specify `no router ospf` <*Domain-No*> to delete the setting, the information set by the `ip ospf area` command is also deleted if the <*Domain-No*> value is the same for both commands.

Related commands

network (router ospf)

ip address

ip ospf authentication

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)`

Parameters

{message-digest | null}

Specifies the authentication method. 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:

   Specify `message-digest` (MD5 authentication) or `null` (null authentication).

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

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)`

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 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

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)

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

Specifies the length of time that the router maintains adjacency when hello packets can no longer be received 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)`

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

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)`

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 transmission 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

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 transmission. Although you can set multiple 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)`

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 transmission 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

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)`

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:

   Specify `broadcast` or `point-to-point`.

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

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)
```

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

Specifies the re-transmission 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)

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 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

ip ospf transmit-delay

Specifies the delay time required to send an OSPF packet. Set this command if you want to perform OSPF aging correctly.

Syntax

To set or change information:

ip ospf transmit-delay <*Seconds*>

To delete information:

no ip ospf transmit-delay

Input mode

(config-if)

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

Specifies that the switch uses the maximum cost for advertisements and operates 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 operates as a stub router after startup, restart, or system switching.

1. Default value when this parameter is omitted:

   The functionality is always enabled.

2. Range of values:

   None

<*Seconds*>

Specifies the length of time that the switch operates as a stub router after startup, restart, or system switching.

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 operate as a stub router.

Impact on communication

None

When the change is applied

- The change is applied immediately after setting values are changed.
- If you specify the `on-startup` parameter, the change takes effect after the restart or system switching. Note that if the switch is 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 functionality for graceful restart is operating, graceful restart fails.

Related commands

None

maximum-paths

When multiple paths (next hops) of equal cost exist for an OSPF-generated route, this command specifies the maximum number of paths in the route.

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.

   Note, however, that if `ip urpf` has been set, you cannot set 9 or a greater value for <*Number*>.

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.

Notes

None

Related commands

None

neighbor

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 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

Specifies the network in which OSPF operates. OSPF operates 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 operates in 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 operating 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

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 | <*interface type*> <*interface number*>}

To delete information:

no passive-interface {default | <*interface type*> <*interface number*>}

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 <*interface type*> <*interface number*>

Input mode

`(config-router)`

Parameters

{default | <*interface type*> <*interface number*>}

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

default

Sets all OSPF networks as a passive interface.

<*interface type*> <*interface number*>

Specifies the interface in the OSPF network.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   `default` or <*interface type*> <*interface number*>

   For <*interface type*> <*interface number*>, the following values can be specified:

   - vlan <*vlan id*>

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

   - `mgmt 0` (This can be specified only for global network domains.)

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

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 operation starts, the router ID is automatically selected in the following order from the VRF or global network to which OSPF belongs. However, after OSPF operation is 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 during OSPF operation 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, OSFP operation starts 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 operation starts, 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

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*> [OP-NPAR]

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 operation 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

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

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

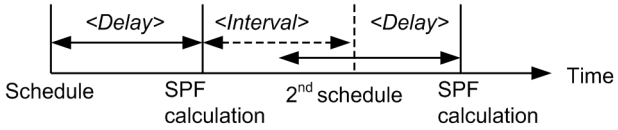
Input mode

(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

Chapter

13. BGP4 [OP-BGP]

address-family ipv4 [OP-BGP] [OP-NPAR]
address-family ipv6 [OP-BGP]
bgp always-compare-med [OP-BGP]
bgp bestpath compare-routerid [OP-BGP]
bgp client-to-client reflection [OP-BGP]
bgp cluster-id [OP-BGP]
bgp confederation identifier [OP-BGP]
bgp confederation peers [OP-BGP]
bgp dampening [OP-BGP]
bgp default local-preference [OP-BGP]
bgp graceful-restart mode [OP-BGP]
bgp graceful-restart restart-time [OP-BGP]
bgp graceful-restart stalepath-time [OP-BGP]
bgp nexthop [OP-BGP]
bgp router-id [OP-BGP]
default-information originate [OP-BGP]
default-metric [OP-BGP]
disable [OP-BGP]
distance bgp [OP-BGP]
exit-address-family [OP-BGP]
maximum-paths [OP-BGP]
neighbor activate [OP-BGP]
neighbor always-nexthop-self [OP-BGP]
neighbor as-override [OP-BGP]
neighbor description [OP-BGP]
neighbor ebgp-multihop [OP-BGP]
neighbor maximum-prefix [OP-BGP]
neighbor next-hop-self [OP-BGP]
neighbor password [OP-BGP]
neighbor peer-group (assigning members) [OP-BGP]
neighbor peer-group (creating) [OP-BGP]
neighbor permit-asloop [OP-BGP]
neighbor remote-as [OP-BGP]
neighbor remove-private-as [OP-BGP]
neighbor route-reflector-client [OP-BGP]
neighbor send-community [OP-BGP]
neighbor set-nexthop-peer [OP-BGP]
neighbor shutdown [OP-BGP]
neighbor soft-reconfiguration [OP-BGP]
neighbor timers [OP-BGP]
neighbor update-source [OP-BGP]
neighbor weight [OP-BGP]
network [OP-BGP]
router bgp [OP-BGP]
timers bgp [OP-BGP]

address-family ipv4 [OP-BGP] [OP-NPAR]

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:

   Specify the 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 [OP-BGP]

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*> [OP-NPAR]

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:

   Specify the 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 in 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 [OP-BGP]

During route selection, this allows comparison of MED values of routes received from different ASs.

If you set the command in config-router mode, the setting applies to the 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 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 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 [OP-BGP]

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 is not used regardless of the command setting.

Related commands

None

bgp client-to-client reflection [OP-BGP]

Specifies that BGP4 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 you set the command in `config-router` mode, the setting applies to the 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 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 information:

no bgp client-to-client reflection

To delete information:

bgp client-to-client reflection

Note:

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 [OP-BGP]

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 route refresh capability 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 route refresh capability 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 [OP-BGP]

Specifies the AS number of the local confederation when configuring a confederation.

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 [OP-BGP]

Specifies the member AS numbers of the ASs connected to the local member AS when configuring a confederation. 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*> [...]]

Note:

- This command can extend over multiple lines. You can specify a maximum of 25 <*As*> parameters in a command, 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 [OP-BGP]

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 you set the command in `config-router` mode, the setting applies to the BGP4 routes of the global network.

If you set the command in `config-router-af(ipv6)` mode, the setting applies to the 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

Note:

- 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:

   The initial value is 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:

   The initial value is 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:

   The initial value is 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:

   The initial value is 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 functionality 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 [OP-BGP]

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 precedence over the information set by this command.

If you set the command in config-router mode, the setting applies to the 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 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:

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 [OP-BGP]

Specifies use of the graceful restart functionality and operating mode of the graceful restart functionality. The graceful restart functionality 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

Note:

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 functionality and disables the receive router functionality.

receive

Enables the receive router functionality and disables the restart router functionality.

both

Enables both the restart router functionality and the receive router functionality.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify `restart`, `receive`, or `both`.

Default behavior

The graceful restart functionality is not negotiated for the peer.

Impact on communication

If one of the following occurs, the BGP session with the specified peer is temporarily disconnected. As a result, communication stops until the routes are relearned.

- The graceful restart functionality is enabled or disabled by this command.
- The parameter value for the graceful restart mode is changed to enable only the receive router functionality, or to change the mode that enables only the receive router functionality to another mode.

When the change is applied

The change is applied when the command is set.

Notes

1. If one of the following occurred, the BGP session with the specified peer is temporarily disconnected:
   - Graceful restart is enabled or disabled by this command.
   - The parameter value for the graceful restart mode is changed to enable only the receive router functionality, or to change the mode that enables only the receive router functionality to another mode.

Related commands

routing options graceful-restart time-limit

bgp graceful-restart restart-time

bgp graceful-restart stalepath-time

bgp graceful-restart restart-time [OP-BGP]

Specifies the maximum time that a peer will wait to be reconnected 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

Note:

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 receive router deletes the routes received from the peer.

The restart router stops monitoring of End-of-RIB reception from the 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

routing options graceful-restart time-limit

bgp graceful-restart mode

bgp graceful-restart stalepath-time

bgp graceful-restart stalepath-time [OP-BGP]

Specifies the maximum time that a peer will keep routes received before a graceful restart after the 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 stalepath-time <*Seconds*>

To delete information:

no bgp graceful-restart stalepath-time

Note:

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 a 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

routing options graceful-restart time-limit

bgp graceful-restart mode

bgp graceful-restart restart-time

bgp nexthop [OP-BGP]

Specifies the route to be used in resolving the next hop of a BGP route.

If you set the command in `config-router` mode, the setting applies to the 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 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:

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 global network are not used to resolve the next hop.

Related commands

route-map

bgp router-id [OP-BGP]

Sets the 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. BGP is disabled if the local router identifier is not set by this command, or if no IPv4 address is set for the loopback interface and the IPv4 address of the interface is not set.
2. If the IPv4 address for the loopback interface or interface IPv4 address is selected and then changed, the local router identifier does not change until the Switch or the IP unicast routing program is restarted or the `disable` 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 [OP-BGP]

Advertises the default routes redistributed from non-BGP routing protocols to all BGP peers.

If you set the command in `config-router` mode, the setting applies to the default IPv4 routes of the global network.

If you set the command in `config-router-af(ipv4 vrf)` mode, the setting applies to the default IPv4 routes of the specified VRF.

If you set the command in `config-router-af(ipv6)` mode, the setting applies to the default IPv6 routes of the global network.

If you set the command in `config-router-af(ipv6 vrf)` mode, the setting applies to the default IPv6 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 [OP-BGP]

Sets the metric (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 you set the command in `config-router` mode, the setting applies to the 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 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:

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 (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 [OP-BGP]

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 [OP-BGP]

Sets distances for the routing information learned from an external peer, internal peer, and member AS peer.

If you set the command in `config-router` mode, the setting applies to the 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 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:

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 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*>

Sets the distance 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 [OP-BGP]

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 [OP-BGP]

When multiple routing information entries of equal cost to a given destination exist, this command generates multipaths using the specified value as the maximum number of paths.

If you set the command in `config-router` mode, the setting applies to the 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 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:

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).

   Note, however, that if `ip urpf` has been set, you cannot set 9 or a greater value for <*Number*>.

{ 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:

   Specify `same-as` or `all-as`.

Default behavior

Multipaths are not generated.

Impact on communication

Load balancing is used when packets are forwarded over multiple BGP paths to the same destination generated by the command.

When the change is applied

The change is applied when the command is set.

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 [OP-BGP]

Enables an exchange of routes between an IPv6 address family and peers.

This command applies only to BGP4+.

If you set the command in `config-router-af(ipv6)` mode, the setting applies to BGP4+ 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]

Note:

`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 [OP-BGP]

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 you set the command in `config-router` mode, the setting applies to the 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 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 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]

Note:

`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 is 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.
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 [OP-BGP]

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 you set the command in config-router mode, the setting applies to the 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 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 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]

Note:

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 description [OP-BGP]

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 or 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]

Note:

`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*>} [OP-NPAR]

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*>} [OP-NPAR]

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 *Any 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 [OP-BGP]

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 or 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]

Note:

`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*>} [OP-NPAR]

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*>} [OP-NPAR]

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 [OP-BGP]

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 you set the command in `config-router` mode, the setting applies to the 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 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:

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]

Note:

`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.

Note:

- 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 for output of a warning message for the maximum number of routes that can be learned from a BGP peer. If you specify 100%, a warning 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+) 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 [OP-BGP]

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 you set the command in `config-router` mode, the setting applies to the 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 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 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]

Note:

`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, 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 [OP-BGP]

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 or 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]

Note:

`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*>} [OP-NPAR]

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*>} [OP-NPAR]

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 *Any 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) [OP-BGP]

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 or 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]

Note:

`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> [OP-NPAR]

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> [OP-NPAR]

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 identifier 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 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 identifier can be set for the peers of the global network and peers of VRF, or peers in different VRFs. In this case, the peers of the global network and peers of 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: `clear ip bgp [vrf {<`*vrf id*`> | all}] * {both| in | out}` command for BGP4 or `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) [OP-BGP]

Configures 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 or 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]

Note:

`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 configured.

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 identifier 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 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 identifier can be set for the peers of the global network and peers of VRF, or peers in different VRFs. In this case, the peers of the global network and peers of VRF, or the peers of different VRFs, are handled as different peer groups.

Related commands

neighbor peer-group (assigning members)

neighbor permit-asloop [OP-BGP]

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 you set the command in config-router mode, the setting applies to the 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 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 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]

Note:

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 [OP-BGP]

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 or 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]

Note:

`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*>} [OP-NPAR]

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*>} [OP-NPAR]

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. Before you enter this command, use the `bgp router-id` command to set the local router identifier or set an IPv4 address for the loopback interface.

   If neither is set, this command cannot be set.

2. 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. This command must be set for either a peer that belongs to a peer group or the peer group.

3. Notes on deleting information
   - If you delete the information set by this command for a peer, all `neighbor` command settings for the peer are deleted.
   - If you delete the information set by this command for a peer group, all `neighbor` command settings for the peers that belong to the peer group are deleted.
4. 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 [OP-BGP]

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 you set the command in `config-router` mode, the setting applies to the 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 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 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

Note:

`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 [OP-BGP]

Specifies the route reflector client. This command also specifies that the local router is to operate as a route reflector.

If you set the command in `config-router` mode, the setting applies to the 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 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 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]

Note:

`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 [OP-BGP]

Specifies that the COMMUNITIES attribute is to be sent if it is added to the BGP routing information that is to be advertised.

If you set the command in config-router mode, the setting applies to the 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 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 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]

Note:

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 [OP-BGP]

Specifies that the next hop of the received routing information is to be changed to the remote IP address used for peering.

If you set the command in `config-router` mode, the setting applies to the 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 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 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]

Note:

`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 [OP-BGP]

Disables a peer connection.

If you set the command in `config-router` mode, the setting applies to BGP4 or 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]

Note:

`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*>} [OP-NPAR]

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*>} [OP-NPAR]

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 disabled.

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 [OP-BGP]

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 you set the command in `config-router` mode, the setting applies to the 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 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 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]

Note:

`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:

   inbound

Default behavior

The routes suppressed by the input policy are not stored.

Impact on communication

If route refresh capability 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 route refresh capability 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 [OP-BGP]

