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*AX3640S/AX3630S Software Manual*

**Configuration Command Reference Vol. 2**  
**For Version 11.10**

AX36S-S005X-H0

**Alaxala**

## ■ Relevant products

This manual applies to the models in the AX3640S and AX3630S series of switches. It also describes the functionality of version 11.10 of the software. The described functionality is that supported by the software OS-L3A-A/OS-L3A and OS-L3L-A/OS-L3L, and by optional licenses.

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## ■ Reading and storing this manual

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

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

## ■ Notes

Information in this document is subject to change without notice.

## ■ Editions history

December 2012 (Edition 18) AX36S-S005X-H0

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## History of Amendments

[For version 11.7]

### Summary of amendments

Item	Changes
Policy-based routing	<ul style="list-style-type: none"><li>This chapter was added.</li></ul>
IPv4 multicast routing protocol information	<ul style="list-style-type: none"><li>The <code>ip pim multiple-negative-cache</code> command was added.</li></ul>
Error messages displayed when editing the configuration	<ul style="list-style-type: none"><li>The subsection <i>Policy-based routing information</i> was added.</li></ul>

[For version 11.6]

Descriptions of AX3650S series switches were moved to the AX3800S/AX3650S Software Manual.

[For version 11.5]

### Summary of amendments

Item	Changes
IPv4, ARP, and ICMP	<ul style="list-style-type: none"><li>The following commands were added: <code>arp discard-unresolved-packets</code> <code>arp-limit</code> <code>vrf forwarding</code></li></ul>
Loopback Interfaces (IPv4)	<ul style="list-style-type: none"><li>A parameter related to VRF has been added to the <code>interface loopback</code> command.</li></ul>
Route Summarization (IPv4)	<ul style="list-style-type: none"><li>A parameter related to VRF was added to the <code>ip summary-address</code> command.</li></ul>
Static Routing (IPv4)	<ul style="list-style-type: none"><li>A parameter related to VRF was added to the <code>ip route</code> command.</li></ul>
RIP	<ul style="list-style-type: none"><li>The following commands were added: <code>address-family ipv4</code> <code>exit-address-family</code></li><li>A description related to VRF was added to the following commands: <code>auto-summary</code> <code>default-metric</code> <code>disable</code> <code>distance</code> <code>generate-secondary-route</code> <code>inherit-metric</code> <code>metric-offset</code> <code>neighbor</code> <code>network</code> <code>passive-interface</code> <code>timers basic</code> <code>version</code></li></ul>
OSPF	<ul style="list-style-type: none"><li>A parameter related to VRF was added to the <code>router ospf</code> command.</li><li>A description related to VRF was added to the following commands: <code>ip ospf area</code> <code>router-id</code></li></ul>

Item	Changes
BGP4	<ul style="list-style-type: none"> <li>• The following commands were added:  address-family ipv4  neighbor as-override  neighbor permit-asloop</li> <li>• 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 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 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</li> <li>• The range of the specifiable prefix length for the <code>network</code> command was changed.</li> </ul>

Item	Changes
Route Filtering (IPv4 and IPv6)	<ul style="list-style-type: none"> <li>The <code>match vrf</code> command was added.</li> <li>A description related to VRF was added to the following commands:  <code>distribute-list in (BGP4)</code>  <code>distribute-list in (BGP4+)</code>  <code>distribute-list in (RIP)</code>  <code>distribute-list out (BGP4)</code>  <code>distribute-list out (BGP4+)</code>  <code>distribute-list out (OSPF)</code>  <code>distribute-list out (OSPFv3)</code>  <code>distribute-list out (RIP)</code>  <code>distribute-list out (RIPng)</code>  <code>match interface</code>  <code>match protocol</code>  <code>neighbor in (BGP4)</code>  <code>neighbor in (BGP4+)</code>  <code>neighbor out (BGP4)</code>  <code>neighbor out (BGP4+)</code>  <code>redistribute (BGP4)</code>  <code>redistribute (BGP4+)</code>  <code>redistribute (OSPF)</code>  <code>redistribute (OSPFv3)</code>  <code>redistribute (RIP)</code>  <code>redistribute (RIPng)</code> </li> </ul>
IPv4 multicast routing protocol information	<ul style="list-style-type: none"> <li>The following commands were added:  <code>ip igmp router</code>  <code>ip pim mcache-limit</code>  <code>ip pim vrf-gateway</code> </li> <li>A description related to VRF was added to the following commands:  <code>ip igmp group-limit (global)</code>  <code>ip igmp source-limit (global)</code>  <code>ip igmp ssm-map enable</code>  <code>ip igmp ssm-map static</code>  <code>ip multicast-routing</code>  <code>ip pim bsr-candidate</code>  <code>ip pim deletion-delay-time</code>  <code>ip pim keep-alive-time</code>  <code>ip pim message-interval (global)</code>  <code>ip pim mroute-limit</code>  <code>ip pim negative-cache-time</code>  <code>ip pim query-interval (global)</code>  <code>ip pim register-checksum</code>  <code>ip pim register-probe-time</code>  <code>ip pim rp-address</code>  <code>ip pim rp-candidate</code>  <code>ip pim rp-mapping algorithm</code>  <code>ip pim ssm</code> </li> </ul>
IPv6, NDP, and ICMPv6	<ul style="list-style-type: none"> <li>The following commands were added:  <code>nd-limit</code>  <code>vrf forwarding</code> </li> </ul>
Loopback Interfaces (IPv6)	<ul style="list-style-type: none"> <li>The <code>vrf forwarding</code> command was added.</li> </ul>
Route Summarization (IPv6)	<ul style="list-style-type: none"> <li>A parameter related to VRF was added to the <code>ipv6 summary-address</code> command.</li> <li>The range of the specifiable prefix length for the <code>ipv6 summary-address</code> command was changed.</li> </ul>

Item	Changes
Static Routing (IPv6)	<ul style="list-style-type: none"> <li>A parameter related to VRF was added to the <code>ipv6 route</code> command.</li> <li>The range of the specifiable prefix length for the <code>ipv6 route</code> command was changed.</li> </ul>
RIPng	<ul style="list-style-type: none"> <li>A parameter related to VRF was added to the <code>ipv6 router rip</code> command.</li> </ul>
OSPFv3	<ul style="list-style-type: none"> <li>A parameter related to VRF was added to the <code>ipv6 router ospf</code> command.</li> <li>A description related to VRF was added to the following commands: <code>ipv6 ospf area</code> <code>router-id</code></li> <li>The range of the specifiable prefix length for the <code>area range</code> command was changed.</li> </ul>
IPv6 multicast routing protocol information	<ul style="list-style-type: none"> <li>The following commands were added: <code>ipv6 pim mcache-limit</code> <code>ipv6 pim vrf-gateway</code></li> <li>A description related to VRF was added to the following commands: <code>ipv6 mld group-limit (global)</code> <code>ipv6 mld query-interval (global)</code> <code>ipv6 mld source-limit (global)</code> <code>ipv6 mld ssm-map enable</code> <code>ipv6 mld ssm-map static</code> <code>ipv6 multicast-routing</code> <code>ipv6 pim assert-metric</code> <code>ipv6 pim assert-preference</code> <code>ipv6 pim bsr candidate bsr</code> <code>ipv6 pim bsr candidate rp</code> <code>ipv6 pim deletion-delay-time</code> <code>ipv6 pim hello-interval (global)</code> <code>ipv6 pim join-prune-interval (global)</code> <code>ipv6 pim keep-alive-time</code> <code>ipv6 pim mroute-limit</code> <code>ipv6 pim negative-cache-time</code> <code>ipv6 pim register-probe-time</code> <code>ipv6 pim rp-address</code> <code>ipv6 pim rp-mapping-algorithm</code> <code>ipv6 pim ssm</code></li> <li>The description of the <code>ipv6 pim direct</code> command was changed.</li> </ul>
VRFs	<ul style="list-style-type: none"> <li>This chapter was added.</li> </ul>
Error messages displayed when editing the configuration	<ul style="list-style-type: none"> <li>The subsection <i>VRF information</i> was added.</li> </ul>

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

[For version 11.4]

#### Summary of amendments

Item	Changes
IPv6 DHCP relay	<ul style="list-style-type: none"> <li>This chapter was added.</li> </ul>
Error messages displayed when editing the configuration	<ul style="list-style-type: none"> <li>The subsection <i>IPv6 DHCP relay information</i> was added.</li> </ul>

[For version 11.2]

### Summary of amendments

Item	Changes
IPv4, ARP, and ICMP	<ul style="list-style-type: none"> <li>The <code>ip routing</code> was added.</li> </ul>
OSPF	<ul style="list-style-type: none"> <li>The <code>point-to-point</code> parameter was added to the <code>ip ospf network</code> command.</li> </ul>
OSPFv3	<ul style="list-style-type: none"> <li>The <code>ipv6 ospf network</code> command was added.</li> </ul>

[For version 11.1]

### Summary of amendments

Item	Changes
RIP	<ul style="list-style-type: none"> <li>The <code>ip rip authentication key</code> command was added.</li> </ul>
IPv4 multicast routing protocol information	<ul style="list-style-type: none"> <li>The <code>ip pim rp-mapping-algorithm</code> command was added.</li> </ul>

[For version 11.0]

### Summary of amendments

Item	Changes
Static Routing (IPv4)	<ul style="list-style-type: none"> <li>The description of the <code>ip route static maximum-paths</code> command was changed.</li> </ul>
OSPF	<ul style="list-style-type: none"> <li>The description of the <code>maximum-paths</code> command was changed.</li> </ul>
BGP4	<ul style="list-style-type: none"> <li>The description of the <code>maximum-paths</code> command was changed.</li> </ul>
Static Routing (IPv6)	<ul style="list-style-type: none"> <li>The description of the <code>ip route static maximum-paths</code> command was changed.</li> </ul>
OSPFv3	<ul style="list-style-type: none"> <li>The description of the <code>maximum-paths</code> command was changed.</li> </ul>

[For version 10.8]

### Summary of amendments

Item	Changes
IPv4, ARP, and ICMP	<ul style="list-style-type: none"> <li>The descriptions on <i>Impact on communication</i> of the following commands were changed:  <code>arp max-send-count</code>  <code>arp send-interval</code>  <code>arp timeout</code>  <code>ip address</code>  <code>ip local-proxy-arp</code>  <code>ip mtu</code>  <code>ip proxy-arp</code>  <code>ip redirects (interface)</code>  <code>ip source-route</code>  <code>ip subnet-broadcast</code> </li> </ul>
BGP4	<ul style="list-style-type: none"> <li>The <code>neighbor remove-private-as</code> command was added.</li> </ul>
IPv6, NDP, and ICMPv6	<ul style="list-style-type: none"> <li>The descriptions on <i>Impact on communication</i> of the following commands were changed:  <code>ipv6 address</code>  <code>ipv6 redirects</code> </li> </ul>

[For version 10.6]

### Summary of amendments

Item	Changes
IPv4, ARP, and ICMP	<ul style="list-style-type: none"> <li>The <code>ip local-proxy-arp</code> command was added.</li> <li>The <code>ip redirects (global)</code> command was added.</li> <li>Notes were added to the <code>ip redirects (interface)</code> command.</li> </ul>
Null Interface (IPv4)	<ul style="list-style-type: none"> <li>This chapter was added.</li> </ul>
Static Routing (IPv4)	<ul style="list-style-type: none"> <li>The description of the <code>ip route</code> command was changed to correspond with support for the null interface.</li> </ul>
OSPF	<ul style="list-style-type: none"> <li>The <code>no-summary</code> and <code>no-redistribution</code> parameters were added to the <code>area nssa</code> command.</li> <li>The <code>no-summary</code> parameter was added to the <code>area stub</code> command.</li> </ul>
IPv6, NDP, and ICMPv6	<ul style="list-style-type: none"> <li>Notes were added to the <code>ipv6 redirects</code> command.</li> <li>The <code>ipv6 source-route</code> command was added.</li> </ul>
Null Interface (IPv6)	<ul style="list-style-type: none"> <li>This chapter was added.</li> </ul>
Static Routing (IPv6)	<ul style="list-style-type: none"> <li>The description of the <code>ipv6 route</code> command was changed to correspond with support for the null interface.</li> </ul>
OSPFv3	<ul style="list-style-type: none"> <li>The <code>no-summary</code> parameter was added to the <code>area stub</code> command.</li> </ul>

[For version 10.5]

### Summary of amendments

Item	Changes
RIP	<ul style="list-style-type: none"> <li>The <code>auto-summary</code> command was added.</li> </ul>
RA	<ul style="list-style-type: none"> <li>0 was added to the specifiable values of the <code>&lt;MTU&gt;</code> parameter of the <code>ipv6 nd link-mtu</code> command.</li> </ul>

[For version 10.4]

### Summary of amendments

Item	Changes
BGP4	<ul style="list-style-type: none"> <li>The description of the <code>neighbor activate</code> command was changed.</li> <li>The description of the <code>neighbor always-nexthop-self</code> command was changed.</li> <li>The description of the <code>neighbor description</code> command was changed.</li> <li>The description of the <code>neighbor ebgp-multihop</code> command was changed.</li> <li>The description of the <code>neighbor maximum-prefix</code> command was changed.</li> <li>The description of the <code>neighbor next-hop-self</code> command was changed.</li> <li>The description of the <code>neighbor password</code> command was changed.</li> <li>The <code>neighbor peer-group (assigning members)</code> command was added.</li> <li>The <code>neighbor peer-group (creating)</code> command was added.</li> <li>The description of the <code>neighbor remote-as</code> command was changed.</li> <li>The description of the <code>neighbor route-reflector-client</code> command was changed.</li> <li>The description of the <code>neighbor send-community</code> command was changed.</li> <li>The description of the <code>neighbor set-nexthop-peer</code> command was changed.</li> <li>The description of the <code>neighbor shutdown</code> command was changed.</li> <li>The description of the <code>neighbor soft-reconfiguration</code> command was changed.</li> <li>The description of the <code>neighbor timers</code> command was changed.</li> <li>The description of the <code>neighbor update-source</code> command was changed.</li> <li>The description of the <code>neighbor weight</code> command was changed.</li> </ul>



Item	Changes
Route Filtering (IPv4 and IPv6)	<ul style="list-style-type: none"> <li>The description of the <code>neighbor in (BGP4)</code> command was changed.</li> <li>The description of the <code>neighbor in (BGP4+)</code> command was changed.</li> <li>The description of the <code>neighbor out (BGP4)</code> command was changed.</li> <li>The description of the <code>neighbor out (BGP4+)</code> command was changed.</li> </ul>

[For version 10.3]

#### Summary of amendments

Item	Changes
OSPF	<ul style="list-style-type: none"> <li>The description of the <code>area authentication</code> command was changed.</li> <li>The description of the <code>area default-cost</code> command was changed.</li> <li>The description of the <code>area nssa</code> command was changed.</li> <li>The description of the <code>area nssa translate</code> command was changed.</li> <li>The description of the <code>area range</code> command was changed.</li> <li>The description of the <code>area stub</code> command was changed.</li> <li>The description of the <code>area virtual-link</code> command was changed.</li> <li>The <code>areaid-format</code> command was added.</li> <li>The <code>graceful-restart strict-lsa-checking</code> command was added.</li> <li>The description of the <code>ip ospf area</code> command was changed.</li> <li>The description of the <code>network</code> command was changed.</li> </ul>
BGP4	<ul style="list-style-type: none"> <li>The <code>bgp bestpath compare-routerid</code> command was added.</li> <li>The <code>bgp nexthop</code> command was added.</li> </ul>
IPv4 multicast routing protocol information	<ul style="list-style-type: none"> <li>The <code>ip igmp group-limit</code> command was added.</li> <li>The <code>ip igmp source-limit</code> command was added.</li> <li>The <code>ip igmp static-group</code> command was added.</li> <li>The <code>ip igmp version</code> command was added.</li> </ul>
IPv6, NDP, and ICMPv6	<ul style="list-style-type: none"> <li>The description of the <code>ipv6 address</code> command was changed.</li> </ul>
OSPFv3	<ul style="list-style-type: none"> <li>The description of the <code>area default-cost</code> command was changed.</li> <li>The description of the <code>area range</code> command was changed.</li> <li>The description of the <code>area stub</code> command was changed.</li> <li>The description of the <code>area virtual-link</code> command was changed.</li> <li>The <code>areaid-format</code> command was added.</li> <li>The <code>graceful-restart strict-lsa-checking</code> command was added.</li> <li>The description of the <code>ipv6 ospf area</code> command was changed.</li> </ul>

[For version 10.2]

#### Summary of amendments

Item	Changes
IPv4, ARP, and ICMP	<ul style="list-style-type: none"> <li>The description of the <code>ip icmp rate-limit unreachable</code> command was changed.</li> </ul>
OSPF	<ul style="list-style-type: none"> <li>The <code>max-metric router-lsa</code> command was added.</li> <li>The description of the <code>ip ospf area</code> command was changed.</li> <li>The description of the <code>router-id</code> command was changed.</li> </ul>

Item	Changes
BGP4	<ul style="list-style-type: none"> <li>• The description of router bgp was changed.</li> <li>• The description of distance bgp was changed.</li> <li>• The bgp client-to-client reflection command was added.</li> <li>• The bgp cluster-id command was added.</li> <li>• The bgp confederation identifier command was added.</li> <li>• The bgp confederation peers command was added.</li> <li>• The bgp dampening command was added.</li> <li>• The bgp graceful-restart mode command was added.</li> <li>• The bgp graceful-restart restart-time command was added.</li> <li>• The bgp graceful-restart stalepath-time command was added.</li> <li>• The description of bgp router-id was changed.</li> <li>• The description of neighbor ebgp-multihop was changed.</li> <li>• The description of neighbor next-hop-self was changed.</li> <li>• The description of neighbor remote-as was changed.</li> <li>• The neighbor route-reflector-client command was added.</li> <li>• The neighbor always-nexthop-self command was added.</li> <li>• The neighbor set-nexthop-peer command was added.</li> <li>• The neighbor maximum-prefix command was added.</li> </ul>
IPv6, NDP, and ICMPv6	<ul style="list-style-type: none"> <li>• The description of the ipv6 icmp error-interval command was changed.</li> </ul>
OSPFv3	<ul style="list-style-type: none"> <li>• The max-metric router-lsa command was added.</li> <li>• The description of the ipv6 ospf area command was changed.</li> <li>• The description of the router-id command was changed.</li> </ul>

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# Preface

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## Applicable products and software versions

This manual applies to the models in the AX3640S and AX3630S series of switches. It also describes the functionality of version 11.10 of the software. The described functionality is that supported by the software OS-L3A-A/OS-L3A and OS-L3L-A/OS-L3L, and by optional licenses.

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

Unless otherwise noted, this manual describes the functions applicable to both the AX3640S and AX3630S series of switches, and functionalities common to each software. For functionalities that are not common to both AX3640S and AX3630S series switches, and functionalities not common to OS-L3A-A/OS-L3A and OS-L3L-A/OS-L3L are indicated as follows:

[AX3640S]:

The description applies to AX3640S series switches.

[AX3630S]:

The description applies to AX3630S series switches.

[OS-L3A]:

The description applies to OS-L3A-A/OS-L3A for the AX3640S and AX3630S series of switches.

The functions supported by optional licenses are indicated as follows:

[OP-DH6R]:

The description applies to the OP-DH6R optional license.

[OP-OTP]:

The description applies to the OP-OTP 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.

- **Unpacking the switch and the basic settings for initial installation**

Quick Start Guide  
(AX36S-Q001X)

- **Determining the hardware facility conditions and how to handle the hardware**

Hardware Instruction Manual  
(AX36S-H001X)

- **Understanding the software functions, configuration settings, and use of the operation commands**

Configuration Guide  
Vol.1  
(AX36S-S001X)  
Vol.2  
(AX36S-S002X)  
Vol.3  
(AX36S-S003X)

- **Learning the syntax of configuration commands and the details of command parameters**

Configuration  
Command Reference  
Vol. 1  
(AX36S-S004X)  
Vol. 2  
(AX36S-S005X)

- **Learning the syntax of operation commands and the details of command parameters**

Operation Command Reference  
Vol. 1  
(AX36S-S006X)  
Vol. 2  
(AX36S-S007X)

- **Understanding messages and logs**

Message and Log Reference  
(AX36S-S008X)

- **Understanding the MIB**

MIB Reference  
(AX36S-S009X)

- **How to troubleshoot when a problem occurs**

Troubleshooting Guide  
(AX36S-T001X)

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

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

AX3640S series switch

AX3630S 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
BGP	Border Gateway Protocol
BGP4	Border Gateway Protocol - version 4
BGP4+	Multiprotocol Extensions for Border Gateway Protocol - version 4
bit/s	bits per second (can also appear as bps)
BPDU	Bridge Protocol Data Unit
BRI	Basic Rate Interface
CC	Continuity Check
CDP	Cisco Discovery Protocol
CFM	Connectivity Fault Management
CIDR	Classless Inter-Domain Routing
CIR	Committed Information Rate
CIST	Common and Internal Spanning Tree
CLNP	ConnectionLess Network Protocol
CLNS	ConnectionLess Network System
CONS	Connection Oriented Network System
CRC	Cyclic Redundancy Check
CSMA/CD	Carrier Sense Multiple Access with Collision Detection
CSNP	Complete Sequence Numbers PDU
CST	Common Spanning Tree
DA	Destination Address
DC	Direct Current
DCE	Data Circuit terminating Equipment
DHCP	Dynamic Host Configuration Protocol
DIS	Draft International Standard/Designated Intermediate System
DNS	Domain Name System
DR	Designated Router
DSAP	Destination Service Access Point
DSCP	Differentiated Services Code Point
DTE	Data Terminal Equipment
DVMRP	Distance Vector Multicast Routing Protocol
E-Mail	Electronic Mail
EAP	Extensible Authentication Protocol
EAPOL	EAP Over LAN
EFM	Ethernet in the First Mile
ES	End System
FAN	Fan Unit
FCS	Frame Check Sequence
FDB	Filtering DataBase
FQDN	Fully Qualified Domain Name
FTTH	Fiber To The Home
GBIC	GigaBit Interface Converter
GSRP	Gigabit Switch Redundancy Protocol
HMAC	Keyed-Hashing for Message Authentication
IANA	Internet Assigned Numbers Authority
ICMP	Internet Control Message Protocol
ICMPv6	Internet Control Message Protocol version 6
ID	Identifier
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers, Inc.
IETF	the Internet Engineering Task Force
IGMP	Internet Group Management Protocol
IP	Internet Protocol
IPCP	IP Control Protocol
IPv4	Internet Protocol version 4