Sets the KEEPALIVE message transmission interval and hold timer value for BGP peers.

If you set the command in config-router mode, the setting applies to BGP4 or 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]

Note:

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*>} [OP-NPAR]

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*>} [OP-NPAR]

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 transmission 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 KEEPALIVE message transmission interval to be used depends on the negotiation result of the hold timer value when the BGP4 or BGP4+ session is established as described below.

   - 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 transmission 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, 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 change the <*Holdtime*> or <*Keepalive*> value, the BGP session with the specified 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 update-source [OP-BGP]

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 or 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]

Note:

`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*>} [OP-NPAR]

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*>} [OP-NPAR]

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*>, the following values can be specified:

- vlan <*vlan id*>

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

- `loopback 0` (for `config-router` mode)

- loopback <*loopback id*> (for `config-router-af(ipv4 vrf)` mode or `config-router-af(ipv6 vrf)` mode) [OP-NPAR]

For <*loopback id*>, specify the loopback interface ID set by the `interface loopback` command.

- `mgmt 0` (Global network peers can only be specified.)

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 [OP-BGP]

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 you set the command in `config-router` mode, the setting applies to the 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 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:

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]

Note:

`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 [OP-BGP]

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 you set the command in `config-router` mode, the setting applies to the 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 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.

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 BGP4 route and bound for the same destination as the BGP4 route is advertised to that router, a routing loop might occur.

Related commands

route-map

router bgp [OP-BGP]

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 [OP-BGP]

Sets the KEEPALIVE message transmission interval and hold timer value for all BGP peers.

However, if the neighbor timers command has been set, the KEEPALIVE message transmission interval and hold timer value set by the neighbor timers command have precedence.

If you set the command in config-router mode, the setting applies to BGP4 or 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 transmission 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 KEEPALIVE message transmission interval to be used depends on the negotiation result of the hold timer value when the BGP4 or BGP4+ session is established as described below.

   - 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, 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.
2. If you use this command to change the <*Holdtime*> or <*Keepalive*> value, BGP sessions with all peers are temporarily disconnected.

Related commands

neighbor timers

Chapter

14. Route Filtering (IPv4 and IPv6)

distribute-list in (BGP4) [OP-BGP]
distribute-list in (BGP4+) [OP-BGP]
distribute-list in (OSPF)
distribute-list in (OSPFv3)
distribute-list in (RIP)
distribute-list in (RIPng)
distribute-list out (BGP4) [OP-BGP]
distribute-list out (BGP4+) [OP-BGP]
distribute-list out (OSPF)
distribute-list out (OSPFv3)
distribute-list out (RIP)
distribute-list out (RIPng)
ip as-path access-list [OP-BGP]
ip community-list [OP-BGP]
ip prefix-list
ipv6 prefix-list
match as-path [OP-BGP]
match community [OP-BGP]
match interface
match ip address
match ip route-source
match ipv6 address
match ipv6 route-source
match origin [OP-BGP]
match protocol
match route-type
match tag
match vrf [OP-NPAR]
neighbor in (BGP4) [OP-BGP]
neighbor in (BGP4+) [OP-BGP]
neighbor out (BGP4) [OP-BGP]
neighbor out (BGP4+) [OP-BGP]
redistribute (BGP4) [OP-BGP]
redistribute (BGP4+) [OP-BGP]
redistribute (OSPF)
redistribute (OSPFv3)
redistribute (RIP)
redistribute (RIPng)
route-map
set as-path prepend count [OP-BGP]
set community [OP-BGP]
set community-delete [OP-BGP]
set distance
set local-preference [OP-BGP]
set metric
set metric-type
set origin [OP-BGP]
set tag

distribute-list in (BGP4) [OP-BGP]

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+) [OP-BGP]

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)

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)

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)

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 [<*interface type*> <*interface number*>]

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 [<*interface type*> <*interface number*>]

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.

<*interface type*> <*interface number*>

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:

   Specify as follows in <*interface type*> <*interface number*> format:

   - vlan <*vlan id*>

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

   - `mgmt 0` (this can be specified only in `config-router` mode)

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)

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 [<*interface type*> <*interface number*>]

To delete information:

no distribute-list [{prefix-list <*prefix list*> | route-map <*route map*>}] in [<*interface type*> <*interface number*>]

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*.

<*interface type*> <*interface number*>

Specifies the learning source interface.

1. Default value when this parameter is omitted:

   Routes are not filtered by the interface.

2. Range of values:

   Specify as follows in <*interface type*> <*interface number*> format:

   - vlan <*vlan id*>

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

   - `mgmt 0` (this can be specified only in `config-rtr-rip` mode for the global network)

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) [OP-BGP]

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+) [OP-BGP]

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)

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)

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)

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 [{<*interface type*> <*interface number*> | <*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 [{<*interface type*> <*interface number*> | <*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*.

<*interface type*> <*interface number*>

Specifies the learning source interface.

1. Default value when this parameter is omitted:

   Routes are not filtered by the interface.

2. Range of values:

   Specify as follows in <*interface type*> <*interface number*> format:

   - vlan <*vlan id*>

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

   - `mgmt 0` (this can be specified only in `config-router` mode)

<*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)

Filters which RIPng routes are advertised.

Syntax

To set or change information:

distribute-list {prefix-list <*prefix list*> | route-map <*route map*>} out [{<*interface type*> <*interface number*> | <*Protocol*>}]

To delete information:

no distribute-list [{prefix-list <*prefix list*> | route-map <*route map*>}] out [{<*interface type*> <*interface number*> | <*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*.

<*interface type*> <*interface number*>

Specifies the learning source interface.

1. Default value when this parameter is omitted:

   Routes are not filtered by the interface.

2. Range of values:

   Specify as follows in <*interface type*> <*interface number*> format:

   - vlan <*vlan id*>

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

   - `mgmt 0` (this can be specified only in `config-rtr-rip` mode for the global network)

<*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 [OP-BGP]

Configures an access-list that operates as an AS_PATH filter for BGP4 and BGP4+. The access-list operating 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:

   Specify permit or deny.

<*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 details about how to specify the regular expression, see *13.1.2(3)(d) Regular expressions* in the manual *Configuration Guide Vol. 3 For Version 11.7*.

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 [OP-BGP]

Configures a community-list that operates as a Community filter for BGP4 and BGP4+. A community-list operating 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:

   Specify `permit` or `deny`.

{<*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:

   Specify <*Community*>, <*AA*>`:`<*NN*>, `local-AS`, `no-advertise`, or `no-export`.

   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 details about how to specify the regular expression, see *13.1.2(3)(d) Regular expressions* in the manual *Configuration Guide Vol. 3 For Version 11.7*.

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

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 *Any 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:

   Specify `permit` or `deny`.

<*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*> [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

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 *Any 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:

   Specify `permit` or `deny`.

<*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 [OP-BGP]

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 [OP-BGP]

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

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:

   Specify as follows in <*interface type*> <*interface number*> format:

   - vlan <*vlan id*>

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

   - loopback 0

   - loopback <*loopback id*> [OP-NPAR]

     For <*loopback id*>, specify the loopback interface ID set by the `interface loopback` command.

   - mgmt `0`

   - null 0

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

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 commands permits access for any IPv6 address prefix.

Related commands

access-list

ip access-list

prefix-list

match ip route-source

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 commands permits access for any source IPv6 address.

Related commands

access-list

ip access-list

ip prefix-list

match ipv6 address

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 commands permits access for any IPv4 address prefix.

Related commands

ipv6 access-list

ipv6 prefix-list

match ipv6 route-source

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 commands permits access for any source IPv4 address.

Related commands

ipv6 access-list

ipv6 prefix-list

match origin [OP-BGP]

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:

   Specify igp, egp, or incomplete.

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

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

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.

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:

   Specify `local`, `internal`, `external`, `external type-1`, `external type-2`, `nssa-external`, `nssa-external type-1`, or `nssa-external type-2`.

   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.

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

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 [OP-NPAR]

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 filter conditions.

global

The global route is used as filter conditions.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify `global` or <*vrf id*>.

   Specify a VRF ID for <*vrf id*>.

   For details, see *Specifiable values for parameters*.

Default behavior

A VRF 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

neighbor in (BGP4) [OP-BGP]

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]

Note:

`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+) [OP-BGP]

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]

Note:

`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) [OP-BGP]

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*>]]

Note:

`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+) [OP-BGP]

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*>]]

Note:

`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) [OP-BGP]

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 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+) [OP-BGP]

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 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)

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 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 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:

Specify 1 or 2.

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)

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 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 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:

Specify 1 or 2.

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)

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 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)

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 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

Configures route-map. Route-map allows 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.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify `permit` or `deny`. If an entry for the entered <*Id*> value already exists, the parameter value is overwritten.

<*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 [OP-BGP]

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 [OP-BGP]

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:

   Specify <*Community*> [...] [additive] or none.

   <*Community*> := {0-4294967295 (decimal) | <*0-65535*>:<*0-65535*> (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 [OP-BGP]

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*> := {* | 0-4294967295 | {<*0-65535*>|*}:{<*0-65535*>|*} | 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

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 [OP-BGP]

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

Assigns 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 to be set for the routing information.

With {+ | -} specified, specifies the metric 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 for the learning source protocol.

   If you specify -, the <*Metric*> value is subtracted from the metric for the learning source protocol.

Default behavior

The metric 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 for the last result is reduced to the upper or lower limit by each protocol.

Related commands

None

set metric-type

Sets the metric type or metric 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.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify `internal`, `type-1`, or `type-2`.

   Specify `internal` to use the metric 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.

Default behavior

The metric type and metric 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 [OP-BGP]

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:

   Specify igp, egp, or incomplete.

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

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:

   Set 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

Chapter

15. IPv4 Multicast Routing Protocol Information

ip igmp group-limit (global)
ip igmp group-limit (interface)
ip igmp router
ip igmp source-limit (global)
ip igmp source-limit (interface)
ip igmp ssm-map enable
ip igmp ssm-map static
ip igmp static-group
ip igmp version
ip multicast-routing
ip multicast protocol
ip pim accept-bootstrap [OP-MBSE]
ip pim bsr-candidate
ip pim deletion-delay-time
ip pim dense-mode
ip pim keep-alive-time
ip pim max-interface
ip pim mcache-limit
ip pim message-interval (global)
ip pim message-interval (interface)
ip pim mroute-limit
ip pim negative-cache-time
ip pim nonstop-forwarding
ip pim query-interval (global)
ip pim query-interval (interface)
ip pim rate-limit cache-misshit
ip pim rate-limit register-receive
ip pim rate-limit register-request
ip pim rate-limit wrong-incoming-interface
ip pim register-checksum
ip pim register-probe-time
ip pim rp-address
ip pim rp-candidate
ip pim rp-mapping-algorithm
ip pim sparse-mode
ip pim ssm
ip pim vrf-gateway [OP-NPAR]

ip igmp group-limit (global)

Specifies the maximum number of groups that can run per interface.

For an interface for which the `ip igmp group-limit (interface)` command is also specified, the specification of the `ip igmp group-limit (interface)` command has higher priority.

Syntax

To set or change information:

ip igmp [vrf <*vrf id*>] group-limit <*number*>

To delete information:

no ip igmp [vrf <*vrf id*>] group-limit

Input mode

`(config)`

Parameters

vrf <*vrf id*> [OP-NPAR]

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 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

In group participation, there is no limit on the maximum number of groups that can run per interface. However, you must operate within the described capacity limits.

For details of capacity limit, see *3. Capacity Limit* in the manual *Configuration Guide Vol. 1 For Version 11.7*.

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 that can be used per interface, but do not guarantee operation with the specified value.

2. If a change in configuration would cause the current number of managed group 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 group-limit (interface)

Specifies the maximum number of groups that can run on the corresponding interface.

Syntax

To set or change information:

ip igmp group-limit <*number*>

To delete information:

no ip igmp group-limit

Input mode

(config-if)

Parameters

<*number*>

Specifies the maximum number of groups that can run on the corresponding interface.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 256

Default behavior

The value that is specified by the `ip igmp group-limit (global)` command is applied as the maximum number of groups that can run on the corresponding interface. If no value is specified, there is no limit on group participation. However, you must operate within the described capacity limits.

For details on capacity limits, see *3. Capacity Limit* in the manual *Configuration Guide Vol. 1 For Version 11.7*.

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 that can be used per interface, but do not guarantee operation with the specified value.
2. 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, 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 router

Runs IGMP on the specified interface.

This command is valid when PIM-SM/SSM is used.

Syntax

To set information:

ip igmp router

To delete information:

no ip igmp router

Input mode

(config-if)

Parameters

None

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

1. IGMP runs on interfaces on which the `ip pim sparse-mode` command is set, even if this command is not set.

Related commands

ip pim max-interface

ip pim sparse-mode

ip igmp source-limit (global)

Specifies the maximum total number of sources belonging to all groups that can run per interface.

For an interface for which the `ip igmp source-limit (interface)` command is specified, the specification of the `ip igmp source -limit (interface)` command has higher priority.

Syntax

To set or change information:

ip igmp [vrf <*vrf id*>] source-limit <*number*>

To delete information:

no ip igmp [vrf <*vrf id*>] source-limit

Input mode

`(config)`

Parameters

vrf <*vrf id*> [OP-NPAR]

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 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.

For details on capacity limits, see *3. Capacity Limit* in the manual *Configuration Guide Vol. 1 For Version 11.7*.

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 that can be joined per interface, but do not guarantee the operation 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, (if other sources then join the managed group), sources that have left the managed group cannot rejoin it 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 linkage operation 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 source-limit (interface)

Specifies the maximum number of the total of sources belonging to all groups that can run on the corresponding interface.

Syntax

To set or change information:

ip igmp source-limit <*number*>

To delete information:

no ip igmp source-limit

Input mode

`(config-if)`

Parameters

<*number*>

Specifies the maximum number of the total of sources belonging to all groups that can run on the corresponding interface.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 256

Default behavior

The value that is specified by the `ip igmp source-limit (global)` command is applied. If no value is specified, there is no limit on source participation in groups. However, you must operate multicast routing entries within the described capacity limits.

For details on capacity limits, see *3. Capacity Limit* in the manual *Configuration Guide Vol. 1 For Version 11.7*.

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 that can be joined per interface, but do not guarantee the operation 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, (if other sources then join the managed group), sources that have left the managed group cannot rejoin it 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 linkage operation 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

Enables the use of PIM-SSM in IGMPv1 or IGMPv2.

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*> [OP-NPAR]

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

Sets the source address for the group address for which PIM-SSM is operated in IGMPv1 and IGMPv2.

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*> [OP-NPAR]

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 (IP 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 (IP 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 (IP 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 the following commands 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

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)`

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:

   Specifies 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

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)

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 15-1: List of IGMP interface versions

Specified value of this parameter	IGMP version	IGMP operating 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:

   The value is 2 or 3. If 3 is specified, "only" can be specified.

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

Enables the IP multicast functionality (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*> [OP-NPAR]

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 IP multicast functionality on the Switch, this setting is required.
2. If you use the PIM-SM/SSM functionality for IPv4 multicast on the Switch, you must also specify the PIM-SM/SSM (`ip pim sparse-mode` command) setting for one or more interfaces for the global network or each VRF.
3. If you use the PIM-DM functionality for IPv4 multicast on the Switch, you must also specify the PIM-DM (`ip pim dense-mode` command) setting for one or more interfaces for the global network.

Related commands

ip multicast protocol

ip multicast protocol

Specifies the protocol to be used for IPv4 multicast.

Syntax

To set or change information:

ip multicast protocol {pim-sm | pim-dm}

To delete information:

no ip multicast protocol

Input mode

(config)

Parameters

{pim-sm | pim-dm}

Specifies the protocol to be used for IPv4 multicast.

If pim-sm is specified, PIM-SM/SSM protocol can be used in the global network and all VRFs of the Switch.

If pim-dm is specified, PIM-DM protocol can be used only for the global network of the Switch.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   pim-sm or pim dm

Default behavior

The PIM-SM/SSM protocol can be used for the global network and all VRFs in IPv4 multicast.

Impact on communication

When the protocol is switched between PIM-SM/SSM and the PIM-DM protocol, multicast communication stops temporarily.

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

1. When the protocol is switched between PIM-SM/SSM and the PIM-DM protocol, IGMP protocol information is initialized and learned again.

Related commands

ip multicast-routing

ip pim dense-mode

ip pim sparse-mode

ip pim accept-bootstrap [OP-MBSE]

Discards bootstrap messages received from the specified interface and prevent the messages from being forwarded to the local network.

This command is valid when PIM-SM/SSM is used.

Syntax

To set or change information:

no ip pim accept-bootstrap

To delete information:

ip pim accept-bootstrap

Input mode

(config-if)

Parameters

None

Default behavior

Forwards bootstrap messages received 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

Sets the Switch as a BSR candidate.

This command is valid when PIM-SM/SSM is used.

Syntax

To set or change information:

ip pim [vrf <*vrf id*>] bsr-candidate loopback <*interface number*> [priority <*value*>]

To delete information:

no ip pim [vrf <*vrf id*>] bsr-candidate loopback <*interface number*> [priority <*value*>]

Input mode