IPv6	Internet Protocol version 6
IPV6CP	IP Version 6 Control Protocol
IPX	Internetwork Packet Exchange
ISO	International Organization for Standardization
ISP	Internet Service Provider
IST	Internal Spanning Tree
L2LD	Layer 2 Loop Detection
LAN	Local Area Network
LCP	Link Control Protocol
LED	Light Emitting Diode
LLC	Logical Link Control
LLDP	Link Layer Discovery Protocol
LLQ+3WFQ	Low Latency Queueing + 3 Weighted Fair Queueing
LSP	Label Switched Path
LSP	Link State PDU
LSR	Label Switched Router
MA	Maintenance Association
MAC	Media Access Control
MC	Memory Card
MD5	Message Digest 5
MDI	Medium Dependent Interface
MDI-X	Medium Dependent Interface crossover
MEP	Maintenance association End Point
MIB	Management Information Base
MIP	Maintenance domain Intermediate Point
MRU	Maximum Receive Unit
MSTI	Multiple Spanning Tree Instance
MSTP	Multiple Spanning Tree Protocol
MTU	Maximum Transfer Unit
NAK	Not Acknowledge
NAS	Network Access Server
NAT	Network Address Translation
NCP	Network Control Protocol
NDP	Neighbor Discovery Protocol
NET	Network Entity Title
NLA ID	Next-Level Aggregation Identifier
NPDU	Network Protocol Data Unit
NSAP	Network Service Access Point
NSSA	Not So Stubby Area
NTP	Network Time Protocol
OADP	Octpower Auto Discovery Protocol
OAM	Operations, Administration, and Maintenance
OSPF	Open Shortest Path First
OUI	Organizationally Unique Identifier
packet/s	packets per second (can also appear as pps)
PAD	PADding
PAE	Port Access Entity
PC	Personal Computer
PCI	Protocol Control Information
PDU	Protocol Data Unit
PICS	Protocol Implementation Conformance Statement
PID	Protocol IDentifier
PIM	Protocol Independent Multicast
PIM-DM	Protocol Independent Multicast-Dense Mode
PIM-SM	Protocol Independent Multicast-Sparse Mode
PIM-SSM	Protocol Independent Multicast-Source Specific Multicast
PoE	Power over Ethernet
PRI	Primary Rate Interface
PS	Power Supply
PSNP	Partial Sequence Numbers PDU
QoS	Quality of Service
QSFP+	Quad Small Form factor Pluggable Plus
RA	Router Advertisement
RADIUS	Remote Authentication Dial In User Service
RDI	Remote Defect Indication
REJ	REJect
RFC	Request For Comments

RIP	Routing Information Protocol
RIPng	Routing Information Protocol next generation
RMON	Remote Network Monitoring MIB
RPF	Reverse Path Forwarding
RQ	ReQuest
RSTP	Rapid Spanning Tree Protocol
SA	Source Address
SD	Secure Digital
SDH	Synchronous Digital Hierarchy
SDU	Service Data Unit
SEL	NSAP SElector
SFD	Start Frame Delimiter
SFP	Small Form factor Pluggable
SFP+	Enhanced Small Form factor Pluggable
SMTP	Simple Mail Transfer Protocol
SNAP	Sub-Network Access Protocol
SNMP	Simple Network Management Protocol
SNP	Sequence Numbers PDU
SNPA	Subnetwork Point of Attachment
SPF	Shortest Path First
SSAP	Source Service Access Point
STP	Spanning Tree Protocol
TA	Terminal Adapter
TACACS+	Terminal Access Controller Access Control System Plus
TCP/IP	Transmission Control Protocol/Internet Protocol
TLA ID	Top-Level Aggregation Identifier
TLV	Type, Length, and Value
TOS	Type Of Service
TPID	Tag Protocol Identifier
TTL	Time To Live
UDLD	Uni-Directional Link Detection
UDP	User Datagram Protocol
UPC	Usage Parameter Control
UPC-RED	Usage Parameter Control - Random Early Detection
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
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<sup>2</sup> bytes. 1 GB (gigabyte) is 1024<sup>3</sup> bytes. 1 TB (terabyte) is 1024<sup>4</sup> bytes.





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## Chapter

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# 1. Reading the Manual

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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 a 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-ext-nacl)	Configures an IPv4 packet filter.	(config)# ip access-list extended
10	(config-std-nacl)	Configures an IPv4 address filter.	(config)# ip access-list standard
11	(config-ipv6-acl)	Configures an IPv6 filter.	(config)# ipv6 access-list
12	(config-ext-macl)	Configures a MAC filter.	(config)# mac access-list extended
13	(config-ip-qos)	Configures IPv4 QoS.	(config)# ip qos-flow-list
14	(config-ipv6-qos)	Configures IPv6 QoS.	(config)# ipv6 qos-flow-list
15	(config-mac-qos)	Configures MAC QoS.	(config)# mac qos-flow-list
16	(dhcp-config)	Configures DHCP.	(config)# ip dhcp pool
17	(config-dhcp)	Configures IPv6 DHCP (PD).	(config)# ipv6 dhcp pool
18	(config-route-map)	Configures a route map.	(config)# route-map
19	(config-rtr-rip)	Configures RIPv4.	(config)# ipv6 router rip
20	(config-router)	Configures RIP.	(config)# router rip
		Configures OSPF.	(config)# router ospf
		Configures BGP4/BGP4+.	(config)# router bgp
21	(config-rtr)	Configures OSPFv3.	(config)# ipv6 router ospf
22	(config-router-af)	Configures BGP4+.	(config)# router bgp (config-router)# address-family ipv6
23	(config-auto-cf)	Configures auto-config.	(config)# auto-config
24	(config-netconf)	Configures netconf.	(config)# netconf.
25	(config-view)	Configures view.	(config)# parser view

#	Prompt displayed for the command mode	Description	Command for mode transition
26	(config-ether-cfm)	Configures the domain name and MA.	(config)# ethernet cfm domain
27	(config-track-object)	Configures the policy-based routing tracking functionality.	(config)# track-object
28	(config-pol)	Configures policy-based routing list information.	(config)# policy-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 <u>inbound1</u>
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 <u>telnet-host</u> 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	<p>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.</p> <p>The following are the input formats:</p> <ul style="list-style-type: none"> <li>For gigabitethernet interface range gigabitethernet &lt;nif no.&gt;/&lt;port no.&gt; [- &lt;port no.&gt;]</li> <li>For tengigabitethernet interface range tengigabitethernet &lt;nif no.&gt;/&lt;port no.&gt; [- &lt;port no.&gt;]</li> <li>For vlan interface range vlan &lt;vlan id&gt; [- &lt;vlan id&gt;]</li> <li>For port-channel interface range port-channel &lt;channel group number&gt; [- &lt;channel group number&gt;]</li> </ul> <p>You can specify no more than 8 of the above input formats, separating each by a comma (,).</p>	<p>interface range gigabitethernet 0/1-3</p> <p>interface range gigabitethernet 0/1-3, gigabitethernet 0/11-13</p> <p>interface range vlan 1-100</p>
add/remove specification	<p>Add to or delete from the information when multiple interfaces have been specified.</p> <p>The add specification adds information to the current information.</p> <p>The remove specification deletes information from the current information.</p>	<p>switchport trunk allowed vlan add 100,200-210</p> <p>switchport trunk allowed vlan remove 100,200-210</p> <p>switchport isolation interface add gigabitethernet 0/1-3, tengigabitethernet 0/25-26</p> <p>switchport isolation interface remove gigabitethernet 0/1-3, tengigabitethernet 0/25-26</p>

## 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



Character name	Character	Code
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.> and <port no.> values for AX3640S series switches [AX3640S]

Model	Range of values	
	<nif no.>	<port no.>
AX3640S-24T AX3640S-24TW	0	1 to 24
AX3640S-24T2XW		1 to 26
AX3640S-24SW		1 to 24
AX3640S-24S2XW		1 to 26
AX3640S-48TW		1 to 48
AX3640S-48T2XW		1 to 50

*Table 1-6:* Range of <nif no.> and <port no.> values for AX3630S series switches [AX3630S]

Model	Range of values	
	<nif no.>	<port no.>
AX3630S-24T AX3630S-24TD	0	1 to 24
AX3630S-24T2X AX3630S-24T2XD		1 to 26
AX3630S-24P		1 to 24
AX3630S-24S2XW		1 to 26
AX3630S-48TW		1 to 48
AX3630S-48T2XW		1 to 50

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

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

*Table 1-7:* Range of <channel group number> values

#	Model	Range of values
1	All models	1 to 32

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

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

Table 1-8: Range of &lt;vlan id&gt; values

#	Range of values
1	1 to 4094

### 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 100,200,300...

switchport trunk allowed vlan add 400,500...

### 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 shows the syntax 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 0/1-2,gigabitethernet 0/5,tengigabitethernet 0/25-26

## Chapter

---

# 2. IPv4, ARP, and ICMP

---

- arp
- arp discard-unresolved-packets
- arp max-send-count
- arp send-interval
- arp timeout
- ip address
- ip icmp rate-limit unreachable
- ip local-proxy-arp
- ip mtu
- ip proxy-arp
- ip redirects (global)
- ip redirects (interface)
- ip routing
- ip source-route
- ip subnet-broadcast

---

## 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. If a static ARP is to be set, the destination MAC addresses must be set at the same time using static MAC addresses. If the destination MAC addresses are not set, IP forwarding might be performed by software processing.

**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 ARP.

### When the change is applied

The change is applied immediately after setting values are changed.

### Notes

1. Use this command to reduce high CPU loads caused by communication in which 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. When load balancing is enabled and the output interface for which this command is set is in a multipath configuration, relay packets are not discarded by the hardware, and are processed by the CPU if one of the paths is selected and the address cannot be resolved.

### 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

---

## 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.

1. Default value when this parameter is omitted:

Subnet broadcast IPv4 packets are not forwarded.

2. Range of values:

None

secondary

Specifies the secondary setting for a multihomed interface.

1. Default value when this parameter is omitted:

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

2. Range of values:

None

**Default behavior**

None

**Impact on communication**

None

**When the change is applied**

The change is applied immediately after setting values are changed.

**Notes**

None

**Related commands**

interface vlan

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` (global)

`ip redirects` (interface)

---

## 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 11.10*.

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

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

128 to 9216 (bytes)

### Default behavior

The frame length (bytes) set in the port MTU information is used as the IP MTU length.

### Impact on communication

None

### When the change is applied

The change is applied immediately after setting values are changed.

### Notes

1. The IP MTU length for Ethernet is set by comparing the frame length set in the port MTU information with the IP MTU value. Therefore, to set a value larger than 1500 for the IP MTU length, check the `ip mtu` settings as well as the `mtu` settings in the port MTU information.
2. This setting also takes effect for IPv6. For IPv6, the protocol specification defines that the MTU length must be 1280 or larger. Therefore, to use IPv6, do not specify a value smaller than 1280 for the MTU length.
3. When packets sent from this Switch and IPv4 packets with options are forwarded, the smallest of the following values is used as the MTU value of the VLAN interface: the MTU value of the Ethernet interface that belongs to the VLAN, the MTU value specified in the system MTU information, or the MTU value set by this command.