```
(config)
```

Parameters

vrf <*vrf id*> [OP-NPAR]

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*.

<*interface number*>

Specifies the loopback interface number.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 250

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 functionality on VRFs, perform the settings so that the following conditions are satisfied.
   - For the VRF ID, set the same value as the VRF ID that the operation target loopback interface belongs to.
   - For the loopback interface number, set the same value as the loopback interface ID that is specified as the operation target loopback interface.

Related commands

ip pim sparse-mode

interface loopback

ip pim deletion-delay-time

Sets the remaining time until routing information is deleted by prune reception using PIM join/prune messages.

This command is valid when PIM-SM/SSM is used.

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*> [OP-NPAR]

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 dense-mode

Specifies operation as an IPv4 PIM-DM.

Syntax

To set information:

ip pim dense-mode

To delete information:

no ip pim dense-mode

Input mode

(config-if)

Parameters

None

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

1. When using the PIM-DM protocol on the corresponding interface, you need to set the `pim-dm` parameter by using the `ip multicast protocol` command.
2. IGMP runs on interfaces on which this command is set.
3. If you set this command for the interface for which the `ip pim sparse-mode` command is set, the settings are updated.
4. This command is valid only for the global network.

Related commands

ip multicast-routing

ip multicast protocol

ip pim keep-alive-time

Sets the keep-alive time when communication is idle in PIM-SM and PIM-DM.

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*> [OP-NPAR]

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 keep-alive time (in seconds) when communication is idle in PIM-SM and PIM-DM. If a data packet is not relayed even once during the keep-alive time, the corresponding relay 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 keep-alive time for communication-idle in PIM-SM and PIM-DM 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 keep-alive time (even when it is infinite), the relay entry might be deleted depending on the protocol. For example, if multicast routing information is deleted, the corresponding relay entry is deleted at the same time.
2. The deletion of relay entries caused by non-communication might lag behind this setting value for up to 90 seconds.
3. The keep-alive time for non-communication in PIM-SSM is infinite.

Related commands

ip pim dense-mode

ip pim sparse-mode

ip pim max-interface

Specifies the maximum number of interfaces that can run IPv4 PIM and IGMP to adjust memory efficiency.

Syntax

To set or change information:

ip pim max-interface <*number*>

To delete information:

no ip pim max-interface

Input mode

(config)

Parameters

<*number*>

Specifies the number of interfaces that can run IP multicast. Note that, the number of specifiable interfaces will be one less than the specified value because a protocol reserves one interface.

When the value of this command is changed, the IP multicast routing program restarts automatically.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For AX6700S series switches:

   The valid setting range of the maximum number of interfaces that can run IPv4 PIM and IGMP for each device varies depending on the BSU type.

   The following table describes the valid setting range of the maximum number of interfaces that can run IPv4 PIM and IGMP for each BSU type.

Table 15-2: Valid setting range of the maximum number of interfaces that can run IPv4 PIM and IGMP for each BSU type

BSU type	Range of values
BSU-LA	32, 64, 128
BSU-LB	32, 64, 128, 256

For AX6600S series switches:

The valid setting range of the maximum number of interfaces that can run IPv4 PIM and IGMP for each device varies depending on the CSU type.

The following table describes the valid setting range of the maximum number of interfaces that can run IPv4 PIM and IGMP for each CSU type.

Table 15-3: Valid setting range of the maximum number of interfaces that can run IPv4 PIM and IGMP for each CSU type

CSU type	Range of values
CSU-1A	32, 64, 128

CSU type	Range of values
CSU-1B	32, 64, 128, 256

For AX6300S series switches:

The valid setting range of the maximum number of interfaces that can run IPv4 PIM and IGMP for each device varies depending on the MSU type.

The following table describes the valid setting range of the maximum number of interfaces that can run IPv4 PIM and IGMP for each MSU type.

Table 15-4: Valid setting range of the maximum number of interfaces that can run IPv4 PIM and IGMP for each MSU type

MSU type	Range of values
MSU-1A and MSU-1A1	32, 64, 128
MSU-1B and MSU-1B1	32, 64, 128, 256

Default behavior

For AX6700S series switches:

If the BSU type is BSU-LA, the maximum number of interfaces that can run IP multicast is 128, and if BSU-LB, it is 256.

For AX6600S series switches:

If the CSU type is CSU-1A, the maximum number of interfaces that can run IP multicast is 128, and if CSU-1B, it is 256.

For AX6300S series switches:

If the MSU type is MSU-1A or MSU-1A1, the maximum number of interfaces that can run IP multicast is 128, and if MSU-1B or MSU-1B1, it is 256.

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 igmp router

ip pim dense-mode

ip pim sparse-mode

ip pim mcache-limit

Sets the maximum number of the total of IPv4 PIM-SM/SSM multicast forwarding entries and negative cache entries.

This command is valid when PIM-SM/SSM is used.

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*> [OP-NPAR]

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 the total 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:

   For AX6700S series switches:

   The valid setting range of the maximum number of the total of IPv4 PIM-SM/SSM multicast forwarding entries and negative cache entries for each device varies depending on the BSU type.

   The following table describes the valid setting range of the maximum number of the total of IPv4 PIM-SM/SSM multicast forwarding entries and negative cache entries for each BSU type.

Table 15-5: Valid setting range of the maximum number of IPv4 PIM-SM/SSM multicast routing entries for each BSU type

BSU type	Range of values
BSU-LA	0 to 4000
BSU-LB	0 to 8000

For AX6600S series switches:

The valid setting range of the maximum number of the total of IPv4 PIM-SM/SSM

multicast forwarding entries and negative cache entries for each device varies depending on the CSU type.

The following table describes the valid setting range of the maximum number of the total of IPv4 PIM-SM/SSM multicast forwarding entries and negative cache entries for each CSU type.

Table 15-6: Valid setting range of the maximum number of IPv4 PIM-SM/SSM multicast routing entries for each CSU type

CSU type	Range of values
CSU-1A	0 to 4000
CSU-1B	0 to 8000

For AX6300S series switches:

The valid setting range of the maximum number of the total of IPv4 PIM-SM/SSM multicast forwarding entries and negative cache entries for each device varies depending on the MSU type.

The following table describes the valid setting range of the maximum number of the total of IPv4 PIM-SM/SSM multicast forwarding entries and negative cache entries for each MSU type.

Table 15-7: Valid setting range of the maximum number of IPv4 PIM-SM/SSM multicast routing entries for each MSU type

MSU type	Range of values
MSU-1A and MSU-1A1	0 to 4000
MSU-1B and MSU-1B1	0 to 8000

Default behavior

There is no limit on the maximum number of the total of IPv4 PIM-SM/SSM multicast forwarding entries and negative cache entries.

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 maximum number of the total of IPv4 PIM-SM/SSM multicast forwarding entries and negative cache entries, but do not guarantee the operation based on the specified value.
2. If the maximum number of the total of IPv4 PIM-SM/SSM multicast forwarding entries and negative cache entries exceeds the setting value of this command due to the change of 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 of IPv4 PIM-SM/SSM multicast forwarding entries and negative cache entries exceeds the maximum number, 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.

Related commands

ip pim sparse-mode

ip pim message-interval (global)

Sets the interval for sending join/prune messages that are sent regularly by PIM of the Switch.

For an interface for which the `ip pim message-interval (interface)` command is also specified, the specification of the `ip pim message-interval (interface)` command has higher priority.

This command is valid when PIM-SM/SSM is used.

Syntax

To set or change information:

ip pim [vrf <*vrf id*>] message-interval <*seconds*>

To delete information:

no ip pim [vrf <*vrf id*>] message-interval

Input mode

`(config)`

Parameters

vrf <*vrf id*> [OP-NPAR]

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 interval for sending 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 message-interval (interface)

Sets the interval for sending join/prune messages that are sent regularly by the PIM of the corresponding interface.

This command is valid when PIM-SM/SSM is used.

Syntax

To set or change information:

ip pim message-interval <*seconds*>

To delete information:

no ip pim message-interval

Input mode

`(config-if)`

Parameters

<*seconds*>

Sets the interval (in seconds) for sending join/prune messages that are sent regularly by the PIM of the corresponding interface.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   30 to 3600 (seconds)

Default behavior

The value that is specified by the `ip pim message-interval (global)` command is applied. If no value is specified, 60 (seconds) is used.

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

Specifies the maximum number of PIM-SM/SSM multicast routing entries (total of (S, G) and (*, G) entries).

This command is valid when PIM-SM/SSM is used.

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*> [OP-NPAR]

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 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:

   For AX6700S series switches:

   The valid setting range of the maximum number of PIM-SM/SSM multicast routing entries for each device varies depending on the BSU type.

   The following table describes the valid setting range of the maximum number of PIM-SM/SSM multicast routing entries for each BSU type.

Table 15-8: Valid setting range of the maximum number of PIM-SM/SSM multicast routing entries for each BSU type

BSU type	Range of values
BSU-LA	0 to 4000
BSU-LB	0 to 8000

For AX6600S series switches:

The valid setting range of the maximum number of PIM-SM/SSM multicast routing entries for each device varies depending on the CSU type.

The following table describes the valid setting range of the maximum number of

PIM-SM/SSM multicast routing entries for each CSU type.

Table 15-9: Valid setting range of the maximum number of PIM-SM/SSM multicast routing entries for each CSU type

CSU type	Range of values
CSU-1A	0 to 4000
CSU-1B	0 to 8000

For AX6300S series switches:

The valid setting range of the maximum number of PIM-SM/SSM multicast routing entries for each device varies depending on the MSU type.

The following table describes the valid setting range of the maximum number of PIM-SM/SSM multicast routing entries for each MSU type.

Table 15-10: Valid setting range of the maximum number of PIM-SM/SSM multicast routing entries for each MSU type

MSU type	Range of values
MSU-1A and MSU-1A1	0 to 4000
MSU-1B and MSU-1B1	0 to 8000

Default behavior

There is no limit on the maximum number of PIM-SM/SSM multicast routing entries (total of (S, G) and (*, G) entries).

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 maximum number of PIM-SM/SSM multicast routing entries, but do not guarantee the operation based on the specified value.
2. If the number of PIM-SM/SSM multicast routing entries exceeds the setting value of this command due to the change of 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 negative-cache-time

Sets the retention time for negative caches in PIM-SM.

This command is valid when PIM-SM/SSM is used.

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*> [OP-NPAR]

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

Prevents IPv4 PIM-SSM multicast forwarding from being stopped temporarily during system switching. On the other hand, IPv4 PIM-SM multicast forwarding stops temporarily.

Syntax

To set or change information:

ip pim nonstop-forwarding

To delete information:

no ip pim nonstop-forwarding

Input mode

```
(config)
```

Parameters

None

Default behavior

IPv4 PIM-SM multicast forwarding stops temporarily during system switching.

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

1. If IPv4 multicast is run on the interface of the VRF, this command is not valid.
2. If IPv4 multicast protocol is set for PIM-DM, this command is not valid.

Related commands

ip multicast-routing

ip pim sparse-mode

ip pim query-interval (global)

Sets the interval for sending Hello messages that are sent regularly by PIM of the Switch.

For an interface for which the `ip pim query-interval (interface)` command is also specified, the specification of the `ip pim query-interval (interface)` command has higher priority.

This command is valid when PIM-SM/SSM is used.

Syntax

To set or change information:

ip pim [vrf <*vrf id*>] query-interval <*seconds*>

To delete information:

no ip pim [vrf <*vrf id*>] query-interval

Input mode

`(config)`

Parameters

vrf <*vrf id*> [OP-NPAR]

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 interval for sending 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 query-interval (interface)

Sets the interval for sending Hello messages that are sent regularly by the PIM of the corresponding interface.

This command is valid when PIM-SM/SSM is used.

Syntax

To set or change information:

ip pim query-interval <*seconds*>

To delete information:

no ip pim query-interval

Input mode

`(config-if)`

Parameters

<*seconds*>

Sets the interval (in seconds) for sending Hello messages that are sent regularly by the PIM of the corresponding interface.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   5 to 3600 (seconds)

Default behavior

The value that is specified by the `ip pim query-interval (global)` command is applied. If no value is specified, 30 (seconds) is used.

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 rate-limit cache-misshit

Specifies the upper limit for the number of received multicast packets when there are no corresponding multicast entries.

If the upper limit is exceeded, received multicast packets are discarded.

Syntax

To set or change information:

ip pim rate-limit cache-misshit {<*num*> | unlimit}

To delete information:

no ip pim rate-limit cache-misshit

Input mode

`(config)`

Parameters

{<*num*> | unlimit}

Specifies the upper limit per second per device.

To not set a limit, specify `unlimit`.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   10 to 3000 or `unlimit`

Default behavior

The upper limit of the number of received multicast packets when there are no corresponding multicast entries is 1000.

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 upper limit for the number of received packets, but do not guarantee operation with the specified value.
2. If you specify a value exceeding the performance limit by using this command, or specify no limit, the maximum transmission rate is the performance limit.

Related commands

ip multicast-routing

ip pim sparse-mode

ip pim rate-limit register-receive

Specifies the upper limit of the number of receivable PIM-Register packets at the rendezvous point.

If the upper limit is exceeded, received PIM-Register packets are discarded.

Syntax

To set or change information:

ip pim rate-limit register-receive {<*num*> | unlimit}

To delete information:

no ip pim rate-limit register-receive

Input mode

`(config)`

Parameters

{<*num*> | unlimit}

Specifies the upper limit per second per device.

To not set a limit, specify `unlimit`.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   10 to 3000 or `unlimit`

Default behavior

The upper limit of the number of receivable PIM-Register packets at the rendezvous point is 1000.

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 upper limit for the number of received packets, but do not guarantee operation with the specified value.
2. If you specify a value exceeding the performance limit by using this command, or specify no limit, the maximum transmission rate is the performance limit.
3. If access list logging and DHCP snooping are used, the reception cause (register-receive) of the target packets for this command is controlled by the setting of the `ip pim rate-limit register-request` command rather than this command.

Related commands

ip multicast-routing

ip pim sparse-mode

ip pim rate-limit register-request

Specifies the upper limit of the number of receive packets when the first-hop router sends received multicast packets as PIM-Register packets to the rendezvous point.

If the upper limit is exceeded, received multicast packets are discarded.

Syntax

To set or change information:

ip pim rate-limit register-request {<*num*> | unlimit}

To delete information:

no ip pim rate-limit register-request

Input mode

`(config)`

Parameters

{<*num*> | unlimit}

Specifies the upper limit per second per device for multicast packets.

To not set a limit, specify `unlimit`.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   10 to 3000 or `unlimit`

Default behavior

The upper limit of the number of received packets when the first-hop router sends received multicast packets as PIM-Register packets to the rendezvous point is 1000.

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 upper limit for the number of received packets, but do not guarantee operation with the specified value.
2. If you specify a value exceeding the performance limit by using this command, or specify no limit, the maximum transmission rate is the performance limit.
3. If access list logging and DHCP snooping are used, PIM-Register packets whose reception cause is controlled by register-receive are also controlled by the setting of this command rather than the `ip pim rate-limit register-receive` command.

Related commands

ip multicast-routing

ip pim sparse-mode

ip pim rate-limit wrong-incoming-interface

Specifies the upper limit of the number of multicast packets that can be received from input interfaces other than the input interface of multicast entries.

If the upper limit is exceeded, received multicast packets are discarded.

Syntax

To set or change information:

ip pim rate-limit wrong-incoming-interface {<*num*> | unlimit}

To delete information:

no ip pim rate-limit wrong-incoming-interface

Input mode

`(config)`

Parameters

{<*num*> | unlimit}

Specifies the upper limit per second per device.

To not set a limit, specify `unlimit`.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   10 to 3000 or `unlimit`

Default behavior

The upper limit of the number of multicast packets that can be received from input interfaces other than the input interface of multicast entries is 100.

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 upper limit for the number of received packets, but do not guarantee operation with the specified value.
2. If you specify a value exceeding the performance limit by using this command, or specify no limit, the maximum transmission rate is the performance limit.

Related commands

ip multicast-routing

ip pim sparse-mode

ip pim register-checksum

Sets the range for calculating PIM checksums for the transmission of PIM-Register messages (encapsulation packets).

This command is valid when PIM-SM/SSM is used.

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*> [OP-NPAR]

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) during the transmission of PIM-Register messages (encapsulation packets). If `all` is specified, checksums are calculated for all of the PIM message part (eight bytes) and encapsulated data during the transmission of PIM-Register messages (encapsulation packets).

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:

   `header` or `all`

Default behavior

Performs operation 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

Specifies the start time for null-Register transmission based on the suppression time for Register transmission.

This command is valid when PIM-SM/SSM is used.

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*> [OP-NPAR]

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 transmission based on the suppression time for Register transmission.

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 transmission based on the suppression time for Register transmission is 5 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 5 seconds.

Related commands

ip pim sparse-mode

ip pim rp-address

Sets the static rendezvous point information.

This command is valid when PIM-SM/SSM is used.

Syntax

To set information:

ip pim [vrf <*vrf id*>] rp-address <*rp address*> [<*access list*>]

To delete information:

no ip pim [vrf <*vrf id*>] rp-address <*rp address*> [<*access list*>]

Input mode

(config)

Parameters

vrf <*vrf id*> [OP-NPAR]

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*.

<*rp address*>

Specifies the IP address of the rendezvous point.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

<*access list*>

Specifies an access list for the IP 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 the following commands 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 on the default behavior when the access list parameter is omitted.
3. To set the Switch as a rendezvous point, specify the IPv4 address of the loopback interface.
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

Sets the Switch as a rendezvous point candidate.

This command is valid when PIM-SM/SSM is used.

Syntax

To set or change information:

ip pim [vrf <*vrf id*>] rp-candidate loopback <*interface number*> [priority <*value*>] [group-list <*access list*>]

To delete information:

no ip pim [vrf <*vrf id*>] rp-candidate loopback <*interface number*> [priority <*value*>] [group-list <*access list*>]

Input mode

`(config)`

Parameters

vrf <*vrf id*> [OP-NPAR]

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*.

<*interface number*>

Specifies the loopback interface number.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 250

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 (IP 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 the following commands 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 on the default behavior when the access list parameter is omitted.
3. To use this command, set an IPv4 address for the loopback interface.
4. To use this functionality on VRFs, perform the settings so that the following conditions are satisfied.
   - For the VRF ID, set the same value as the VRF ID that the operation target loopback interface belongs to.
   - For the loopback interface number, set the same value as the loopback interface ID that is specified as the operation target loopback interface.
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 sparse-mode

interface loopback

ip access-list standard

ip pim rp-mapping-algorithm

Specifies the rendezvous point selection algorithm to be used by IPv4 PIM.

This command is valid when PIM-SM/SSM is used.

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*> [OP-NPAR]

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:

   `method1` or `method2`

Default behavior

The algorithm described in RFC2362 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

Specifies operation 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)

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 set this command for the interface for which the `ip pim dense-mode` command is set, the settings are updated.

Related commands

ip igmp router

ip multicast-routing

ip multicast protocol

ip pim ssm

Uses PIM-SSM on interfaces on which the `ip pim sparse-mode` command is set.

This command is valid when PIM-SM/SSM is used.

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*> [OP-NPAR]

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 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. Specify a single address for the accesss list. If multiple addresses are specified, it is undefined which address is used.
2. 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 the following commands 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
3. If an access list that has not been set is specified, this command is not valid.
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 vrf-gateway [OP-NPAR]

Enables PIM-SM protocol relay between different VRFs or global networks when PIM-SM is used.

This command is valid when PIM-SM/SSM 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*> [OP-NPAR]

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

import multicast inter-vrf

ip pim sparse-mode

Chapter 16. IPv6, NDP, and ICMPv6

ipv6 address
ipv6 enable
ipv6 icmp error-interval
ipv6 icmp nodeinfo-query
ipv6 neighbor
ipv6 redirects
ipv6 source-route
nd-limit [OP-NPAR]
vrf forwarding [OP-NPAR]

ipv6 address

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)`

Parameters

<*ipv6 address*>

Sets 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 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:

   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 resends the RA packets.

Related commands

interface vlan

interface mgmt

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)`

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

None

Related commands

interface vlan

interface mgmt

ipv6 address

ipv6 icmp error-interval

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 interval for sending 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

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

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*>

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 lower 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

None

Related commands

None

ipv6 redirects

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 state, 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)
```

Parameters

None

Default behavior

ICMPv6 Redirect messages are sent.

Specify `no ipv6 redirects` to disable 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

None

Related commands

interface vlan

ipv6 source-route

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 [OP-NPAR]

Configures 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 24576

Default behavior

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

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 exceeded the maximum value set by the command, a warning log 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 Switch has been exceeded, a warning log 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 log message also remains.
4. Even if you use the 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 [OP-NPAR]

See *vrf forwarding [OP-NPAR]* in *2. IPv4, ARP, and ICMP*.

Chapter

17. Loopback Interface (IPv6)

interface loopback
ipv6 address (loopback)
vrf forwarding (loopback) [OP-NPAR]

interface loopback

See *interface loopback* in *3. Loopback Interface (IPv4)*.

ipv6 address (loopback)

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)`

Parameters

<*ipv6 address*>

Specifies 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 in 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.

Related commands

interface loopback

vrf forwarding

vrf forwarding (loopback) [OP-NPAR]

See *vrf forwarding (loopback) [OP-NPAR]* in *3. Loopback Interface (IPv4)*.

Chapter

18. Null Interface (IPv6)

interface null

interface null

See *4. Null Interface (IPv4)*.

Chapter 19. RA

ipv6 hop-limit
ipv6 nd link-mtu
ipv6 nd managed-config-flag
ipv6 nd no-advertise-link-address
ipv6 nd ns-interval
ipv6 nd other-config-flag
ipv6 nd prefix
ipv6 nd ra-interval
ipv6 nd ra-lifetime
ipv6 nd reachable-time
ipv6 nd router-preference
ipv6 nd suppress-ra

ipv6 hop-limit

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)
```

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 link-mtu

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)`

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

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)

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

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)

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

Sets the interval for sending 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)

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

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)

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

Specifies the IPv6 prefix 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)`

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 <*Valid-Lifetime*> value is greater than the <*Preferred-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

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)

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

1. For guidelines regarding the specified minimum and maximum intervals, see *21. Router Advertisements* in the manual *Configuration Guide Vol. 3 For Version 11.7*.

Related commands

ipv6 nd ra-lifetime

ipv6 nd reachable-time

ipv6 nd ns-interval

ipv6 nd ra-lifetime

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)`

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 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-interval

ipv6 nd reachable-time

ipv6 nd ns-interval

ipv6 nd reachable-time

Specifies how long terminals receive 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)
```

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

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)`

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:

   Specify `high`, `medium`, or `low`.

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

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)

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

Chapter

20. IPv6 DHCP relays [OP-DH6R]

ipv6 dhcp relay destination [OP-DH6R]
ipv6 dhcp relay hop-limit [OP-DH6R]
ipv6 dhcp relay static-route-setting [OP-DH6R]
service ipv6 dhcp relay [OP-DH6R]

ipv6 dhcp relay destination [OP-DH6R]

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)`

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 about 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 [OP-DH6R]

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)`

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 [OP-DH6R]

Automatically adds an assigned 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 [OP-DH6R]

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 relaying 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 functionality. Set the `no service ipv6 dhcp` command to disable the IPv6 DHCP server functionality, and then use IPv6 DHCP relays.

Related commands

None

Chapter

21. IPv6 DHCP Server Functionality

dns-server
domain-name
ipv6 dhcp pool
ipv6 dhcp server
ipv6 dhcp static-route-setting
ipv6 local pool
prefix-delegation
prefix-delegation pool
service ipv6 dhcp
sip-domain-name
sip-server
sntp-server

dns-server

Sets the DNS server address used by the IPv6 DHCP server. The DNS server address is delegated 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 pool.
3. The maximum number of DNS server addresses that can be configured per device is 4096.

Related commands

None

domain-name

Sets the IPv6 DHCP server domain name. The domain name is delegated 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 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. This command can be set more than once.
2. The maximum number of domain names that can be configured is 16 per pool.
3. The maximum number of domain names that can be configured per device is 4096.

Related commands

None

ipv6 dhcp pool

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 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 pools that can be configured is 1024.
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

Configures the delegation 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)
```

Parameters

<*Pool Name*>

Specifies the pool name set in the 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 1024 interfaces.
2. You cannot specify this command more than once for an interface.

Related commands

ip dhcp pool

ipv6 dhcp static-route-setting

Automatically adds routing information to a client in a routing information table maintained on the Switch. A prefix is delegated 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 delegated 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 delegated prefixes is immediately deleted. If you set this command after delegating prefixes without setting this command, all information for the delegated 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 delegated prefixes as static, or use a routing protocol to replace routing information.

Related commands

None

ipv6 local pool

Configures 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 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 delegated for a device.
2. This command cannot be set together with a static IPv6 prefix setting in the same 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

Configures a static IPv6 prefix, IAID, and lifetime to be used in the specified 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 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. If this parameter is specified, the prefix that matches the IAID set for IA_PD by the client will be delegated. 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:

   lifetime <*Valid Lifetime*> <*Preferred Lifetime*>, lifetime infinite <*Preferred Lifetime*>, or lifetime infinite infinite

   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 delegated for a Switch.
2. This command cannot be set together with the local pool setting in the same pool setting.

Related commands

None

prefix-delegation pool

Configures the IAID and lifetime for the range of IPv6 prefixes specified in the 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 local pool name set in the 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 delegated. 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:

   lifetime <*Valid Lifetime*> <*Preferred Lifetime*>, lifetime infinite <*Preferred Lifetime*>, or lifetime infinite infinite

   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 range setting specified in the 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. A 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

None

Related commands

None

sip-domain-name

Sets the SIP domain name provided by an IPv6 DHCP server. The SIP domain name is delegated 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 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. This command can be set more than once.
2. The maximum number of domain names that can be configured is 16 per pool.
3. The maximum number of SIP domain names that can be configured per device is 4096.

Related commands

None

sip-server

Sets the IPv6 address of the SIP server provided by an IPv6 DHCP server. The IPv6 address of the SIP server is delegated 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 pool.
3. The maximum number of IPv6 addresses of the SIP server that can be configured per device is 4096.

Related commands

None

sntp-server

Sets the address of the SNTP server provided by the IPv6 DHCP server. The address of the SNTP server is delegated 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 pool.
3. The maximum number of SNTP server addresses that can be configured per device is 4096.

Related commands

None

Chapter 22. Routing Options (IPv6)

Routing Options (IPv6)

Routing Options (IPv6)

See *8. Routing Options (IPv4)*.

Chapter

23. Route Aggregation (IPv6)

ipv6 summary-address

ipv6 summary-address

Generates an IPv6 summary 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*> [OP-NPAR]

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 a summarized IPv6 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 of the summary 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 summary route is generated.

1. Default value when this parameter is omitted:

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

2. Range of values:

   None

noinstall

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

1. Default value when this parameter is omitted:

   Summary routes are registered in the forwarding table.

2. Range of values:

   None

summary-only

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

Summary 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 whose next hop has a loopback interface or null interface cannot be used as aggregation source routes.

Related commands

distribute-list out (RIPng) (OSPFv4) (BGP4+)

redistribute (RIPng) (OSPFv4) (BGP4+)

neighbor out (BGP4+)

Chapter

24. Static Routing (IPv6)

ipv6 route
ipv6 route static maximum-paths
ipv6 route static poll-interval
ipv6 route static poll-multiplier

ipv6 route

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*> [OP-NPAR]

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*>, the following values can be specified:

   When <*Nexthop-Address*> is specified:

   - vlan <*vlan id*>

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

   - `mgmt 0` (Global network routes can only be specified.)

   When <*Nexthop-Address*> is not specified:

   - null 0

{vrf <*nexthop vrf id*> | global} [OP-NPAR]

Specifies that 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:

Specify `vrf` <*nexthop vrf id*> or `global`.

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

For details about the range of values for <*vrf id*>, see *Specifiable values for parameters*.

<*Distance*>

Specifies the distance 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:

Specify `noinstall` or `reject`.

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 a VRF in which the next hop with the highest weight exists, using that next hop as a basis.

   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 100 2001:db8:ffff:1::/64 2001:db8:1:1::1 vrf 200 weight 30
ipv6 route vrf 100 2001:db8:ffff:1::/64 2001:db8:1:2::1 vrf 100 weight 20
ipv6 route vrf 100 2001:db8:ffff:1::/64 2001:db8:1:3::1 vrf 200 weight 10
```

Related commands

ipv6 route static poll-interval

ipv6 route static poll-multiplier

ipv6 route static maximum-paths

ipv6 route static maximum-paths

Specifies the maximum number of paths (maximum number of next hops) to be generated for static route information.

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.

   Note, however, that if `ip urpf` has been set, you cannot set 9 or a greater value for <*Number*>.

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.

Notes

None

Related commands

ip route

ipv6 route static poll-interval

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 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 route

ipv6 route static poll-multiplier

ipv6 route static poll-multiplier

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

Chapter

25. RIPng

default-metric
disable
distance
generate-secondary-route
inherit-metric
ipv6 rip enable
ipv6 rip metric-offset
ipv6 router rip
passive-interface
timers basic

default-metric

Specifies the metric to be used when routing information learned by another protocol is advertised by RIPng. Metrics set by the `redistribute` or `distribute-list out` command have precedence over the metric information specified by this command. This command applies to static routes, OSPFv3 routes, and BGP4+ routes.

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.

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 route: Metric 1
- OSPFv3 route: Metric 16
- BGP4+ route: 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

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

Specifies the distance for routing information learned by RIPng. A distance 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 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

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

Specifies that the metric 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 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

Enables RIPng on the specified interface.

Syntax

To set information:

ipv6 rip enable

To delete information:

no ipv6 rip enable

Input mode

(config-if)

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

Specifies the metric 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)`

Parameters

<*Metric*>

Specifies a metric.

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:

   Specify `in` or `out`.

Default behavior

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

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*> [OP-NPAR]

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

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 RIPng packet transmission.

Syntax

To set information:

passive-interface {default | <*interface type*> <*interface number*>}

To delete information:

no passive-interface {default | <*interface type*> <*interface number*>}

Input mode

`(config-rtr-rip)`

Parameters

{default | <*interface type*> <*interface number*>}

Specifies the interface to be prevented from sending RIPng packets.

default

Prevents all interfaces from sending RIPng packets.

<*interface type*> <*interface number*>

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:

   `default` or <*interface type*> <*interface number*>

   For <*interface type*> <*interface number*>, the following values can be specified:

   - vlan <*vlan id*>

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

   - `mgmt 0` (This can be specified only for global network settings.)

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 disable transmission for all interfaces available for RIPng packet transmission. In this state, if you specify the `no passive-interface` <*interface type*> <*interface number*> command, the specified interface becomes available for transmission. The following shows a configuration example.

Example 1

(1) To disable only `vlan 2` for transmission, enter the following command:

(config-rtr-rip)# passive-interface vlan 2

(2) To enable `vlan 2` for transmission 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 disable all interfaces for transmission, enter the following command:

(config-rtr-rip)# passive-interface default

(2) To enable only `vlan 3` for transmission 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 transmission 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

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

Chapter

26. OSPFv3

area default-cost
area range
area stub
area virtual-link
areaid-format
default-metric
disable
distance ospf
graceful-restart mode
graceful-restart restart-time
graceful-restart strict-lsa-checking
ipv6 ospf area
ipv6 ospf cost
ipv6 ospf dead-interval
ipv6 ospf hello-interval
ipv6 ospf network
ipv6 ospf priority
ipv6 ospf retransmit-interval
ipv6 ospf transmit-delay
ipv6 router ospf
max-metric router-lsa
maximum-paths
passive-interface
router-id
timers spf

area default-cost

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

Specifies networks in an area. A maximum of 1024 networks can be specified.