## **Related commands**

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 (global)

---

Specifies whether ICMP and ICMPv6 Redirect messages can be sent for the entire Switch.

### Syntax

To set information:

no ip redirects

To delete information:

ip redirects

### Input mode

(config)

### Parameters

None

### Default behavior

The command enables the sending of ICMP or ICMPv6 Redirect messages. Note, however, before ICMP or ICMPv6 Redirect messages can be sent, the relevant interface must also be set to allow the sending of these messages.

### Impact on communication

None

### When the change is applied after the functionality is configured

The change is applied immediately after setting values are changed.

### Notes

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

### Related commands

ip redirects (interface)

ipv6 redirects

---

## ip redirects (interface)

---

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

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

### Related commands

interface vlan

---

## ip routing

---

`no ip routing` invalidates IPv4 and IPv6 forwarding.

### Syntax

To set information:

`no ip routing`

To delete information:

`ip routing`

### Input mode

(`config-if`)

### Parameters

None

### Default behavior

The command enables IPv4 and IPv6 forwarding.

### Impact on communication

The interfaces for which IPv4 and IPv6 forwarding is disabled by using this command cannot communicate with other interfaces.

### When the change is applied

The change is applied immediately after setting values are changed.

### Notes

1. The setting specified by this command is always applied to both IPv4 and IPv6 protocols. You cannot use this command to apply the setting to either only IPv4 or IPv6.
2. If GSRP Layer 3 redundancy switching is being used, you cannot use this command to disable IPv4 and IPv6 forwarding.
3. For VLANs for which IPv4 and IPv6 forwarding have been disabled by using this command, the settings of the following commands (which are related to forwarding) are ignored:
  - `ip local-proxy-arp`
  - `ip proxy-arp`
  - `ip redirects (interface)`
  - `ip source-route`
  - `ip subnet-broadcast`
  - `ipv6 redirects`
4. VLANs for which IPv4 and IPv6 forwarding is disabled by using this command no longer function as routers. To reduce the load on the CPU, we recommend that you do not set a routing protocol and VRRP for these VLANs.
5. For a load-balanced multipath route, check whether the destination interfaces of the paths include VLAN interfaces for which IPv4 and IPv6 forwarding is disabled by using this command. If such VLAN interfaces are included, packet discarding might occur even if a VLAN interface with forwarding enabled is selected as the destination interface. Make sure that multipath routes do not include any VLAN interfaces for which forwarding is disabled by using this command.

## **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`





## Chapter

---

# 3. Loopback Interface (IPv4)

---

```
interface loopback  
ip address (loopback)
```

---

## interface loopback

---

Moves to the loopback interface level.

### Syntax

To set information:

interface loopback 0

To delete information:

no interface loopback 0

### Input mode

(config)

### Parameters

0

Specifies a loopback interface.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

None

### Default behavior

None

### Impact on communication

None

### When the change is applied

The change is applied immediately after setting values are changed.

### Notes

None

### Related commands

ip address

ipv6 address

---

## 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

None

### 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 details of the maximum number of interfaces, see 3.2 *Capacity limit* in the manual *Configuration Guide Vol. 1 For Version 11.10*.

### Related commands

ip route

ipv6 route

## Chapter

---

# 5. Policy-based Routing [AX3640S] [OS-L3A]

---

default [AX3640S] [OS-L3A]  
default-state [AX3640S] [OS-L3A]  
disable [AX3640S] [OS-L3A]  
failure detection [AX3640S] [OS-L3A]  
interval [AX3640S] [OS-L3A]  
policy-interface [AX3640S] [OS-L3A]  
policy-list [AX3640S] [OS-L3A]  
policy-list default-init-interval [AX3640S] [OS-L3A]  
policy-list resequence [AX3640S] [OS-L3A]  
recover [AX3640S] [OS-L3A]  
recovery detection [AX3640S] [OS-L3A]  
timeout [AX3640S] [OS-L3A]  
track-object [AX3640S] [OS-L3A]  
track-object default-init-interval [AX3640S] [OS-L3A]  
type icmp [AX3640S] [OS-L3A]

---

## default [AX3640S] [OS-L3A]

---

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

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

### Syntax

To set or change information:

`default {permit | deny}`

To delete information:

`no default`

### Input mode

(`config-pol`)

### Parameters

{`permit` | `deny`}

Sets the default policy-based routing behavior.

`permit`

Forwards packets based on the normal routing information.

`deny`

Discards packets.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

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 [AX3640S] [OS-L3A]

---

The `default-state` command 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 [AX3640S] [OS-L3A]**

---

The `disable` command 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 [AX3640S] [OS-L3A]

---

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 polling reply waiting (`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 [AX3640S] [OS-L3A]

---

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 six seconds.

### Impact on communication

None

### When the change is applied

The change is applied when the command is set.

### Notes

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

### Related commands

`type icmp`

`timeout`

---

## policy-interface [AX3640S] [OS-L3A]

---

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

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

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

### Syntax

To set or change information:

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

To delete information:

```
no <sequence>
```

### Input mode

(config-pol)

### Parameters

<sequence>

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

1. Default value when this parameter is omitted:

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

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

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

2. Range of values:

Specify 1 to 4294967294 in decimal.

vlan <vlan id>

Specifies the ID of the packet-destination VLAN.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

Specify an output VLAN ID.

For 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 routing information is monitored.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

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

### Default behavior

None

### Impact on communication

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

### When the change is applied

The change is applied immediately after setting values are changed.

### Notes

1. Before using this command, set a VLAN interface.
2. Before you specify the `track-object` parameter in this command, enable the tracking 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 [AX3640S] [OS-L3A]

---

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:

`no policy-list <policy list no.>`

### Input mode

(`config`)

### Parameters

`<policy list no.>`

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

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

Specify 1 to 256 in decimal.

### Default behavior

None

### Impact on communication

None

### When the change is applied

The change is applied immediately after setting values are changed.

### Notes

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

### Related commands

`permit` (ip access-list extended)

`policy-interface`

`default`

`recover`

`policy-list resequence`



---

## policy-list default-init-interval [AX3640S] [OS-L3A]

---

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 forward ability is stopped, if you use this configuration command to change the interval, monitoring restarts when the new period minus the elapsed time has passed.

### Related commands

policy-list

---

## policy-list resequence [AX3640S] [OS-L3A]

---

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

### Syntax

To set or change information:

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

### Input mode

(config)

### Parameters

*<policy list no.>*

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

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

Specify 1 to 256 in decimal.

*<starting sequence>*

Specifies the starting number of the sequence value.

1. Default value when this parameter is omitted:

The initial value is 10.

2. Range of values:

Specify 1 to 4294966494 in decimal.

*<increment sequence>*

Specifies the sequence-value increment.

1. Default value when this parameter is omitted:

The initial value is 10.

2. Range of values:

1 to 100 in decimal

### Default behavior

None

### Impact on communication

None

### When the change is applied

The change is applied immediately after setting values are changed.

### Notes

None

### **Related commands**

policy-list

policy-interface

---

## recover [AX3640S] [OS-L3A]

---

The `recover` command specifies the switchback behavior setting 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

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

### When the change is applied

The change is applied immediately after setting values are changed.

### Notes

None

### Related commands

`policy-list`

---

## recovery detection [AX3640S] [OS-L3A]

---

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 [AX3640S] [OS-L3A]

---

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 [AX3640S] [OS-L3A]

---

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-init-interval [AX3640S] [OS-L3A]

---

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

`default-state`

---

## type icmp [AX3640S] [OS-L3A]

---

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

### Syntax

To set or change information:

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

To delete information:

```
no type
```

### Input mode

(config-track-object)

### Parameters

*<destination ip address>*

Specifies the monitoring-target address.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

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

source *<ip address>*

Specifies the sender address for ICMP Echo packets.

1. Default value when this parameter is omitted:

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

2. Range of values:

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

nexthop *<ip address>*

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

1. Default value when this parameter is omitted:

The next hop is determined according to the routing information.

2. Range of values:

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

tos *<tos>*

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

1. Default value when this parameter is omitted:

normal(0)

2. Range of values:

Specify 0 to 15 (in decimal) or a tos name. For details about the tos names that can be set, see *Table 18-6 tos names that can be specified* in the manual *Configuration Command Reference Vol. 1 For Version 11.10*.

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 18-7 precedence names that can be specified* in the manual *Configuration Command Reference Vol. 1 For Version 11.10*.

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

### 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 multihomed 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 distributed 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 list of IP addresses of routers for a client (optional information). 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 DHCP address 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 DHCP address 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 distributed to the client.

### Syntax

To set or change information:

domain-name <Domain Name>

To delete information:

no domain-name

### Input mode

(dhcp-config)

### Parameters

<Domain Name>

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

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

A domain name that contains a maximum of 253 characters

### Default behavior

None

### Impact on communication

None

### When the change is applied

The change is applied immediately after setting values are changed.

### Notes

None

### Related commands

None

---

## hardware-address

---

Specifies the MAC address of a client when a static IP address is distributed to the client. This command is used together with the `host` command.

### Syntax

To set or change information:

```
hardware-address <MAC Address> <protocol>
```

To delete information:

```
no hardware-address
```

### Input mode

(dhcp-config)

### Parameters

<MAC Address>

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

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

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

Example: 0211.2233.4455

<protocol>

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

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

Only `ethernet` (as a numeric value, only 1)

### Default behavior

None

### Impact on communication

None

### When the change is applied

The change is applied immediately after setting values are changed.

### Notes

1. This command cannot be entered together with the `network` command.

### Related commands

None

---

## host

---

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

## Related commands

None



---

## ip dhcp dynamic-dns-update

---

Specifies whether to link dynamic DNS when distributing IP addresses.

### Syntax

To set information:

`ip dhcp dynamic-dns-update`

To delete information:

`no ip dhcp dynamic-dns-update`

### Input mode

(*config*)

### Parameters

None

### Default behavior

DNS is not updated.

### Impact on communication

None

### When the change is applied

The change is applied immediately after setting values are changed.

### Notes

None

### Related commands

None

---

## ip dhcp excluded-address

---

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

### Syntax

To set information:

```
ip dhcp excluded-address <Low Address> [<High Address>]
```

To delete information:

```
no ip dhcp excluded-address <Low Address> [<High Address>]
```

### Input mode

(`config`)

### Parameters

<Low Address> [<High Address>]

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

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

The following addresses cannot be set:

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

### Default behavior

All IP addresses in the range specified by the `network` command can be assigned.

### Impact on communication

None

### When the change is applied

The change is applied immediately after setting values are changed.

### Notes

1. If the number of DHCP address pools exceeds the maximum number when the setting for excluded addresses is deleted, you cannot delete the setting.

### Related commands

None

---

## ip dhcp key

---

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 distributed to a client.

### Syntax

To set or change information:

```
lease {<time day> [<time hour> [<time min> [<time sec>] ] ] | infinite}
```

To delete information:

```
no lease
```

### Input mode

(dhcp-config)

### Parameters

```
{<time day> [<time hour> [<time min> [<time sec>] ] ] | infinite}
```

Sets the lease time.