Use this command to configure route summarization on an area boundary router. This command is useful for reducing the amount of route 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 <*Prefix-Len*> 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.

{advertise | not-advertise}

Specifies whether to advertise inter-area routes. All of the route 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:

   Specify `advertise` or `not-advertise`.

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

Allows areas other than area 0 to function as stub areas.

In a stub area, external AS routes are prevented 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

Prevents 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 route 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

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

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:

   `decimal` or `ipv4-address`

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

Specifies the metric of a route to be advertised as an external AS route. This command does not apply to directly connected routes. Metrics specified by the `redistribute` command have precedence 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.

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

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 operation stops.

When the change is applied

The change is applied immediately after setting values are changed.

Notes

None

Related commands

None

distance ospf

Sets the distance for OSPFv3. You can specify different distances 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.

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:

   Specify `externl` (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.

<*distance*>

Specifies a distance.

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

Specifies whether to enable the graceful restart functionality for OSPFv3.

There is both the restart router functionality and the helper router functionality for graceful restarts. To use the restart router functionality, the helper router functionality must be enabled for all the 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 the restart functionality or helper functionality.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify `restart`, `helper`, or `both`.

   If you specify `both`, the restart functionality and helper functionality are enabled.

Default behavior

The restart router functionality and helper router functionality are disabled.

Impact on communication

None

When the change is applied

The change is applied when the next graceful restart is performed. The helper functionality is activated when a neighboring router starts a graceful restart.

Notes

1. To use the restart functionality, set the `router-id` command to specify the router ID, or set an IPv4 address for the loopback interface. If you do not specify these settings, the router ID might be changed before or after the graceful restart is started. If the router ID is changed, graceful restart fails.

Related commands

graceful-restart restart-time

graceful-restart strict-lsa-checking

routing options graceful-restart time-limit

graceful-restart restart-time

Specifies the time allowed for a re-connection after restarting when the restart router functionality for graceful restart is used 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 time allowed for graceful restart re-connection 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

60 seconds is set.

Impact on communication

None

When the change is applied

The change is applied when the next graceful restart is performed.

Notes

None

Related commands

graceful-restart mode

graceful-restart strict-lsa-checking

routing options graceful-restart time-limit

graceful-restart strict-lsa-checking

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 functionality, the restart router stops the graceful restart functionality with all helpers.

Related commands

graceful-restart mode

ipv6 ospf area

Enables OSPFv3. OSPFv3 operates 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)`

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 operate 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. If you specify `no ipv6 router ospf` <*Domain-No*> to delete the setting, the information set by the `ipv6 ospf area` command is also deleted if the <*Domain-No*> value is the same for both commands.

Related commands

ipv6 address

ipv6 ospf cost

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)

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

Specifies the length of time that the router maintains adjacency when hello packets can no longer be received 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)`

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

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)`

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

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)`

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:

   Specify `broadcast` or `point-to-point`.

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

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)

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

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)

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 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

ipv6 ospf transmit-delay

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)

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

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*>

Specify 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*> [OP-NPAR]

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 operation 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 set 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

Specifies that the switch uses the maximum cost for advertisements and operates 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 operates as a stub router after startup, restart, or system switchover.

1. Default value when this parameter is omitted:

   The functionality is always enabled.

2. Range of values:

   None

<*Seconds*>

Specifies the length of time that the switch operates as a stub router after startup, restart, or system switchover.

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 operate as a stub router.

Impact on communication

None

When the change is applied

- The change is applied immediately after setting values are changed.
- If you specify the `on-startup` parameter, the change takes effect after the restart or system switchover. Note that if the switch is 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 functionality for graceful restart is operating, graceful restart fails.

Related commands

None

maximum-paths

When multiple paths (next hop) of equal cost exist for an OSPFv3-generated route, this command specifies the maximum number of paths in the route.

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.

   Note, however, that if `ip urpf` has been set, you cannot set 9 or a greater value for <*Number*>.

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.

Notes

None

Related commands

None

passive-interface

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 | <*interface type*> <*interface number*>}

To delete information:

no passive-interface {default | <*interface type*> <*interface number*>}

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 <*interface type*> <*interface number*>

Input mode

`(config-rtr)`

Parameters

{default | <*interface type*> <*interface number*>}

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

default

Sets all OSPFv3 networks as a passive interface.

<*interface type*> <*interface number*>

Specifies the interface in the OSPFv3 network.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   `default` or <*interface type*> <*interface number*>

   For <*interface type*> <*interface number*>, the following values can be specified:

   - vlan <*vlan id*>

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

   - `mgmt 0` (This can be specified only for global network domains.)

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

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 operation starts, the router ID is automatically selected in the following order from the VRF or global network to which OSPFv3 belongs. However, after OSPFv3 operation starts, 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 during OSPFv3 operation 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 operation starts 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 operation starts, 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 is 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

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

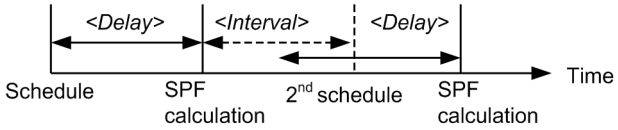
Input mode

(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

Chapter

27. BGP4+ [OP-BGP]

BGP4+ [OP-BGP]

BGP4+ [OP-BGP]

See *13. BGP4 [OP-BGP]*.

Chapter

28. Route Filters (IPv6)

Route Filters (IPv6)

Route Filters (IPv6)

See *14. Route Filtering (IPv4 and IPv6)*.

Chapter

29. IPv6 Multicast Routing Protocol Information

ipv6 mld fast-leave
ipv6 mld group-limit (global)
ipv6 mld group-limit (interface)
ipv6 mld query-interval (global)
ipv6 mld query-interval (interface)
ipv6 mld router
ipv6 mld source-limit (global)
ipv6 mld source-limit (interface)
ipv6 mld ssm-map enable
ipv6 mld ssm-map static
ipv6 mld static-group
ipv6 mld version
ipv6 multicast-routing
ipv6 pim
ipv6 pim assert-metric
ipv6 pim assert-preference
ipv6 pim bsr candidate bsr
ipv6 pim bsr candidate rp
ipv6 pim deletion-delay-time
ipv6 pim direct
ipv6 pim hello-interval (global)
ipv6 pim hello-interval (interface)
ipv6 pim join-prune-interval (global)
ipv6 pim join-prune-interval (interface)
ipv6 pim keep-alive-time
ipv6 pim max-interface
ipv6 pim mcache-limit
ipv6 pim mroute-limit
ipv6 pim negative-cache-time
ipv6 pim nonstop-forwarding
ipv6 pim rate-limit cache-misshit
ipv6 pim rate-limit register-receive
ipv6 pim rate-limit register-request
ipv6 pim rate-limit wrong-incoming-interface
ipv6 pim register-probe-time
ipv6 pim rp-address
ipv6 pim rp-mapping-algorithm
ipv6 pim ssm
ipv6 pim vrf-gateway [OP-NPAR]

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 functionality 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)

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 functionality 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 functionality can be used when one operation terminal is connected on an interface. Do not use this functionality when multiple operation terminals are connected.

Related commands

ipv6 mld router

ipv6 mld group-limit (global)

Specifies the maximum number of groups that can run per interface.

For an interface for which the `ipv6 mld group-limit` (interface) command is also specified, the specification of the `ipv6 mld group-limit` (interface) command has higher priority.

Syntax

To set or change information:

ipv6 mld [vrf <*vrf id*>] group-limit <*number*>

To delete information:

no ipv6 mld [vrf <*vrf id*>] group-limit

Input mode

`(config)`

Parameters

vrf <*vrf id*> [OP-NPAR]

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 global network.

2. Range of values:

   See *Specifiable values for parameters*.

<*number*>

Specifies the maximum number of 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

In group participation, there is no limit on the maximum number of groups that can run per interface. However, you must operate 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 that can be used per interface, but do not guarantee operation 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 group-limit (interface)

Specifies the maximum number of groups that can run on the corresponding interface.

Syntax

To set or change information:

ipv6 mld group-limit <*number*>

To delete information:

no ipv6 mld group-limit

Input mode

(config-if)

Parameters

<*number*>

Specifies the maximum number of groups that can run on the corresponding interface.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 256

Default behavior

The value that is specified by the `ipv6 mld group-limit` (global) command is applied as the maximum number of groups that can run on the corresponding interface. If no value is specified, there is no limit on group participation. However, you must operate 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 that can be used per interface, but do not guarantee operation 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 (global)

Sets the interval for sending query messages that are sent regularly by IPv6 MLD of the Switch.

For an interface for which the `ipv6 mld query-interval` (interface) command is also specified, the specification of the `ipv6 mld query-interval` (interface) command has higher priority.

Syntax

To set or change information:

ipv6 mld [vrf <*vrf id*>] query-interval <*seconds*>

To delete information:

no ipv6 mld [vrf <*vrf id*>] query-interval

Input mode

`(config)`

Parameters

vrf <*vrf id*> [OP-NPAR]

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 global network.

2. Range of values:

   See *Specifiable values for parameters*.

<*seconds*>

Sets the interval (in seconds) for sending 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 interval for sending 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 query-interval (interface)

Sets the interval for sending query messages that are sent regularly by IPv6 MLD of the corresponding interface.

Syntax

To set or change information:

ipv6 mld query-interval <*seconds*>

To delete information:

no ipv6 mld query-interval

Input mode

`(config-if)`

Parameters

<*seconds*>

Sets the interval (in seconds) for sending 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 (seconds)

Default behavior

The value that is specified by the `ipv6 mld query-interval` (global) command is applied. If no value is specified, 125 (seconds) is used.

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

Runs MLD on the specified interface.

Syntax

To set information:

ipv6 mld router

To delete information:

no ipv6 mld router

Input mode

(config-if)

Parameters

None

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

1. If you use MLD on the corresponding interface, this setting is required.

Related commands

ipv6 multicast-routing

ipv6 pim

ipv6 mld source-limit (global)

Specifies the maximum total number of sources belonging to all groups that can run per interface.

For an interface for which the `ipv6 mld source-limit` (interface) command is also specified, the specification of the `ipv6 mld source-limit` (interface) command has higher priority.

Syntax

To set or change information:

ipv6 mld [vrf <*vrf id*>] source-limit <*number*>

To delete information:

no ipv6 mld [vrf <*vrf id*>] source-limit

Input mode

`(config)`

Parameters

vrf <*vrf id*> [OP-NPAR]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies 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 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 source-limit (interface)

Specifies the maximum total number of sources belonging to all groups that can run on the corresponding interface.

Syntax

To set or change information:

ipv6 mld source-limit <*number*>

To delete information:

no ipv6 mld source-limit

Input mode

`(config-if)`

Parameters

<*number*>

Specifies the maximum total number of sources belonging to all groups that can run on the corresponding interface.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 256

Default behavior

The value that is specified by the `ipv6 mld source-limit` (global) command is applied. If no value is specified, there is no limit on source participation in groups. However, you must operate 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

Performs settings to enable PIM-SSM interoperability with MLDv1/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*> [OP-NPAR]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies 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

Sets the source address for the group address for which PIM-SSM is operated 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*> [OP-NPAR]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies 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

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)`

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 details about addresses that can be specified in the access list, see *31.3.1 Addresses subject to forwarding* in the manual *Configuration Guide Vol. 3 For Version 11.7*.
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

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)

Parameters

{1 | 2 [only]}

The following table describes the version of the MLD interface that is run corresponding to the specified value of this parameter.

Table 29-1: List of MLD interface versions

Value set	Version	MLD operating 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:

   1 or 2. If 2 is specified, only can also be specified.

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

Performs settings to enable the IPv6 multicast functionality.

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*> [OP-NPAR]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies 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 functionality on the Switch, this setting is required.
2. If you use the IPv6 multicast functionality on the Switch, you must set the loopback address for the global network or the corresponding VRF.
3. If you use the IPv6 multicast functionality on the Switch, you must also specify the IPv6 PIM (`ipv6 pim` command) setting for one or more interfaces for the global network or each VRF.

Related commands

interface loopback

ipv6 pim

Runs IPv6 PIM on the specified interface.

Syntax

To set information:

ipv6 pim

To delete information:

no ipv6 pim

Input mode

(config-if)

Parameters

None

Default behavior

None

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

1. If you use IPv6 PIM on the corresponding interface, this setting is required.

Related commands

ipv6 mld router

ipv6 multicast-routing

ipv6 pim assert-metric

Specifies the metric value 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*> [OP-NPAR]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies global network.

2. Range of values:

   See *Specifiable values for parameters*.

{<*metric*> | unicast-routing}

Specifies the metric value used in assert messages.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 65535 or unicast-routing

The following table describes metric values to be used in assert messages when this parameter is specified, or this command is omitted.

Table 29-2: Metric values used in assert messages according to the configuration

#	Value set in the configuration	Metric values used in assert messages	
		Directly connected source address	Indirectly connected source address
1	When this command is omitted	0	1024
2	<*metric*>	<*metric*>	
3	unicast-routing	Obtained from the unicast routing protocol[#]	

#: The first metric value of the unicast is used.

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*> [OP-NPAR]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies global network.

2. Range of values:

   See *Specifiable values for parameters*.

{<*preference*> | unicast-routing}

Specifies the preference information to be used in assert messages.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   0 to 255 or unicast-routing

The following table describes preference values to be used in assert messages when this parameter is specified, or this command is omitted.

Table 29-3: Preference values used in assert messages according to the configuration

#	Value set in the configuration	Preference values used in assert messages	
		Directly connected source address	Indirectly connected source address
1	When this command is omitted	0	101
2	<*preference*>	<*preference*>	
3	unicast-routing	Obtained from the unicast routing protocol#	

#: The first distance value of the unicast is used.

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

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*> [OP-NPAR]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies global network.

2. Range of values:

   See *Specifiable values for parameters*.

<*ipv6 address*>

Specifies the loopback address of the Switch.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

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.
2. To use this functionality on VRFs, the settings must satisfy the following conditions:

- For the VRF ID, set the same value as the VRF ID that the operation target loopback interface belongs to.
- For the loopback address, set the same value as the loopback address that is specified for the operation target loopback interface.

Related commands

ipv6 pim

interface loopback

ipv6 pim bsr candidate rp

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*> [OP-NPAR]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies global network.

2. Range of values:

   See *Specifiable values for parameters*.

<*ipv6 address*>

Specifies the loopback address of the Switch.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

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 details about addresses that can be specified in the access list, see *31.3.1 Addresses subject to forwarding* in the manual *Configuration Guide Vol. 3 For Version 11.7*.
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 set by the `ipv6 access-list` command is specified, this command is on the default behavior when the access list parameter is omitted.
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.
7. When an access list is specified in this command, you cannot change the command directly by specifying another access list.
8. To use this functionality on VRFs, the settings must satisfy the following conditions:
   - For the VRF ID, set the same value as the VRF ID that the operation target loopback interface belongs to.
   - For the loopback address, set the same value as the loopback address that is specified for the operation target loopback interface.

Related commands

ipv6 pim

interface loopback

ipv6 access-list

ipv6 pim deletion-delay-time

Sets the delay time before 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*> [OP-NPAR]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies global network.

2. Range of values:

   See *Specifiable values for parameters*.

<*seconds*>

Sets the delay time (in seconds) before 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 delay time until routing information is deleted using 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 delay 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

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)`

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. Up to 16 source addresses are valid.

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. The same IPv6 source address cannot be set for multiple interfaces by using this command.
5. If you set this command for multiple interfaces in the global network or VRF, do not include the same IPv6 source address. When the same IPv6 source address is used for multiple interfaces, some of the settings will become invalid.