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

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

```
infinite
```

Specifies an unlimited lease time.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

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

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

3. The `lease` command is ignored for a DHCP address pool in which a static IP address has been set.
4. The shorter the lease time set, the more frequently a client updates the lease. Therefore, do not specify an extremely short lease time except for very limited cases such as temporary IP addresses. 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 DHCP address pool has priority.

2. The `max-lease` command is ignored for a DHCP address pool in which a static IP address has been set.
3. The shorter the lease time set, the more frequently a client updates the lease. Therefore, do not specify an extremely short lease time except for very limited cases such as temporary IP addresses. 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 DHCP address 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 distributed by DHCP. IP addresses whose host name portion is set to all 0s or all 1s are not included in the DHCP address pool.

### Syntax

To set or change information:

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

To delete information:

```
no network
```

### Input mode

(dhcp-config)

### Parameters

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

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

*Table 7-2: IP address range for each class*

Class	IP address
class A (/8)	1 . x . x . x to 127 . x . x . x
class B (/16)	128 . x . x . x to 191 . x . x . x
class C (/24)	192 . x . x . x to 223 . x . x . x

*<IP Address>*

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

The following addresses cannot be set:

- 127.0.0.0 to 127.255.255.255
- An address whose host part is not 0.
- Addresses that do not belong to class A, B, or C

*{<Mask> | /<Masklen>}*

1. Default value when this parameter is omitted:

A mask corresponding to class A, B, or C

2. Range of values:

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

## Related commands

None

---

## service dhcp

---

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

---

## **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



## Chapter

---

# 9. Route Summarization (IPv4)

---

ip summary-address

---

## ip summary-address

---

Generates an IPv4 summarized route.

### Syntax

To set or change information:

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

To delete information:

```
no ip summary-address <IPv4-Prefix> <Mask>
```

### Input mode

(config)

### Parameters

<IPv4-Prefix>

Specifies a summarized 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 a summarized 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 summarized route.

1. Default value when this parameter is omitted:

130

2. Range of values:

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

as-set

Specifies that AS\_SET is generated when the AS\_PATH attribute for a summarized route is generated.

1. Default value when this parameter is omitted:

AS\_SET is not generated when the AS\_PATH attribute for a summarized route is generated.

2. Range of values:

None

#### noinstall

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

1. Default value when this parameter is omitted:

Summarized routes are registered in the forwarding table.

2. Range of values:

None

#### summary-only

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

1. Default value when this parameter is omitted:

Advertisement of summarization source routes is not suppressed.

2. Range of values:

None

### Default behavior

Summarized routes are not generated.

### Impact on communication

None

### When the change is applied

The change is applied immediately after setting values are changed.

### Notes

1. Routes whose next hop has a loopback interface or null interface cannot be used as summarization 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 <IPv4-Prefix> <Mask> <NextHop-Address> [<Distance>] [weight <Weight>] [tag <Tag>] [{noinstall | reject}] [poll] [noresolve]
```

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

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

To delete information:

```
no ip route <IPv4-Prefix> <Mask> <NextHop-Address>
```

```
no ip route <IPv4-Prefix> <Mask> <NextHop-Address> <interface type> <interface number>
```

```
no ip route <IPv4-Prefix> <Mask> <interface type> <interface number>
```

### Input mode

(config)

### Parameters

*<IPv4-Prefix>*

Specifies the destination IPv4 address.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

Specify an IPv4 address.

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

*<Mask>*

Specifies the destination IP address mask.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

Specify an IP address mask.

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

*<NextHop-Address>*

Specifies the next hop address of the route.

1. Default value when this parameter is omitted:

The next hop is not specified.

2. Range of values:

Specify an IPv4 address.

*<interface type> <interface number>*

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

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

- null 0

*<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<sup>#</sup> including directly connected routes are used to resolve the next hop on static routes.  
  
<sup>#</sup>: 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

None

### 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) that will be generated for static routing information.

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

### Syntax

To set or change information:

```
ip route static maximum-paths <Number>
```

To delete information:

```
no ip route static maximum-paths
```

### Input mode

(config)

### Parameters

<Number>

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

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

Specify 1 to 16 in decimal.

### Default behavior

The initial value is set to 6.

### Impact on communication

None

### When the change is applied

The change is applied immediately after setting values are changed.

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

### 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 will be 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

---

- auto-summary
- default-metric
- disable
- distance
- 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

---

## 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.

### Syntax

To set information:

auto-summary

To delete information:

no auto-summary

### Input mode

(config-router)

### 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 priority over the metric information specified by this command. This command applies to static routes, OSPF routes, and BGP4 routes.

### 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 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.

### **Syntax**

To set information:

disable

To delete information:

no disable

### **Input mode**

(config-router)

### **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 for routing information learned by RIP. 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-router)

### Parameters

*<Distance>*

Specifies the distance 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

---

## **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-router)`

### **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.

### Syntax

To set information:

inherit-metric

To delete information:

no inherit-metric

### Input mode

(config-router)

### 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-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 priority over the version specified in `config-router` mode.

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

*Table 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 <sup>#</sup>	Broadcast <sup>#</sup>
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.

### Syntax

To set or change information:

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

To delete information:

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

### Input mode

(config-router)

### 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.

vlan <vlan id>

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

{ in | out }

in

Specify this to add the metric when packets are received

out

Specify this to add the metric when packets are sent.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

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.

### Syntax

To set information:

```
neighbor <IPv4-Address>
```

To delete information:

```
no neighbor <IPv4-Address>
```

### Input mode

(config-router)

### 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 <code>network</code> setting exists, or the <code>neighbor</code> setting is beyond the specifiable range of the <code>network</code> setting.	RIP packets are not sent to the router specified by the <code>neighbor</code> command.
2	The <code>neighbor</code> setting is within the specifiable range of the <code>network</code> setting, and the <code>passive-interface</code> command does not explicitly suppress the interface connected to the network of the router specified by the <code>neighbor</code> command.	RIP packets are sent by unicast to the neighboring router specified in the <code>neighbor</code> setting, and are sent by broadcast (multicast) to the interface specified in the <code>network</code> setting.
3	The <code>neighbor</code> setting is within the specifiable range of the <code>network</code> setting, and the <code>passive-interface</code> command explicitly suppresses the interface connected to the network of the router specified by the <code>neighbor</code> command.	RIP packets are sent by unicast only to the neighboring router specified in the <code>neighbor</code> 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.

### Syntax

To set information:

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

To delete information:

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

### Input mode

(config-router)

### 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: For <IPv4-Prefix>, set 0 to the bits specified for <Wildcard-Mask>.

<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 bit that is 1 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.

### Syntax

To set information:

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

To delete information:

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

### Input mode

(config-router)

### Parameters

```
{default | vlan <vlan id>}
```

Specifies the interface to be prevented from sending RIP packets.

**default**

Prevents all interfaces from sending RIP packets.

**vlan <vlan id>**

Specifies the interface to be prevented from sending RIP packets.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

default or vlan <vlan id>

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

### Default behavior

Routing information is sent in RIP packets.

### Impact on communication

None

### When the change is applied

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

### Notes

1. Specify the `passive-interface default` command to disable transmission for all interfaces available for RIP packet transmission. In this state, if you specify the `no passive-interface vlan <vlan id>` 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.

### Syntax

To set or change information:

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

To delete information:

no timers basic

### Input mode

(config-router)

### 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 priority over the information specified by this command.

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)

**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 [OS-L3A]

---

area authentication [OS-L3A]  
area default-cost [OS-L3A]  
area nssa [OS-L3A]  
area nssa translate [OS-L3A]  
area range [OS-L3A]  
area stub [OS-L3A]  
area virtual-link [OS-L3A]  
areaid-format [OS-L3A]  
default-metric [OS-L3A]  
disable [OS-L3A]  
distance ospf [OS-L3A]  
graceful-restart mode [OS-L3A]  
graceful-restart strict-lsa-checking [OS-L3A]  
ip ospf area [OS-L3A]  
ip ospf authentication [OS-L3A]  
ip ospf authentication-key [OS-L3A]  
ip ospf cost [OS-L3A]  
ip ospf dead-interval [OS-L3A]  
ip ospf hello-interval [OS-L3A]  
ip ospf message-digest-key [OS-L3A]  
ip ospf network [OS-L3A]  
ip ospf priority [OS-L3A]  
ip ospf retransmit-interval [OS-L3A]  
ip ospf transmit-delay [OS-L3A]  
max-metric router-lsa [OS-L3A]  
maximum-paths [OS-L3A]  
neighbor [OS-L3A]  
network [OS-L3A]  
passive-interface [OS-L3A]  
router-id [OS-L3A]  
router ospf [OS-L3A]  
suppress-fa [OS-L3A]  
timers spf [OS-L3A]

---

## area authentication [OS-L3A]

---

Selects plain-text password authentication or MD5 authentication as the authentication method at the area level.

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

### Syntax

To set or change information:

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

To delete information:

```
no area <Area-ID> authentication
```

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

```
no area <Area-ID>
```

### Input mode

(`config-router`)

### Parameters

<Area-ID>

Specifies the area to which the Switch belongs.

1. Default value when this parameter is omitted:  
This parameter cannot be omitted.
2. Range of values:  
Specify 0 to 4294967295 (in decimal) or an IPv4 address.

message-digest

Selects MD5 authentication.

1. Default value when this parameter is omitted:  
Plain-text password authentication is selected.
2. Range of values:  
None

### Default behavior

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

### Impact on communication

None

### When the change is applied

The change is applied immediately after setting values are changed.

### Notes

None

**Related commands**

ip ospf authentication

ip ospf authentication-key

ip ospf message-digest-key

---

## area default-cost [OS-L3A]

---

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 [OS-L3A]

---

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 routing 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 routing information (Type 3 LSA).

1. Default value when this parameter is omitted:

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

2. Range of values:

None

**no-redistribution**

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

1. Default value when this parameter is omitted:

Routes learned by other protocols (external AS routing 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 [OS-L3A]

---

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 [OS-L3A]

---

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 routing information transmitted between areas.

### Syntax

To set or change information:

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

To delete information:

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

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

```
no area <Area-ID>
```

### Input mode

(config-router)

### Parameters

<Area-ID>

Specifies the area to which the Switch belongs.

1. Default value when this parameter is omitted:  
This parameter cannot be omitted.
2. Range of values:  
Specify 0 to 4294967295 (in decimal) or an IPv4 address.

<IPv4-Prefix>

Specifies a network.

1. Default value when this parameter is omitted:  
This parameter cannot be omitted.
2. Range of values:  
Specifies an IP address. Set the bits within the range of <Mask> to a value other than 0, and set the bits outside the range of <Mask> to 0.  
Note: For <IPv4-Prefix>, set 0 to the bits outside the range of <Mask>.

<Mask>

Specifies a mask.

1. Default value when this parameter is omitted:  
This parameter cannot be omitted.
2. Range of values:  
Specify an IP address mask (other than 0).  
Note: Specify the address mask so that when it is converted to a binary number, all bits after the first bit that is 0 are set to 0.

{advertise | not-advertise}

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

1. Default value when this parameter is omitted:  
`advertise` (Information is advertised as inter-area routes).
2. Range of values:  
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 [OS-L3A]

---

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 routing information) are advertised.

2. Range of values:

None

### Default behavior

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

### Impact on communication

Adjacency with neighboring routers within the area is briefly disconnected.

**When the change is applied**

The change is applied immediately after setting values are changed.

**Notes**

None

**Related commands**

None

---

## area virtual-link [OS-L3A]

---

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 [OS-L3A]*.

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 [OS-L3A]

---

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 [OS-L3A]

---

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 priority over the information specified by this command.

### Syntax

To set or change information:

`default-metric <Metric>`

To delete information:

`no default-metric`

### Input mode

(`config-router`)

### Parameters

*<Metric>*

Specifies a metric.

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 [OS-L3A]**

---

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 [OS-L3A]

---

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 [OS-L3A]

---

The `graceful-restart mode` command specifies the helper functionality for graceful restarts in OSPF.

### Syntax

To set information:

`graceful-restart mode helper`

To delete information:

`no graceful-restart mode`

### Input mode

(`config-router`)

### Parameters

`helper`

Specifies the helper functionality.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

None

### Default behavior

The restart router functionality and helper router functionality are disabled.

### Impact on communication

None

### When the change is applied

The helper functionality is activated when a neighboring router performs a graceful restart.

### Notes

None

### Related commands

None

---

## **graceful-restart strict-lsa-checking [OS-L3A]**

---

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 a graceful restart, the restart router stops graceful restarts for all helpers.

### **Related commands**

`graceful-restart mode`

---

## ip ospf area [OS-L3A]

---

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 priority).



3. Before setting this command, you need to set the `router-id` command. Even if OSPF has not been configured in `config-router` mode, the interface for which this command is set will run OSPF. In this case, the router ID is automatically selected. Therefore, if you manually set the router ID later, the router ID being used is changed.
4. 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 [OS-L3A]

---

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 [OS-L3A]

---

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 [OS-L3A]

---

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 [OS-L3A]

---

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 [OS-L3A]

---

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 [OS-L3A]

---

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 [OS-L3A]

---

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, non-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 [OS-L3A]

---

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 [OS-L3A]

---

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 second.

### Impact on communication

None

### When the change is applied

The change is applied immediately after setting values are changed.

### Notes

None

### Related commands

None

---

## ip ospf transmit-delay [OS-L3A]

---

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

During normal operation, the change is applied immediately after setting values are changed.

### Notes

None

### Related commands

None

---

## max-metric router-lsa [OS-L3A]

---

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 or restart.

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, or restart.

1. Default value when this parameter is omitted:

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

2. Range of values:

Specify 5 to 86400 (seconds) in decimal.

### Default behavior

The switch does not 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. Note that if the switch is running normally 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 restarts is operating, the graceful restart fails.

### Related commands

None

---

## maximum-paths [OS-L3A]

---

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.

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

### Syntax

To set or change information:

```
maximum-paths <Number>
```

To delete information:

```
no maximum-paths
```

### Input mode

(config-router)

### Parameters

<Number>

Specifies the maximum number of paths.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

Specify 1 to 16 in decimal.

### Default behavior

The initial value is set to 4.

### Impact on communication

None

### When the change is applied

The change is applied immediately after setting values are changed.

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

### Notes

None

### Related commands

None

---

## neighbor [OS-L3A]

---

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 [OS-L3A]

---

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 [OS-L3A]

---

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

### Syntax

To set information:

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

To delete information:

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

Note: Use the following procedure to specify `default`:

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

```
(config-router)# passive-interface default
```

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

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

### Input mode

(`config-router`)

### Parameters

```
{default | vlan <vlan id>}
```

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

`default`

Sets all OSPF networks as a passive interface.

`vlan <vlan id>`

Specifies the interface in the OSPF network.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

`default` or `vlan <vlan id>`

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

3. Note on using this parameter:

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

### Default behavior

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

### Impact on communication

None

### When the change is applied

The change is applied immediately after setting values are changed.

**Notes**

None

**Related commands**

network (router ospf)

ip ospf area

---

## router-id [OS-L3A]

---

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 order below. 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 let the router IDs be automatically selected:
  - The largest IPv4 address might not be selected depending on the order in which a command is specified. For example, if you specify the `ip ospf area` command, OSPF 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 [OS-L3A]

---

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>
```

To delete information:

```
no router ospf <Domain-No>
```

### 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.

### 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 [OS-L3A]**

---

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 [OS-L3A]

---

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
```

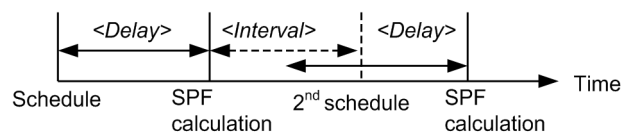
### Input mode

(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 are performed.

**Notes**

None

**Related commands**

None



## Chapter

---

# 13. BGP4 [OS-L3A]

---

address-family ipv6 [OS-L3A]  
bgp always-compare-med [OS-L3A]  
bgp bestpath compare-routerid [OS-L3A]  
bgp client-to-client reflection [OS-L3A]  
bgp cluster-id [OS-L3A]  
bgp confederation identifier [OS-L3A]  
bgp confederation peers [OS-L3A]  
bgp dampening [OS-L3A]  
bgp default local-preference [OS-L3A]  
bgp graceful-restart mode [OS-L3A]  
bgp graceful-restart restart-time [OS-L3A]  
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default-information originate [OS-L3A]  
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neighbor activate [OS-L3A]  
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neighbor as-override [OS-L3A]  
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neighbor ebgp-multihop [OS-L3A]  
neighbor maximum-prefix [OS-L3A]  
neighbor next-hop-self [OS-L3A]  
neighbor password [OS-L3A]  
neighbor peer-group (assigning members) [OS-L3A]  
neighbor peer-group (creating) [OS-L3A]  
neighbor permit-asloop [OS-L3A]  
neighbor remote-as [OS-L3A]  
neighbor remove-private-as [OS-L3A]  
neighbor route-reflector-client [OS-L3A]  
neighbor send-community [OS-L3A]  
neighbor set-nexthop-peer [OS-L3A]  
neighbor shutdown [OS-L3A]  
neighbor soft-reconfiguration [OS-L3A]  
neighbor timers [OS-L3A]  
neighbor update-source [OS-L3A]  
neighbor weight [OS-L3A]  
network [OS-L3A]  
router bgp [OS-L3A]  
timers bgp [OS-L3A]

---

## address-family ipv6 [OS-L3A]

---

Switches to `config-router-af` mode.

### Syntax

To set information:

`address-family ipv6`

To delete information:

`no address-family ipv6`

### Input mode

(`config-router`)

### Parameters

None

### Default behavior

A BGP4+ route policy cannot be set.

### Impact on communication

None

### When the change is applied

The change is applied immediately after setting values are changed.

### Notes

1. If you delete the information set by this command, all information set by the commands for the relevant `config-router-af` 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

---

## bgp always-compare-med [OS-L3A]

---

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

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

If settings are performed in `config-router-af` mode, the settings are applied to BGP4+ routes.

### Syntax

To set information:

`bgp always-compare-med`

To delete information:

`no bgp always-compare-med`

### Input mode

`(config-router)`

`(config-router-af)`

### 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 [OS-L3A]

---

Specifies the use of peer BGP identifiers (router IDs) for route selection among routes learned from external peers.

This command is common to BGP4 and BGP4+.

### Syntax

To set information:

`bgp bestpath compare-routerid`

To delete information:

`no bgp bestpath compare-routerid`

### Input mode

(config-router)

### 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 [OS-L3A]

---

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 settings are performed in `config-router` mode, the settings are applied to BGP4 routes.

If settings are performed in `config-router-af` mode, the settings are applied to BGP4+ routes.

### 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`)

### 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 [OS-L3A]

---

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.

This command is common to BGP4 and BGP4+.

### Syntax

To set or change information:

```
bgp cluster-id <IPv4-Address>
```

To delete information:

```
no bgp cluster-id
```

### Input mode

(config-router)

### 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 [OS-L3A]

---

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

This command is common to BGP4 and BGP4+.

### 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 [OS-L3A]

---

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.

This command is common to BGP4 and BGP4+.

### 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 per command execution, and a maximum of 256 <As> parameters in total.
- If you specify `no bgp confederation peers <As> [...]`, information for only the specified member ASs is deleted.

### Input mode

(config-router)

### 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 [OS-L3A]

---

Specifies that the use of unstable (route-flapping) routes learned from an external peer or inter-AS peer is to be temporarily suppressed to reduce the effect of route flapping.

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

If settings are performed in `config-router-af` mode, the settings are applied to BGP4+ routes.

### 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)
```

### Parameters

*<Half-life>*

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

1. Default value when this parameter is omitted:  
15 (minutes)
2. Range of values:  
Specify 1 to 45 (minutes) in decimal. Specify a value smaller than the *<Max-suppress-time>* value.

*<Reuse>*

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

1. Default value when this parameter is omitted:  
2
2. Range of values:  
Specify 1 to 15 in decimal. Specify a value smaller than the *<Suppress>* value.

*<Suppress>*

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

1. Default value when this parameter is omitted:

3

## 2. Range of values:

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

*<Max-suppress-time>*

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

The maximum penalty is calculated as follows:

- Maximum penalty =  $\text{<Reuse>} \times 2^{(\text{<Max-suppress-time>} / \text{<Half-life>})}$

If the calculation result exceeds 240, 240 is set.

## 1. Default value when this parameter is omitted:

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

## 2. Range of values:

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

**Default behavior**

The route flap dampening 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.

**Related commands**

None

---

## bgp default local-preference [OS-L3A]

---

Specifies the default value of the `LOCAL_PREF` attribute of routes to be advertised to an internal peer.

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

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

If you set the command in `config-router-af` mode, the setting applies to the BGP4+ routes.

### 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)
```

### 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 [OS-L3A]

---

Specifies use of the graceful restart functionality. The Switch supports only the receiving router functionality 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 and BGP4+.

### Syntax

To set information:

`bgp graceful-restart mode receive`

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

`receive`

Specifies that the switch is to operate as a receive router.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

Fixed to `receive`.

### Default behavior

The graceful restart functionality is not negotiated for the peer.

### Impact on communication

If the graceful restart functionality is enabled or disabled by using 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. The Switches support only the receiving router functionality of the graceful restart functionality. Therefore, if a Switch or IP unicast routing program is restarted, communication stops until the routes are learned again.
2. If this command is used to change the status of graceful restarts (enabled or disabled), the BGP session of the relevant peer is temporarily closed.

## **Related commands**

bgp graceful-restart restart-time

bgp graceful-restart stalepath-time

---

## bgp graceful-restart restart-time [OS-L3A]

---

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 and BGP4+.

### 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.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

Specify 1 to 3600 in decimal.

### Default behavior

The initial value is 120 (seconds).

### Impact on communication

None

### When the change is applied

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

### Notes

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

### Related commands

```
bgp graceful-restart mode
```

```
bgp graceful-restart stalepath-time
```

---

## bgp graceful-restart stalepath-time [OS-L3A]

---

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 and BGP4+.

### 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

bgp graceful-restart mode

bgp graceful-restart restart-time

---

## bgp nexthop [OS-L3A]

---

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

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

If settings are performed in `config-router-af` mode, the settings are applied to BGP4+ routes.

### 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)
```

### 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 * { in | both }` operation command is executed.
- For a BGP4+ route, the change is applied when the `clear ipv6 bgp * { 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.