Related commands

ipv6 pim

ipv6 access-list

ipv6 pim hello-interval (global)

Sets the interval for sending Hello messages that are sent regularly by IPv6 PIM of the Switch.

For an interface for which the `ipv6 pim hello-interval (interface)` command is also specified, the specification of the `ipv6 pim hello-interval (interface)` command has higher priority.

Syntax

To set or change information:

ipv6 pim [vrf <*vrf id*>] hello-interval <*seconds*>

To delete information:

no ipv6 pim [vrf <*vrf id*>] hello-interval

Input mode

`(config)`

Parameters

vrf <*vrf id*> [OP-NPAR]

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 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 interval for sending 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 hello-interval (interface)

Sets the interval for sending Hello messages that are sent regularly by IPv6 PIM of the corresponding interface.

Syntax

To set or change information:

ipv6 pim hello-interval <*seconds*>

To delete information:

no ipv6 pim hello-interval

Input mode

`(config-if)`

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 value that is specified by the `ipv6 pim hello-interval` (global) command is applied. If no value is specified, 30 (seconds) is used.

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 (global)

Sets the interval for sending join/prune messages that are sent regularly by IPv6 PIM of the Switch.

For an interface for which the `ipv6 pim join-prune-interval (interface)` command is also specified, the specification of the `ipv6 pim join-prune-interval (interface)` command has higher priority.

Syntax

To set or change information:

ipv6 pim [vrf <*vrf id*>] join-prune-interval <*seconds*>

To delete information:

no ipv6 pim [vrf <*vrf id*>] join-prune-interval

Input mode

`(config)`

Parameters

vrf <*vrf id*> [OP-NPAR]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies 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 interval for sending 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 join-prune-interval (interface)

Sets the interval for sending join/prune messages that are sent regularly by IPv6 PIM of the corresponding interface.

Syntax

To set or change information:

ipv6 pim join-prune-interval <*seconds*>

To delete information:

no ipv6 pim join-prune-interval

Input mode

`(config-if)`

Parameters

<*seconds*>

Sets the interval (in seconds) for sending join/prune messages that are sent regularly by IPv6 PIM of the corresponding interface.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   30 to 3600 (seconds)

Default behavior

The value that is specified by the `ipv6 pim join-prune-interval (global)` command is applied. If no value is specified, 60 (seconds) is used.

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

Sets the keep-alive 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*> [OP-NPAR]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies global network.

2. Range of values:

   See *Specifiable values for parameters*.

<*seconds*>

Sets the keep-alive time (in seconds) for non-communication in IPv6 PIM-SM. If a data packet is not relayed even once during the keep-alive time, the corresponding relay 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 keep-alive time of forwarding 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 keep-alive time (even when it is infinite), the relay entry might be deleted depending on the protocol. For example, if multicast routing information is deleted, the corresponding relay entry is deleted at the same time.
2. The deletion of relay entries caused by non-communication might lag behind this setting value for up to 90 seconds.
3. The keep-alive time for non-communication in PIM-SSM is infinite.

Related commands

ipv6 pim

ipv6 pim max-interface

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 <*number*>

To delete information:

no ipv6 pim max-interface

Input mode

(config)

Parameters

<*number*>

Specifies the number of interfaces that can run IPv6 PIM or MLD. Note that, the number of specifiable interfaces 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.

Table 29-4: Maximum number of interfaces for which IPv6 PIM/MLD can be defined

#	max-interface value	Maximum number of interfaces for which IPv6 PIM/MLD can be defined	
		IPv6 PIM	IPv6 MLD
1	32	31	31
2	64	63	63
3	128	127	127
4	256	255	255

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   For AX6700S series switches:

   The valid setting range of the maximum number of interfaces that can run IPv6 PIM or MLD for each device varies depending on the BSU type.

   The following table describes the valid setting range of the maximum number of interfaces that can run IPv6 PIM or MLD for each BSU type.

Table 29-5: Valid setting range of the maximum number of interfaces that can run IPv6 PIM/MLD for each BSU type

BSU type	Range of values
BSU-LA	32, 64, 128
BSU-LB	32, 64, 128, 256

For AX6600S series switches:

The valid setting range of the maximum number of interfaces that can run IPv6 PIM or MLD for each device varies depending on the CSU type.

The following table describes the valid setting range of the maximum number of interfaces that can run IPv6 PIM or MLD for each CSU type.

Table 29-6: Valid setting range of the maximum number of interfaces that can run IPv6 PIM/MLD for each CSU type

CSU type	Range of values
CSU-1A	32, 64, 128
CSU-1B	32, 64, 128, 256

For AX6300S series switches:

The valid setting range of the maximum number of interfaces that can run IPv6 PIM or MLD for each device varies depending on the MSU type.

The following table describes the valid setting range of the maximum number of interfaces that can run IPv6 PIM or MLD for each MSU type.

Table 29-7: Valid setting range of the maximum number of interfaces that can run IPv6 PIM/MLD for each MSU type

MSU type	Range of values
MSU-1A and MSU-1A1	32, 64, 128
MSU-1B and MSU-1B1	32, 64, 128, 256

Default behavior

For AX6700S series switches:

If the BSU type is BSU-LA, the maximum number of interfaces that can run IPv6 PIM or MLD is 128, and if BSU-LB, it is 256.

For AX6600S series switches:

If the CSU type is CSU-1A, the maximum number of interfaces that can run IPv6 PIM or MLD is 128, and if CSU-1B, it is 256.

For AX6300S series switches:

If the MSU type is MSU-1A or MSU-1A1, the maximum number of interfaces that can run IPv6 PIM or MLD is 128, and if MSU-1B or MSU-1B1, it is 256.

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 mld router

ipv6 pim

ipv6 pim mcache-limit

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*> [OP-NPAR]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies 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:

   For AX6700S series switches:

   The valid setting range of the maximum total number of IPv6 PIM-SM/SSM multicast forwarding entries and negative cache entries for each device varies depending on the BSU type.

   The following table describes the valid setting range of the maximum total number of IPv6 PIM-SM/SSM multicast forwarding entries and negative cache entries for each BSU type.

Table 29-8: Valid setting range of the maximum number of IPv6 PIM-SM/SSM multicast routing entries for each BSU type

BSU type	Range of values
BSU-LA	0 to 1000
BSU-LB	0 to 8000

For AX6600S series switches:

The valid setting range of the maximum total number of IPv6 PIM-SM/SSM multicast forwarding entries and negative cache entries for each device varies depending on the CSU type.

The following table describes the valid setting range of the maximum total number of IPv6 PIM-SM/SSM multicast forwarding entries and negative cache entries for each CSU type.

Table 29-9: Valid setting range of the maximum number of IPv6 PIM-SM/SSM multicast routing entries for each CSU type

CSU type	Range of values
CSU-1A	0 to 1000
CSU-1B	0 to 8000

For AX6300S series switches:

The valid setting range of the maximum total number of IPv6 PIM-SM/SSM multicast forwarding entries and negative cache entries for each device varies depending on the MSU type.

The following table describes the valid setting range of the maximum total number of IPv6 PIM-SM/SSM multicast forwarding entries and negative cache entries for each MSU type.

Table 29-10: Valid setting range of the maximum number of IPv6 PIM-SM/SSM multicast routing entries for each MSU type

MSU type	Range of values
MSU-1A and MSU-1A1	0 to 1000
MSU-1B and MSU-1B1	0 to 8000

Default behavior

There is no limit on the maximum total number of IPv6 PIM-SM/SSM multicast forwarding entries and negative cache entries.

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 maximum total number of IPv6 PIM-SM/SSM multicast forwarding entries and negative cache entries, but do not guarantee operation 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.

Related commands

ipv6 pim

ipv6 pim mroute-limit

Specifies the maximum number of IPv6 PIM-SM/SSM multicast routing 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*> [OP-NPAR]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies global network.

2. Range of values:

   See *Specifiable values for parameters*.

<*number*>

Specifies the maximum number of IPv6 PIM-SM/SSM multicast routing 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:

   For AX6700S series switches:

   The valid setting range of the maximum number of IPv6 PIM-SM/SSM multicast routing entries for each device varies depending on the BSU type.

   The following table describes the valid setting range of the maximum number of IPv6 PIM-SM/SSM multicast routing entries for each BSU type.

Table 29-11: Valid setting range of the maximum number of IPv6 PIM-SM/SSM multicast routing entries for each BSU type

BSU type	Range of values
BSU-LA	0 to 1000
BSU-LB	0 to 8000

   For AX6600S series switches:

   The valid setting range of the maximum number of IPv6 PIM-SM/SSM multicast routing entries for each device varies depending on the CSU type.

   The following table describes the valid setting range of the maximum number of IPv6 PIM-SM/SSM multicast routing entries for each CSU type.

Table 29-12: Valid setting range of the maximum number of IPv6 PIM-SM/SSM multicast routing entries for each CSU type

CSU type	Range of values
CSU-1A	0 to 1000
CSU-1B	0 to 8000

For AX6300S series switches:

The valid setting range of the maximum number of IPv6 PIM-SM/SSM multicast routing entries for each device varies depending on the MSU type.

The following table describes the valid setting range of the maximum number of IPv6 PIM-SM/SSM multicast routing entries for each MSU type.

Table 29-13: Valid setting range of the maximum number of IPv6 PIM-SM/SSM multicast routing entries for each MSU type

MSU type	Range of values
MSU-1A and MSU-1A1	0 to 1000
MSU-1B and MSU-1B1	0 to 8000

Default behavior

There is no limit on the maximum number of IPv6 PIM-SM/SSM multicast routing entries (total of (S, G) and (*, G) entries). 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 the limit of the maximum number of IPv6 PIM-SM/SSM multicast routing entries that can be created for each interface, but do not guarantee operation with the specified value. If the number of IPv6 PIM-SM/SSM multicast routing entries exceeds the setting value of this parameter due to the change of 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 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

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*> [OP-NPAR]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies 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 nonstop-forwarding

Prevents IPv6 PIM-SSM multicast forwarding from being stopped temporarily during a system switchover.

On the other hand, IPv6 PIM-SM multicast forwarding stops temporarily.

Syntax

To set information:

ipv6 pim nonstop-forwarding

To delete information:

no ipv6 pim nonstop-forwarding

Input mode

(config)

Parameters

None

Default behavior

IPv6 PIM-SM and PIM-SSM multicast forwarding stops temporarily during a system switchover.

Impact on communication

None

When the change is applied

The change is applied immediately after the setting value is changed.

Notes

1. If IPv6 multicast is run on the interface of the VRF, this command is not valid.

Related commands

ipv6 multicast-routing

ipv6 pim

ipv6 pim rate-limit cache-misshit

Specifies the upper limit for the number of received multicast packets when there are no corresponding multicast entries.

If the upper limit is exceeded, received multicast packets are discarded.

Syntax

To set information:

ipv6 pim rate-limit cache-misshit {<*num*> | unlimit}

To delete information:

no ipv6 pim rate-limit cache-misshit

Input mode

`(config)`

Parameters

{<*num*> | unlimit}

Specifies the upper limit per second per device.

To not set a limit, specify `unlimit`.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   10 to 3000 or `unlimit`

Default behavior

The upper limit of the number of received multicast packets when there are no corresponding multicast entries is 1000.

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 upper limit for the number of received packets, but do not guarantee operation with the specified value.
2. If you specify a value exceeding the performance limit by using this command, or specify no limit, the maximum transmission rate is the performance limit.

Related commands

ipv6 multicast-routing

ipv6 pim

ipv6 pim rate-limit register-receive

Specifies the upper limit of the number of receivable PIM-Register packets at the rendezvous point.

If the upper limit is exceeded, received PIM-Register packets are discarded.

Syntax

To set information:

ipv6 pim rate-limit register-receive {<*num*> | unlimit}

To delete information:

no ipv6 pim rate-limit register-receive

Input mode

`(config)`

Parameters

{<*num*> | unlimit}

Specifies the upper limit per second per device.

To not set a limit, specify `unlimit`.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   10 to 3000 or `unlimit`

Default behavior

The upper limit of the number of receivable PIM-Register packets at the rendezvous point is 1000.

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 upper limit for the number of received packets, but do not guarantee operation with the specified value.
2. If you specify a value exceeding the performance limit by using this command, or specify no limit, the maximum transmission rate is the performance limit.
3. If access list logging and DHCP snooping are used, the reception cause (register-receive) of the target packets for this command is controlled by the setting of the `ipv6 pim rate-limit register-request` command rather than this command.

Related commands

ipv6 multicast-routing

ipv6 pim

ipv6 pim rate-limit register-request

Specifies the upper limit of the number of packets when the first-hop router sends received multicast packets as PIM-Register packets to the rendezvous point.

If the upper limit is exceeded, received multicast packets are discarded.

Syntax

To set information:

ipv6 pim rate-limit register-request {<*num*> | unlimit}

To delete information:

no ipv6 pim rate-limit register-request

Input mode

`(config)`

Parameters

{<*num*> | unlimit}

Specifies the upper limit per second per device for multicast packets.

To not set a limit, specify `unlimit`.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   10 to 3000 or `unlimit`

Default behavior

The upper limit of the number of received packets when the first-hop router sends received multicast packets as PIM-Register packets to the rendezvous point is 1000.

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 upper limit for the number of received packets, but do not guarantee operation with the specified value.
2. If you specify a value exceeding the performance limit by using this command, or specify no limit, the maximum transmission rate is the performance limit.
3. If access list logging and DHCP snooping are used, PIM-Register packets whose reception cause is controlled by register-receive are also controlled by the setting of this command rather than the `ipv6 pim rate-limit register-receive` command.

Related commands

ipv6 multicast-routing

ipv6 pim

ipv6 pim rate-limit wrong-incoming-interface

Specifies the upper limit of the number of multicast packets that can be received from input interfaces other than the input interface of multicast entries.

If the upper limit is exceeded, received multicast packets are discarded.

Syntax

To set information:

ipv6 pim rate-limit wrong-incoming-interface {<*num*> | unlimit}

To delete information:

no ipv6 pim rate-limit wrong-incoming-interface

Input mode

`(config)`

Parameters

{<*num*> | unlimit}

Specifies the upper limit per second per device.

To not set a limit, specify `unlimit`.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   10 to 3000 or `unlimit`

Default behavior

The upper limit of the number of multicast packets that can be received from input interfaces other than the input interface of multicast entries is 100.

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 upper limit for the number of received packets, but do not guarantee operation with the specified value.
2. If you specify a value exceeding the performance limit by using this command, or specify no limit, the maximum transmission rate is the performance limit.

Related commands

ipv6 multicast-routing

ipv6 pim

ipv6 pim register-probe-time

Specifies the start time for null-Register transmission based on the suppression time for Register transmission.

Syntax

To set or change information:

ipv6 pim [vrf <*vrf id*>] register-probe-time <*seconds*>

To delete information:

no ipv6 pim [vrf <*vrf id*>] register-probe-time

Input mode

(config)

Parameters

vrf <*vrf id*> [OP-NPAR]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies global network.

2. Range of values:

   See *Specifiable values for parameters*.

<*seconds*>

Specifies the start time (in seconds) for null-Register transmission based on the suppression time for Register transmission.

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 transmission based on the suppression time for Register transmission is 5 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 5 seconds.

Related commands

ipv6 pim

ipv6 pim rp-address

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*> [OP-NPAR]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies 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 details about addresses that can be specified in the access list, see *31.3.1 Addresses subject to forwarding* in the manual *Configuration Guide Vol. 3 For Version 11.7*.

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 set by the `ipv6 access-list` command is specified, this command is on the default behavior when the access list parameter is omitted.
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

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*> [OP-NPAR]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies 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:

   `method1` or `method2`

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

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*> [OP-NPAR]

Specifies the target VRF.

1. Default value when this parameter is omitted:

   Specifies 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 the PIM-SSM target group address by using an access list.

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. Specify a single address for the address list. If multiple addresses are specified, it is undefined which address is used.