### Related commands

```
route-map
```

---

## bgp router-id [OS-L3A]

---

Sets the router identifier of the Switch to be used for BGP.

This command is common to BGP4 and BGP4+.

### Syntax

To set or change information:

```
bgp router-id <IPv4-Address>
```

To delete information:

```
no bgp router-id
```

### Input mode

(config-router)

### 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 is used. If no IPv4 address has been assigned to the loopback interface, the largest IPv4 address assigned to the interface is used.

### Impact on communication

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

### When the change is applied

The change is applied when the command is set.

### Notes

1. If all of the following conditions are met, BGP is disabled:
  - The local router identifier has not been set by this command.
  - No IPv4 address has been set for the loopback interface.
  - There are no interfaces for which an IPv4 address is set.
2. If the IPv4 address for the loopback interface, or the IPv4 address for an interface, is selected as the local router identifier and then the IPv4 address of the interface is changed, the change is applied to the BGP behavior when any of the following occurs:
  - The Switch is restarted.
  - The IP unicast routing program is restarted.
  - The `disable (BGP4)` command is deleted.
3. If you add, change, or delete information set by this command, BGP sessions with all peers are temporarily disconnected.

**Related commands**

interface

bgp cluster-id

---

## default-information originate [OS-L3A]

---

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

If settings are performed in `config-router` mode, the settings are applied to the default IPv4 routes.

If settings are performed in `config-router-af` mode, the settings are applied to the default IPv6 routes.

### Syntax

To set information:

`default-information originate`

To delete information:

`no default-information originate`

### Input mode

(`config-router`)

(`config-router-af`)

### 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 [OS-L3A]

---

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 settings are performed in `config-router` mode, the settings are applied to BGP4 routes.

If settings are performed in `config-router-af` mode, the settings are applied to BGP4+ routes.

### Syntax

To set or change information:

`default-metric <Metric>`

To delete information:

`no default-metric`

### Input mode

(`config-router`)

(`config-router-af`)

### 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 [OS-L3A]**

---

Disables BGP even if the BGP setting is specified.

This command is common to BGP4 and BGP4+.

### **Syntax**

To set information:

disable

To delete information:

no disable

### **Input mode**

(config-router)

### **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 [OS-L3A]

---

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

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

If settings are performed in `config-router-af` mode, the settings are applied to BGP4+ routes.

### 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)
```

### 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 [OS-L3A]**

---

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**

None

---

## maximum-paths [OS-L3A]

---

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

The maximum number of paths that can be generated for a multipath BGP4 or BGP4+ route is equal to the value specified in this command or the upper limit of the Switch, whichever is smaller.

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

If settings are performed in `config-router-af` mode, the settings are applied to BGP4+ routes.

### 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)
```

### Parameters

<Number>

Specifies the maximum number of multiple paths.

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, multiple paths are not generated).

{ same-as | all-as }

Specifies BGP routes for which multiple paths can be generated. If you specify `same-as`, multiple paths can be generated for the BGP routes received from the same neighboring AS. If you specify `all-as`, multiple paths 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

Multiple paths 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.

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

**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 [OS-L3A]

---

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

This command applies only to BGP4+.

### 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)

### 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 [OS-L3A]

---

Specifies that the next hop of routes advertised to an internal peer is to be forcibly changed to the address of the local router used for peering with the internal peer (this command also applies when using route reflection or when advertising IGP routes by BGP).

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

If settings are performed in `config-router-af` mode, the settings are applied to BGP4+ routes.

### Syntax

To set information:

For `config-router` mode:

```
neighbor {<IPv4-Address> | <Peer-Group>} always-nexthop-self
```

For `config-router-af` mode:

```
neighbor {<IPv6-Address> | <Peer-Group>} always-nexthop-self
```

To delete information:

For `config-router` mode:

```
no neighbor {<IPv4-Address> | <Peer-Group>} [always-nexthop-self]
```

For `config-router-af` 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`)

### 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 [OS-L3A]

---

Specifies that the first AS number set for the `AS_SEQUENCE` path type of the `ASPATH` attribute is to be overwritten with the local AS number and advertised to an external peer. If the same number as the first AS number appears in succession, all the consecutive AS numbers are overwritten.

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

If settings are performed in `config-router-af` mode, the settings are applied to BGP4+ routes.

### Syntax

To set information:

For `config-router` mode:

```
neighbor {<IPv4-Address> | <Peer-Group>} as-override
```

For `config-router-af` mode:

```
neighbor {<IPv6-Address> | <Peer-Group>} as-override
```

To delete information:

For `config-router` mode:

```
no neighbor {<IPv4-Address> | <Peer-Group>} [as-override]
```

For `config-router-af` 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)
```

### 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 [OS-L3A]

---

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.

This command is common to BGP4 and BGP4+.

### Syntax

To set or change information:

```
neighbor {<IPv4-Address> | <IPv6-Address> | <Peer-Group>} description <Text>
```

To delete information:

```
no neighbor {<IPv4-Address> | <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)

### 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*.

`<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 [OS-L3A]

---

Allows BGP connection between an external peer that is not directly connected and a member AS peer.

This command is common to BGP4 and BGP4+.

### Syntax

To set or change information:

```
neighbor {<IPv4-Address> | <IPv6-Address> | <Peer-Group>} ebgp-multihop [<Ttl>]
```

To delete information:

```
no neighbor {<IPv4-Address> | <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)

### 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*.

```
<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 [OS-L3A]

---

Limits the number of routes that can be learned from a BGP peer. You can specify that the BGP peer is to be disconnected if the number of learned routes exceeds a maximum so that no more routes are learned.

The disconnected BGP peer is reconnected by input of the `clear ip bgp` (for BGP4) or `clear ipv6 bgp` (for BGP4+) operation command.

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

If settings are performed in `config-router-af` mode, the settings are applied to BGP4+ routes.

### Syntax

To set or change information:

For `config-router` mode:

```
neighbor {<IPv4-Address> | <Peer-Group>} maximum-prefix <Maximum>
[<Threshold>] [{warning-only | restart <Minutes>}]
```

For `config-router-af` mode:

```
neighbor {<IPv6-Address> | <Peer-Group>} maximum-prefix <Maximum>
[<Threshold>] [{warning-only | restart <Minutes>}]
```

To delete information:

For `config-router` mode:

```
no neighbor {<IPv4-Address> | <Peer-Group>} [maximum-prefix]
```

For `config-router-af` 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)
```

### 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 [OS-L3A]

---

Allows the next hop when a route learned from a BGP peer is advertised to BGP peers to be changed to the local address used for peering with the destination BGP peers.

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

If settings are performed in `config-router-af` mode, the settings are applied to BGP4+ routes.

### Syntax

To set information:

For `config-router` mode:

```
neighbor {<IPv4-Address> | <Peer-Group>} next-hop-self
```

For `config-router-af` mode:

```
neighbor {<IPv6-Address> | <Peer-Group>} next-hop-self
```

To delete information:

For `config-router` mode:

```
no neighbor {<IPv4-Address> | <Peer-Group>} [next-hop-self]
```

For `config-router-af` 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)
```

### 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 [OS-L3A]

---

Sets TCP MD5 authentication information (authentication key used to generate message digests) between peers.

This command is common to BGP4 and BGP4+.

### Syntax

To set or change information:

```
neighbor {<IPv4-Address> | <IPv6-Address> | <Peer-Group>} password <Key>
```

To delete information:

```
no neighbor {<IPv4-Address> | <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)

### 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*.

```
<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) [OS-L3A]

---

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.

This command is common to BGP4 and BGP4+. Note, however, that BGP4 peers and BGP4+ peers cannot be assigned to the same peer group.

### Syntax

To set or change information:

```
neighbor {<IPv4-Address> | <IPv6-Address>} peer-group <Peer-Group>
```

To delete information:

```
no neighbor {<IPv4-Address> | <IPv6-Address>} [peer-group]
```

Note:

```
no neighbor {<IPv4-Address> | <IPv6-Address>} deletes all neighbor command
settings for the peer.
```

### Input mode

(config-router)

### 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*.

*<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 cannot be assigned to the same peer group.
6. 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 * {both| in | out}` command for BGP4 or `clear ipv6 bgp * {both| in | out}` command for BGP4+.

## Related commands

`neighbor peer-group (creating)`

`neighbor remote-as`

---

## neighbor peer-group (creating) [OS-L3A]

---

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.

This command is common to BGP4 and BGP4+. Note, however, that BGP4 peers and BGP4+ peers cannot be assigned to the same peer group.

### 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)

### 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 cannot be assigned to the same peer group.

### **Related commands**

neighbor peer-group (assigning members)

---

## neighbor permit-asloop [OS-L3A]

---

Allows a received route to be accepted as a normal route even if the `ASPATH` attribute of the received route shows an AS loop.

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

If settings are performed in `config-router-af` mode, the settings are applied to BGP4+ routes.

### Syntax

To set information:

For `config-router` mode:

```
neighbor {<IPv4-Address> | <Peer-Group>} permit-asloop
```

For `config-router-af` mode:

```
neighbor {<IPv6-Address> | <Peer-Group>} permit-asloop
```

To delete information:

For `config-router` mode:

```
no neighbor {<IPv4-Address> | <Peer-Group>} [permit-asloop]
```

For `config-router-af` 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)
```

### 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 [OS-L3A]

---

Sets the AS number of a BGP peer or peer group. This command must be used to set a BGP peer. This command is common to BGP4 and BGP4+.

### Syntax

To set or change information:

```
neighbor {<IPv4-Address> | <IPv6-Address> | <Peer-Group>} remote-as <As>
```

To delete information:

```
no neighbor {<IPv4-Address> | <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)

### 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*.

```
<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 [OS-L3A]

---

Specifies the removal of private AS numbers when the routing information whose `AS_PATH` attribute contains only private AS numbers (64512 to 65535) is advertised to external peers or member AS peers.

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

If settings are performed in `config-router-af` mode, the settings are applied to BGP4+ routes.

### Syntax

To set information:

For `config-router` mode:

```
neighbor {<IPv4-Address> | <Peer-Group>} remove-private-as
```

For `config-router-af` mode:

```
neighbor {<IPv6-Address> | <Peer-Group>} remove-private-as
```

To delete information:

For `config-router` mode:

```
no neighbor {<IPv4-Address> | <Peer-Group>} remove-private-as
```

For `config-router-af` 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)
```

### 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 * { out | both }` (for BGP4) or `clear ipv6 bgp * { out | both }` (for BGP4+) operation command is executed.

### Notes

None

### Related commands

None

---

## neighbor route-reflector-client [OS-L3A]

---

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

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

If settings are performed in `config-router-af` mode, the settings are applied to BGP4+ routes.

### Syntax

To set information:

For `config-router` mode:

```
neighbor {<IPv4-Address> | <Peer-Group>} route-reflector-client
```

For `config-router-af` mode:

```
neighbor {<IPv6-Address> | <Peer-Group>} route-reflector-client
```

To delete information:

For `config-router` mode:

```
no neighbor {<IPv4-Address> | <Peer-Group>} [route-reflector-client]
```

For `config-router-af` 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`)

### 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 [OS-L3A]

---

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

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

If settings are performed in `config-router-af` mode, the settings are applied to BGP4+ routes.