2. For details about addresses that can be specified in the access list, see *31.3.1 Addresses subject to forwarding* in the manual *Configuration Guide Vol. 3 For Version 11.7*.
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 pim

ipv6 access-list

ipv6 pim vrf-gateway [OP-NPAR]

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 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

Chapter

30. VRF [OP-NPAR]

import inter-vrf [OP-NPAR]
import multicast inter-vrf [OP-NPAR]
ipv6 import inter-vrf [OP-NPAR]
ipv6 import multicast inter-vrf [OP-NPAR]
ipv6 maximum routes [OP-NPAR]
maximum routes [OP-NPAR]
vrf definition [OP-NPAR]
vrf mode [OP-NPAR]

import inter-vrf [OP-NPAR]

Applies a filter to control which IPv4 routes are imported from another VRF or 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 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 [OP-NPAR]

Applies a filter to control which multicast routes are imported from another VRF or 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 global network

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. Only `permit` can be used for the route-map specified.
2. The route-map can use only an access-list specification with a `match ip address` command or a `match vrf` command.
3. If the route-map referenced by this command is not set, you can request forwarding from another VRF or global network.

   To prevent multicast forwarding to unwanted VRFs or the global network, always set the route-map parameter first, and then set the import multicast inter-vrf command.
4. Only access lists that are set by the following commands can be specified in the `match ip address` command.

   - `ip access-list standard` command
   - An `access-list` command which specifies the same <*access list number*> as specified in an `ip access-list standard` command

   For details, see *access-list* in the manual *Configuration Command Reference Vol. 2 For*

Version 11.7.

5. If the `match ip address` command does not set an access list for <*access list name*>, the default address (224.0.0.0/4) is used.
6. If you specify a wildcard mask for the access list, use a bit string with consecutive bits set, starting from the most significant bit.

Related commands

access-list

match ip address

match vrf

route-map

ipv6 import inter-vrf [OP-NPAR]

Applies a filter to control which IPv6 routes are imported from another VRF or 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 not imported from another VRF or 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 [OP-NPAR]

Applies a filter to control which multicast routes are imported from another VRF or 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 global network

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Notes

1. Only `permit` can be used for the route-map specified.
2. The route-map can use only an access-list specification with a `match ipv6 address` command or a `match vrf` command.
3. If the route-map referenced by this command is not set, you can request forwarding from another VRF or global network.

   To prevent multicast forwarding to unwanted VRFs or the global network, always set the route-map parameter first, and then set the ipv6 import multicast inter-vrf command.
4. Only access lists that are set by the following command can be specified in the `match ipv6 address` command.

   - `ipv6 access-list` command

   For details, see *access-list* in the manual *Configuration Command Reference Vol. 2 For Version 11.7*.
5. Specify the source IPv6 address for the address set in <*access list name*> in the access-list

specified in the `match ipv6 address` command.

6. If an access list is not set for <*access list name*> in the `match ipv6 address` command, the command uses the default address (ff00::/8).

Related commands

ipv6 access-list

match ipv6 address

match vrf

route-map

ipv6 maximum routes [OP-NPAR]

Specifies the maximum number of IPv6 routes that can be contained in the corresponding 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 an operation warning message.

When the percentage of the number of routes learned by the corresponding VRF to the maximum number of routes exceeds this threshold, a warning message is output. This warning message is output to the event log of the IP routing program.

Additionally, when this parameter is specified, if the number of routes learned by the corresponding VRF exceeds the maximum number of routes specified for <*limit*>, the switch discards subsequently learned routes.

warn-only

When the number of routes learned at the corresponding VRF exceeds the specified maximum number of routes, a warning message is output, but the addition of routes is not stopped.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   <*warn threshold*> or `warn-only`

   Specify a value from 1 to 100 (in decimal) for <*warn threshold*>.

Default behavior

There is no limit on the maximum number of IPv6 routes in the corresponding VRF.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Note that, if you change the <*limit*> to a smaller value after specifying <*warn threshold*>, if the number of routes learned at that point already exceeds the maximum number of routes after the change, the number of routes is not immediately reduced to the <*limit*> value.

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 [OP-NPAR]

Specifies the maximum number of IPv4 routes that can be contained in the corresponding 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 an operation warning message.

When the percentage of the number of routes learned by the corresponding VRF to the maximum number of routes exceeds this threshold, a warning message is output. This warning message is output to the event log of the IP routing program.

Additionally, when this parameter is specified, if the number of routes learned by the corresponding VRF exceeds the maximum number of routes specified for <*limit*>, the switch discards subsequently learned routes.

warn-only

When the number of routes learned at the corresponding VRF exceeds the specified maximum number of routes, a warning message is output, but the addition of routes is not stopped.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   <*warn threshold*> or `warn-only`

   Specify a value from 1 to 100 (in decimal) for <*warn threshold*>.

Default behavior

There is no limit on the maximum number of IPv4 routes in the corresponding VRF.

Impact on communication

None

When the change is applied

The change is applied immediately after setting values are changed.

Note that, if you change the <*limit*> to a smaller value after specifying <*warn threshold*>, if the number of routes learned at that point already exceeds the maximum number of routes after the change, the number of routes is not immediately reduced to the <*limit*> value.

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 [OP-NPAR]

Configures VRF-related operation information.

After this command is entered, the mode switches 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 the operation information of the VRF or global network.

<*vrf id*>

Sets the operation information of the specified VRF.

global

Sets the operation information of the global network.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   Specify <*vrf id*> or `global`.

   Specify a VRF ID for <*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 mode

vrf forwarding

vrf mode [OP-NPAR]

Sets the mode to allow the VRF and Ring Protocol to operate concurrently or exclusively on the same switch.

This command can select two types of modes: a mode that allows Layer 2 control by the Ring Protocol as well as supporting VRF, and a mode that supports the maximum number of VRFs while not supporting all the Layer 2 control functionality. These modes allow you to select either operation with the maximum number of VRFs or concurrent operation of VRFs with Layer 2 control functionality.

Because this command is used to configure the basic operating conditions of the Switch, make sure you set this command during first-stage set up before starting actual online operation. We recommend that you do not make any changes during operation.

Syntax

To set or change information:

vrf mode {axrp-enable | l2protocol-disable | axrp-enable-ipv4-ipv6 | l2protocol-disable-ipv4-ipv6 | gsrp-enable-ipv4-ipv6}

To delete information:

no vrf mode

Input mode

(config)

Parameters

{axrp-enable | l2protocol-disable | axrp-enable-ipv4-ipv6 | l2protocol-disable-ipv4-ipv6 | gsrp-enable-ipv4-ipv6}

Specifies the VRF operation mode.

axrp-enable

The Ring protocol operates, and VRFs in which only IPv4 packets are subject to routing operate.

l2protocol-disable

The Layer 2 protocol does not operate, and VRFs in which only IPv4 packets are subject to routing operate.

axrp-enable-ipv4-ipv6

The Ring protocol operates, and VRFs operate with IPv4 and IPv6.

l2protocol-disable-ipv4-ipv6

The Layer 2 protocol does not operate, and the VRF operates with IPv4 and IPv6.

gsrp-enable-ipv4-ipv6

The GSRP operates, and the VRF operates with IPv4 and IPv6.

1. Default value when this parameter is omitted:

   This parameter cannot be omitted.

2. Range of values:

   axrp-enable, l2protocol-disable, axrp-enable-ipv4-ipv6, l2protocol-disable-ipv4-ipv6, or gsrp-enable-ipv4-ipv6

Default behavior

The VRF functionality does not operate.

Impact on communication

For AX6700S series switches:

Because the BSU restarts, communication via the Switch stops until the restart processing is completed.

For AX6600S and AX6300S series switches:

Because the PSP restarts, communication via the Switch stops until the restart processing is completed.

When the change is applied

For AX6700S series switches:

After the setting value is changed, the change is applied when y is specified for (y/n) confirmation, and the BSU restarts automatically.

For AX6600S and AX6300S series switches:

After the setting value is changed, the change is applied when y is specified for (y/n) confirmation, and the PSP restarts automatically.

Notes

None

Related commands

vrf definition

Chapter 31. Error Messages Displayed When Editing the Configuration

31.1 Error messages displayed when editing the configuration

31.1 Error messages displayed when editing the configuration

31.1.1 Common

See *21.1.1 Common* in the manual *Configuration Command Reference Vol. 1 For Version 11.7*.

31.1.2 IPv4, ARP, and ICMP information

Table 31-1: IPv4, ARP, and ICMP error messages

Message	Description
Cannot 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.
Cannot 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.
Cannot delete IP configuration referred by Virtual Router configuration.	Virtual router information exists. Delete the virtual router information, and then delete the IP information.
Cannot delete IP configuration when NTP broadcast configuration has existed.	NTP broadcast information exists. Delete the NTP broadcast information, and then delete the IP information.
Cannot delete IP configuration with ARP configuration.	ARP information exists. Delete the ARP information, and then delete the IP information.
Cannot 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, and 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 change IP address because there is an inconsistency between IP address and policy based routing configuration.	Because of the following reason, the IP address cannot be changed: • When the IP address was changed, the changed IP address and the next hop IPv4 address that is set in the parameter specifying policy-based routing of the access list were not on the same network. • When the IP address was changed, the next hop IPv4 address that is set in the parameter specifying policy-based routing of the access list becomes the direct broadcast address of the network connecting to the specified output destination interface. Delete the setting of policy-based routing, and then change the IP address.
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 and deleted. Delete the IP address of the loopback interface.
Cannot delete IP address.	The IP address cannot be deleted. The IPv4 access list, Advance access list, IPv4 QoS flow list, and Advance QoS flow list for which `own` and `own-address` are specified are applied to the corresponding interface. Delete the application of the IPv4 access list, Advance access list, IPv4 QoS flow list, and Advance QoS flow list, and then delete the IP address.
Cannot delete IP address because policy based routing is set.	The IP address cannot be deleted. The corresponding interface is specified for the destination interface in the setting of policy-based routing. Delete the setting of policy-based routing, and then delete the IP address.

Message	Description
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.
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 is duplicated by another loopback interface. Specify a VRF ID that is different from the other loopback interfaces.
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 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 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.
uRPF cannot be enabled because the maximum number for multipaths exceeds the limit of 8.	The uRPF functionality cannot be enabled because the maximum number of paths exceeds the limit of eight. To use the uRPF functionality, set the maximum number of paths to eight or less.
uRPF mode of IPv4 and IPv6 are inconsistent.	The uRPF operating modes of IPv4 and IPv6 are inconsistent. Set the same uRPF operating mode.

31.1.3 Policy-based routing information

Table 31-2: Policy-based routing error messages

Message	Description
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. • IPv6 functionality is not enabled for the specified destination interface. Check for the above problems, fix the problems, and then set policy-based routing.

Message	Description
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 address. If you use IPv4 policy-based routing, for the next-hop 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 If you use IPv6 policy-based routing, for the next-hop address, specify the IPv6 address of a network connected to the specified destination interface and not the address set for the specified destination interface.
Can't execute command it because data is not corresponding.	The list number specified by the `policy-list resequence` command does not exist.
The list number specified by resequence of policy base routing does not have the target route.	There is no target route in the list number specified by the `policy-list resequence` command.
The maximum number of entries are exceeded.	The number of routes in the policy-based routing group exceeds the capacity limit of the Switch.
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.
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.

31.1.4 DHCP relay functionality

Table 31-3: 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.

31.1.5 DHCP server functionality

Table 31-4: 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 functionality. Specify another interface name.

Message	Description
<*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.
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.

31.1.6 Route summarization (IPv4) information

Table 31-5: Route summarization (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.

31.1.7 Static routing (IPv4) information

Table 31-6: 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.
The maximum number of multipaths for IPv4 static routes cannot be specified exceeding the limit of 8 because uRPF is used.	Because the uRPF functionality is used, the maximum number of paths cannot be specified beyond the limit of eight. To use the uRPF functionality, set the maximum number of paths to eight or less.

31.1.8 RIP information

Table 31-7: 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.

31.1.9 OSPF information

Table 31-8: 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 maximum number of multipaths for OSPF routes cannot be specified exceeding the limit of 8 because uRPF is used.	Because the uRPF functionality is used, the maximum number of paths cannot be specified beyond the limit of eight. To use the uRPF functionality, set the maximum number of paths to eight or less.
The source router ID and the neighbor router ID belonging to a virtual link must be different.	The source router ID and the neighbor router ID of a virtual link must be different. Specify a different value from the source router ID.
Virtual links cannot 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 cannot 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.

31.1.10 BGP4 information [OP-BGP]

Table 31-9: 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 interval for sending KEEPALIVE messages is larger than the hold timer. Specify a value which is smaller than the hold timer for the interval for sending 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 specified range 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 interval for sending 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.
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-override` command is specified for an internal peer or a 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 number of multipaths for BGP4 routes cannot be specified exceeding the limit of 8 because uRPF is used.	Because the uRPF functionality is used, the maximum number of paths cannot be specified beyond the limit of eight. To use the uRPF functionality, set the maximum number of paths to eight or less.

Message	Description
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.

31.1.11 Route filtering information

Table 31-10: 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.
Cannot 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 specified range 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 specified range 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 specified range 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 specified range 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.

Message	Description
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`.
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.	VRFs cannot be specified for match vrf beyond the limit of 16. VRFs to be specified for match vrf must be within 16.

31.1.12 IPv4 multicast routing protocol information

Table 31-11: 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.
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 31-12: The following table shows the number of interfaces on which IPv4 PIM or IGMP can be configured.

#	Specified max-interface value	Configurable number of interfaces	
		PIM	IGMP
1	32	31	31
2	64	63	63
3	128	127	127
4	256	255	255

31.1.13 IPv6, NDP, and ICMPv6 information

Table 31-13: IPv6, NDP, and ICMPv6 error messages

Message	Description
Cannot delete IP configuration referred by Virtual Router configuration.	Virtual router information exists. Delete the virtual router information, and then delete the IP information.
Cannot delete IP configuration with NDP configuration.	NDP information exists. Delete the NDP information, and then delete the IP information.
Cannot add IP address.	An IP address cannot be added. The IPv6 access list, Advance access list, IPv6 QoS flow list, and Advance QoS flow list for which `own` and `own-address` are specified are applied to the corresponding interface. Delete the application of the IPv6 access list, Advance access list, IPv6 QoS flow list, and Advance QoS flow list, and then add the IP address.
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, and deleted. Delete the `ipv6 enable` and `ipv6 address` commands of the interface.
Cannot assign IPv6 address since vrf mode is not support IPv6 protocol.	Because the VRF mode does not support IPv6, an IPv6 address cannot be set for interfaces other than the global network. Change the mode to the VRF mode supporting IPv6, and then set the IPv6 address.
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.

Message	Description
Cannot change IP address because there is an inconsistency between IP address and policy based routing configuration.	Because of the following reason, the IP address cannot be changed: • When the IP address is changed, the changed IP address and the next hop IPv6 address that is set in the parameter specifying policy-based routing of the access list are not on the same network. Delete the setting of policy-based routing, and then change the IP address.
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 and deleted. Delete the IPv6 address of the loopback interface.
Cannot delete IP address.	The IP address cannot be deleted. The IPv6 access list, Advance access list, IPv6 QoS flow list, and Advance QoS flow list for which `own` and `own-address` are specified are applied to the corresponding interface. Delete the application of the IPv6 access list, Advance access list, IPv6 QoS flow list, and Advance QoS flow list, and then delete the IP address.
Cannot delete IP address because policy based routing is set.	The IP address cannot be deleted. The corresponding interface is specified for the destination interface in the setting of policy-based routing. Delete the setting of policy-based routing, and then delete the IP address.
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.
Cannot delete the configuration referred by policy based routing configuration.	Because the corresponding interface is specified for the destination interface in the setting of IPv6 policy-based routing, the configuration cannot be deleted. Delete the setting of policy-based routing, and then delete the configuration.
Cannot set IP address because there is an inconsistency between IP address and policy based routing configuration.	Because of the following reason, the IP address cannot be changed: • The link-local address to be set is the same IP address as the next-hop address in the parameter specifying policy-based routing of the access list. Delete the setting of policy-based routing, and then set the IP address.
Duplicate IPv6 address.	The same IPv6 address has been set. Make sure that all IPv6 addresses are unique.
Duplicate prefix.	An IPv6 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.
Invalid IPv6 address. -- <*value1*>	The IPv6 address or IPv6 link-local address is invalid. Set a correct IPv6 address.
	<*value1*>: Invalid value
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 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.

Message	Description
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.
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.

31.1.14 RA information

Table 31-14: 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.
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.
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.

31.1.15 IPv6 DHCP relay information [OP-DH6R]

Table 31-15: 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 functionality. Set the `no service ipv6 dhcp` command to disable the IPv6 DHCP server functionality, and then use IPv6 DHCP relays.

31.1.16 IPv6 DHCP server functionality

Table 31-16: IPv6 DHCP server functionality 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`.
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.

31.1.17 Route summarization (IPv6) information

Table 31-17: Route summarization (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.

31.1.18 Static routing (IPv6) information

Table 31-18: 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.

Message	Description
The maximum number of multipaths for IPv4 static routes cannot be specified exceeding the limit of 8 because uRPF is used.	Because the uRPF functionality is used, the maximum number of paths cannot be specified beyond the limit of eight. To use the uRPF functionality, set the maximum number of paths to eight or less.

31.1.19 OSPFv3 information

Table 31-19: 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 maximum number of multipaths for OSPFv3 routes cannot be specified exceeding the limit of 8 because uRPF is used.	Because the uRPF functionality is used, the maximum number of paths cannot be specified beyond the limit of eight. To use the uRPF functionality, set the maximum number of paths to eight or less.
The source router ID and the neighbor router ID belonging to a virtual link must be different.	The source router ID and the neighbor router ID of a virtual link must be different. Specify a different value from the source router ID.
Virtual links cannot 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.

31.1.20 BGP4+ information [OP-BGP]

Table 31-20: 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 interval for sending KEEPALIVE messages is larger than the hold timer. Specify a value which is smaller than the hold timer for the interval for sending 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 specified range 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`.

Message	Description
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 interval for sending 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-override` command is specified for an internal peer or a 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 number of multipaths for BGP4+ routes cannot be specified exceeding the limit of 8 because uRPF is used.	Because the uRPF functionality is used, the maximum number of paths cannot be specified beyond the limit of eight. To use the uRPF functionality, set the maximum number of paths to eight or less.
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.
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.

Message	Description
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.

31.1.21 IPv6 multicast routing protocol information

Table 31-21: 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 total number of groups per interface exceeds the maximum value.	The total number of static group addresses per interface exceeds the maximum number. Delete unnecessary static group address settings.

#: The following table shows the number of interfaces on which IPv6 PIM or MLD can be configured.

Table 31-22: Maximum number of interfaces for which IPv6 PIM or MLD can be configured

#	Specified max-interface value	Configurable number of interfaces	
		PIM	MLD
1	32	31	31
2	64	63	63
3	128	127	127
4	256	255	255

31.1.22 VRF information [OP-NPAR]

Table 31-23: 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 which exist in other configurations.
Cannot change vrf mode since IPv6 addresses are assigned on VRF interfaces.	The vrf mode setting cannot be changed because the configuration of the IPv6 VRF interface exists. Check the VRF settings.
Cannot delete vrf mode, because other VRF configration is configured.	The vrf mode setting cannot be deleted because another VRF configuration is set. Check the VRF settings.

Message	Description
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
Inconsistency is found between the vrf mode and the gsrp configuration.	The VRF cannot be set because of the GSRP configuration.
Inconsistency is found between the vrf mode and the spanning-tree configuration.	The VRF cannot be set because of the spanning tree configuration.
The relation of the VRF ID and vrf mode is not suitable.	The relation between the range of the VRF ID and vrf mode is improper. To use the Ring Protocol functionality, use VRF IDs in the range from 2 to 64. To use the GSRP functionality, use VRF IDs in the range from 2 to 125.
vrf mode not configured.	vrf mode is not set. Check the VRF settings.

Index

A

address-family ipv4 [BGP4] 188
address-family ipv4 [RIP] 108
address-family ipv6 189
area authentication 136
area default-cost [OSPF] 138
area default-cost [OSPFv3] 500
area nssa 140
area nssa translate 142
area range [OSPF] 144
area range [OSPFv3] 501
area stub [OSPF] 146
area stub [OSPFv3] 503
area virtual-link [OSPF] 148
area virtual-link [OSPFv3] 505
areaid-format [OSPF] 151
areaid-format [OSPFv3] 507
arp 10
arp discard-unresolved-packets 12
arp max-send-count 13
arp send-interval 14
arp timeout 15
arp-limit 16
auto-summary 109

B

bgp always-compare-med 190
bgp bestpath compare-routerid 191
bgp client-to-client reflection 192
bgp cluster-id 193
bgp confederation identifier 195
bgp confederation peers 196
bgp dampening 198
bgp default local-preference 200
bgp graceful-restart mode 201
bgp graceful-restart restart-time 203
bgp graceful-restart stalepath-time 205
bgp nexthop 206
bgp router-id 208

C

client-name 66
command description format 2

D

default (policy-list) 38
default-information originate 210
default-metric [BGP4] 211
default-metric [OSPF] 152
default-metric [OSPFv3] 508
default-metric [RIP] 110
default-metric [RIPng] 486
default-router 67
default-state 39
disable 40
disable [BGP4] 213
disable [OSPF] 153
disable [OSPFv3] 509
disable [RIP] 112
disable [RIPng] 487
distance [RIP] 113
distance [RIPng] 488
distance bgp 214
distance ospf [OSPF] 154
distance ospf [OSPFv3] 510
distribute-list in (BGP4) 278
distribute-list in (BGP4+) 280
distribute-list in (OSPF) 281
distribute-list in (OSPFv3) 282
distribute-list in (RIP) 283
distribute-list in (RIPng) 285
distribute-list out (BGP4) 287
distribute-list out (BGP4+) 289
distribute-list out (OSPF) 291
distribute-list out (OSPFv3) 293
distribute-list out (RIP) 294
distribute-list out (RIPng) 296
dns-server [DHCP server functionality] 68
dns-server [IPv6 DHCP server functionality] 452
domain-name [DHCP server functionality] 69
domain-name [IPv6 DHCP server functionality] 453

E

exit-address-family [BGP4] 216
exit-address-family [RIP] 114

F

failure detection 41

G

generate-secondary-route [RIP] 115
generate-secondary-route [RIPng] 489
graceful-restart mode [OSPF] 156
graceful-restart mode [OSPFv3] 512
graceful-restart restart-time [OSPF] 157
graceful-restart restart-time [OSPFv3] 513
graceful-restart strict-lsa-checking [OSPF] 158
graceful-restart strict-lsa-checking [OSPFv3] 514

H

hardware-address 70
host 71

I

import inter-vrf 594
import multicast inter-vrf 595
inherit-metric [RIP] 116
inherit-metric [RIPng] 490
interface loopback 30
interface null 36
interval 43
ip address 18
ip address (loopback) 32
ip as-path access-list 298
ip auto-class-route 90
ip bootp-hops 62
ip community-list 300
ip dhcp dynamic-dns-update 73
ip dhcp excluded-address 74
ip dhcp key 75
ip dhcp pool 76
ip dhcp zone 77
ip helper-address 63
ip icmp rate-limit unreachable 20
ip igmp group-limit (global) 354
ip igmp group-limit (interface) 356
ip igmp router 357
ip igmp source-limit (global) 358
ip igmp source-limit (interface) 360
ip igmp ssm-map enable 362
ip igmp ssm-map static 363
ip igmp static-group 365
ip igmp version 366
ip local-proxy-arp 22
ip mtu 23
ip multicast protocol 368
ip multicast-routing 367
ip ospf area 159
ip ospf authentication 161
ip ospf authentication-key 162
ip ospf cost 163
ip ospf dead-interval 164
ip ospf hello-interval 165
ip ospf message-digest-key 166
ip ospf network 168
ip ospf priority 170
ip ospf retransmit-interval 171
ip ospf transmit-delay 172
ip pim accept-bootstrap 369
ip pim bsr-candidate 370
ip pim deletion-delay-time 372
ip pim dense-mode 374
ip pim keep-alive-time 375
ip pim max-interface 377
ip pim mcache-limit 379
ip pim message-interval (global) 382
ip pim message-interval (interface) 384
ip pim mroute-limit 385
ip pim negative-cache-time 387
ip pim nonstop-forwarding 388
ip pim query-interval (global) 389
ip pim query-interval (interface) 390
ip pim rate-limit cache-misshit 391
ip pim rate-limit register-receive 392
ip pim rate-limit register-request 393
ip pim rate-limit wrong-incoming-interface 394
ip pim register-checksum 395
ip pim register-probe-time 397
ip pim rp-address 398
ip pim rp-candidate 400
ip pim rp-mapping-algorithm 402
ip pim sparse-mode 404
ip pim ssm 405
ip pim vrf-gateway 407
ip prefix-list 302
ip proxy-arp 24
ip redirects 25
ip relay-agent-address 64
ip rip authentication key 117
ip rip v2-broadcast 119
ip rip version 120
ip route 98
ip route static maximum-paths 102
ip route static poll-interval 103
ip route static poll-multiplier 104
ip source-route 26
ip subnet-broadcast 27
ip summary-address 94
ipv6 address 410
ipv6 address (loopback) 425
ipv6 dhcp pool 454
ipv6 dhcp relay destination 446
ipv6 dhcp relay hop-limit 447
ipv6 dhcp relay static-route-setting 448
ipv6 dhcp server 455
ipv6 dhcp static-route-setting 457
ipv6 enable 412
ipv6 hop-limit 430
ipv6 icmp error-interval 413
ipv6 icmp nodeinfo-query 414
ipv6 import inter-vrf 597
ipv6 import multicast inter-vrf 598
ipv6 local pool 458
ipv6 maximum routes 600
ipv6 mld fast-leave 538
ipv6 mld group-limit (global) 539
ipv6 mld group-limit (interface) 541
ipv6 mld query-interval (global) 542
ipv6 mld query-interval (interface) 543
ipv6 mld router 544
ipv6 mld source-limit (global) 545

ipv6 mld source-limit (interface) 547
ipv6 mld ssm-map enable 548
ipv6 mld ssm-map static 549
ipv6 mld static-group 551
ipv6 mld version 552
ipv6 multicast-routing 553
ipv6 nd link-mtu 431
ipv6 nd managed-config-flag 432
ipv6 nd no-advertise-link-address 433
ipv6 nd ns-interval 434
ipv6 nd other-config-flag 435
ipv6 nd prefix 436
ipv6 nd ra-interval 439
ipv6 nd ra-lifetime 441
ipv6 nd reachable-time 442
ipv6 nd router-preference 443
ipv6 nd suppress-ra 444
ipv6 neighbor 415
ipv6 ospf area 515
ipv6 ospf cost 517
ipv6 ospf dead-interval 518
ipv6 ospf hello-interval 519
ipv6 ospf network 520
ipv6 ospf priority 521
ipv6 ospf retransmit-interval 522
ipv6 ospf transmit-delay 523
ipv6 pim 554
ipv6 pim assert-metric 555
ipv6 pim assert-preference 557
ipv6 pim bsr candidate bsr 559
ipv6 pim bsr candidate rp 561
ipv6 pim deletion-delay-time 563
ipv6 pim direct 565
ipv6 pim hello-interval (global) 566
ipv6 pim hello-interval (interface) 567
ipv6 pim join-prune-interval (global) 568
ipv6 pim join-prune-interval (interface) 569
ipv6 pim keep-alive-time 570
ipv6 pim max-interface 572
ipv6 pim mcache-limit 575
ipv6 pim mroute-limit 577
ipv6 pim negative-cache-time 579
ipv6 pim nonstop-forwarding 580
ipv6 pim rate-limit cache-misshit 581
ipv6 pim rate-limit register-receive 582
ipv6 pim rate-limit register-request 583
ipv6 pim rate-limit wrong-incoming-interface 584
ipv6 pim register-probe-time 585
ipv6 pim rp-address 586
ipv6 pim rp-mapping-algorithm 588
ipv6 pim ssm 590
ipv6 pim vrf-gateway 592
ipv6 prefix-list 305
ipv6 redirects 417
ipv6 rip enable 491
ipv6 rip metric-offset 492
ipv6 route 476
ipv6 route static maximum-paths 480
ipv6 route static poll-interval 481
ipv6 route static poll-multiplier 482
ipv6 router ospf 524
ipv6 router rip 494
ipv6 source-route 418
ipv6 summary-address 472

L

lease 79

M

match as-path 308
match community 309
match interface 310
match ip address 311
match ip route-source 312
match ipv6 address 313
match ipv6 route-source 314
match origin 315
match protocol 316
match route-type 317
match tag 319
match vrf 320
max-lease 81
max-metric router-lsa [OSPF] 173
max-metric router-lsa [OSPFv3] 525
maximum routes 602
maximum-paths [BGP4] 217
maximum-paths [OSPF] 174
maximum-paths [OSPFv3] 526
metric-offset 122

N

nd-limit 419
neighbor [OSPF] 175
neighbor [RIP] 124
neighbor activate 219
neighbor always-nexthop-self 221
neighbor as-override 223
neighbor description 225
neighbor ebgp-multihop 228
neighbor in (BGP4) 321
neighbor in (BGP4+) 323
neighbor maximum-prefix 231
neighbor next-hop-self 234
neighbor out (BGP4) 325
neighbor out (BGP4+) 327
neighbor password 236
neighbor peer-group (assigning members) 239
neighbor peer-group (creating) 242
neighbor permit-asloop 244
neighbor remote-as 246
neighbor remove-private-as 249

neighbor route-reflector-client 251
neighbor send-community 253
neighbor set-nexthop-peer 255
neighbor shutdown 257
neighbor soft-reconfiguration 259
neighbor timers 261
neighbor update-source 264
neighbor weight 267
netbios-name-server 83
netbios-node-type 84
network [BGP4] 269
network [DHCP server functionality] 85
network [OSPF] 177
network [RIP] 126

P

passive-interface [OSPF] 179
passive-interface [OSPFv3] 527
passive-interface [RIP] 128
passive-interface [RIPng] 495
policy-based routing 37
policy-interface (policy-list) 44
policy-list 46
policy-list default-aging-interval 47
policy-list default-init-interval 48
policy-list resequence 49
prefix-delegation 460
prefix-delegation pool 462

R

recover (policy-list) 51
recovery detection 52
redistribute (BGP4) 329
redistribute (BGP4+) 331
redistribute (OSPF) 333
redistribute (OSPFv3) 335
redistribute (RIP) 337
redistribute (RIPng) 339
route-map 341
router bgp 272
router ospf 183
router rip 130
router-id [OSPF] 181
router-id [OSPFv3] 529
routing options delete-delay 91
routing options graceful-restart time-limit 92

S

service dhcp 87
service ipv6 dhcp 464
service ipv6 dhcp relay 449
set as-path prepend count 343
set community 344
set community-delete 345
set distance 346
set local-preference 347
set metric 348
set metric-type 349
set origin 350
set tag 351
sip-domain-name 465
sip-server 466
sntp-server 467
suppress-fa 184

T

timeout 54
timers basic [RIP] 131
timers basic [RIPng] 497
timers bgp 274
timers spf [OSPF] 185
timers spf [OSPFv3] 531
track-object 55
track-object default-aging-interval 56
track-object default-init-interval 57
type icmp 58

V

version 133
vrf definition 604
vrf forwarding 28
vrf forwarding (loopback) 33
vrf mode 605