### Syntax

To set information:

For `config-router` mode:

```
neighbor {<IPv4-Address> | <Peer-Group>} send-community
```

For `config-router-af` mode:

```
neighbor {<IPv6-Address> | <Peer-Group>} send-community
```

To delete information:

For `config-router` mode:

```
no neighbor {<IPv4-Address> | <Peer-Group>} [send-community]
```

For `config-router-af` 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)
```

### 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 [OS-L3A]

---

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

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

If settings are performed in `config-router-af` mode, the settings are applied to BGP4+ routes.

### Syntax

To set information:

For `config-router` mode:

```
neighbor {<IPv4-Address> | <Peer-Group>} set-nexthop-peer
```

For `config-router-af` mode:

```
neighbor {<IPv6-Address> | <Peer-Group>} set-nexthop-peer
```

To delete information:

For `config-router` mode:

```
no neighbor {<IPv4-Address> | <Peer-Group>} [set-nexthop-peer]
```

For `config-router-af` 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)
```

### 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 [OS-L3A]

---

Disables a peer connection.

This command is common to BGP4 and BGP4+.

### Syntax

To set information:

```
neighbor {<IPv4-Address> | <IPv6-Address> | <Peer-Group>} shutdown
```

To delete information:

```
no neighbor {<IPv4-Address> | <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)

### 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*.

### 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 [OS-L3A]

---

Stores routes that have been suppressed by the input policy. If the input policy is changed, this command allows the new input policy without disconnecting the BGP session.

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

If settings are performed in `config-router-af` mode, the settings are applied to BGP4+ routes.

### Syntax

To set information:

For `config-router` mode:

`neighbor {<IPv4-Address> | <Peer-Group>} soft-reconfiguration inbound`

For `config-router-af` mode:

`neighbor {<IPv6-Address> | <Peer-Group>} soft-reconfiguration inbound`

To delete information:

For `config-router` mode:

`no neighbor {<IPv4-Address> | <Peer-Group>} [soft-reconfiguration inbound]`

For `config-router-af` 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`)

### 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 [OS-L3A]

---

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

This command is common to BGP4 and BGP4+.

### Syntax

To set or change information:

```
neighbor {<IPv4-Address> | <IPv6-Address> | <Peer-Group>} timers <Keepalive>
<Holdtime>
```

To delete information:

```
no neighbor {<IPv4-Address> | <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)

### 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*.

`<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 [OS-L3A]

---

Specifies the interface used as the local IPv4 address (or IPv6 address) for the BGP session with a peer.

This command is common to BGP4 and BGP4+.

### Syntax

To set or change information:

```
neighbor {<IPv4-Address> | <IPv6-Address> | <Peer-Group>} update-source <interface type> <interface number>
```

To delete information:

```
no neighbor {<IPv4-Address> | <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)

### 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*.

```
<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

## 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 [OS-L3A]

---

Sets the weighting of routes received from a peer. If routes with the same destination are learned from multiple peers, routes with larger values are handled as preferred routes.

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

If settings are performed in `config-router-af` mode, the settings are applied to BGP4+ routes.

### Syntax

To set or change information:

For `config-router` mode:

`neighbor {<IPv4-Address> | <Peer-Group>} weight <Number>`

For `config-router-af` mode:

`neighbor {<IPv6-Address> | <Peer-Group>} weight <Number>`

To delete information:

For `config-router` mode:

`no neighbor {<IPv4-Address> | <Peer-Group>} [weight]`

For `config-router-af` 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`)

### 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 [OS-L3A]

---

Specifies the network address of the routing information generated and advertised via BGP. If there is an active route of any protocol that matches the specified network address, a BGP advertised route is generated and advertised. Advertised routes are inactive routes which are not registered in the forwarding table.

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

If settings are performed in `config-router-af` mode, the settings are applied to BGP4+ routes.

This command can be specified more than once.

### Syntax

To set information:

For `config-router` mode:

```
network <IPv4-Prefix>/<Mask-Len> [ge <Mask-Len>] [le <Mask-Len>]
(multiple lines can be entered)
```

For `config-router-af` mode:

```
network <IPv6-Prefix>/<Prefix-Len> [ge <Prefix-Len>] [le <Prefix -Len>]
(multiple lines can be entered)
```

To delete information:

For `config-router` mode:

```
no network <IPv4-Prefix>/<Mask-Len> [ge <Mask-Len>] [le <Mask-Len>]
```

For `config-router-af` mode:

```
no network <IPv6-Prefix>/<Prefix-Len> [ge <Prefix -Len>] [le <Prefix -Len>]
```

### Input mode

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

### 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 64 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 64 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 64 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 [OS-L3A]

---

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 ipv6` command to change `config-router` mode to `config-router-af` mode.

This command is common to BGP4 and BGP4+.

### 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 must be set in `config-router` mode. Before setting the BGP4+ policy, use the `address-family ipv6` command to switch to `config-router-af` 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 [OS-L3A]

---

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 priority.

This command is common to BGP4 and BGP4+.

### Syntax

To set or change information:

```
timers bgp <Keepalive> <Holdtime>
```

To delete information:

```
no timers bgp
```

### Input mode

```
(config-router)
```

### 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)

---

distributed-list in (BGP4) [OS-L3A]  
distributed-list in (BGP4+) [OS-L3A]  
distributed-list in (OSPF) [OS-L3A]  
distributed-list in (OSPFv3) [OS-L3A]  
distributed-list in (RIP)  
distributed-list in (RIPng)  
distributed-list out (BGP4) [OS-L3A]  
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distributed-list out (OSPF) [OS-L3A]  
distributed-list out (OSPFv3) [OS-L3A]  
distributed-list out (RIP)  
distributed-list out (RIPng)  
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ip community-list [OS-L3A]  
ip prefix-list  
ipv6 prefix-list  
match as-path [OS-L3A]  
match community [OS-L3A]  
match interface  
match ip address  
match ip route-source  
match ipv6 address  
match ipv6 route-source  
match origin [OS-L3A]  
match protocol  
match route-type [OS-L3A]  
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set metric-type [OS-L3A]  
set origin [OS-L3A]  
set tag

---

## istribute-list in (BGP4) [OS-L3A]

---

Filters which BGP4-learned routes are added to the routing table.

### Syntax

To set or change information:

```
istribute-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

BGP4-learned routes are not controlled.

### Impact on communication

None

### When the change is applied

The change is applied when the `clear ip bgp * { in | both }` operation command is executed.

### Notes

None

### Related commands

access-list

ip access-list

ip prefix-list

route-map

---

## distribute-list in (BGP4+) [OS-L3A]

---

Filters which BGP4+ 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-router-af)

### 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 * { in | both }` operation command is executed.

### Notes

None

### Related commands

ipv6 prefix-list

route-map

---

## istribute-list in (OSPF) [OS-L3A]

---

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) [OS-L3A]

---

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 criteria 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.

### Syntax

To set or change information:

```
distribute-list {<access list> | prefix <prefix list> | route-map <route map>} in [vlan <vlan id>]
```

```
distribute-list {<access list> | prefix <prefix list> | route-map <route map>} gateway <IPv4-Address> in
```

To delete information:

```
no distribute-list [{<access list> | prefix <prefix list> | route-map <route map>}] in [vlan <vlan id>]
```

```
no distribute-list [{<access list> | prefix <prefix list> | route-map <route map>}] gateway <IPv4-Address> in
```

### Input mode

(config-router)

### Parameters

```
{<access list> | prefix <prefix list> | route-map <route map>}
```

Specifies the access-list, prefix-list, or route-map used for filtering.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

For <access list>, specify 1 to 199 or 1300 to 2699 in decimal, or a name of no more than 31 characters.

For <prefix list>, specify a name of no more than 31 characters.

For <route map>, specify a name of no more than 31 characters.

For details, see *Specifiable values for parameters*.

```
gateway <IPv4-Address>
```

Specifies the gateway.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

Specify an IPv4 address.

```
vlan <vlan id>
```

Specifies the learning source interface.

1. Default value when this parameter is omitted:

There is no filter dedicated to the interface.

2. Range of values:

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



**Default behavior**

RIP-learned routes are not controlled.

**Impact on communication**

None

**When the change is applied**

The change is applied immediately after setting values are changed.

**Notes**

None

**Related commands**

access-list

ip access-list

ip prefix-list

route-map

---

## distribute-list in (RIPng)

---

Filters which RIPng-learned routes are added to the routing table.

### Syntax

To set or change information:

```
distribute-list {prefix-list <prefix list> | route-map <route map>} in [vlan <vlan id>]
```

To delete information:

```
no distribute-list [{prefix-list <prefix list> | route-map <route map>}] in [vlan <vlan id>]
```

### Input mode

(config-rtr-rip)

### Parameters

```
{prefix-list <prefix list> | route-map <route map>}
```

Specifies the prefix-list or route-map used for filtering.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

For <prefix list>, specify a name of no more than 31 characters.

For <route map>, specify a name of no more than 31 characters.

For details, see *Specifiable values for parameters*.

```
vlan <vlan id>
```

Specifies the learning source interface.

1. Default value when this parameter is omitted:

Routes are not filtered by the interface.

2. Range of values:

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

### Default behavior

RIPng-learned routes are not controlled.

### Impact on communication

None

### When the change is applied

The change is applied immediately after setting values are changed.

### Notes

None

### Related commands

ipv6 prefix-list

route-map

---

## distribute-list out (BGP4) [OS-L3A]

---

Filters which BGP4 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 }
```

```
<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 * { out | both }` operation command is executed.

### Notes

None

## **Related commands**

access-list

ip access-list

ip prefix-list

route-map

---

## distribute-list out (BGP4+) [OS-L3A]

---

Filters which BGP4+ 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-router-af)

### 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 }
```

```
<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 * { out | both }` operation command is executed.

### Notes

None

### Related commands

ipv6 prefix-list

route-map

---

## distribute-list out (OSPF) [OS-L3A]

---

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 }
```

```
<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) [OS-L3A]

---

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 criteria 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 }
```

```
<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.

### Syntax

To set or change information:

```
distribute-list {<access list> | prefix <prefix list> | route-map <route map>} out [{vlan
<vlan id> | <Protocol>}]
```

```
distribute-list {<access list> | prefix <prefix list> | route-map <route map>} gateway
<IPv4-Address> out [<Protocol>]
```

To delete information:

```
no distribute-list [{<access list> | prefix <prefix list> | route-map <route map>}] out [{vlan
<vlan id> | <Protocol>}]
```

```
no distribute-list [{<access list> | prefix <prefix list> | route-map <route map>}] gateway
<IPv4-Address> out [<Protocol>]
```

### Input mode

(config-router)

### Parameters

```
{<access list> | prefix <prefix list> | route-map <route map>}
```

Specifies the access-list, prefix-list, or route-map used for filtering.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

For <access list>, specify 1 to 199 or 1300 to 2699 in decimal, or a name of no more than 31 characters.

For <prefix list>, specify a name of no more than 31 characters.

For <route map>, specify a name of no more than 31 characters.

For details, see *Specifiable values for parameters*.

vlan <vlan id>

Specifies the learning source interface.

1. Default value when this parameter is omitted:

Routes are not filtered by the interface.

2. Range of values:

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

<Protocol>

Specify the learning source protocol.

1. Default value when this parameter is omitted:

Routes are not filtered by the protocol.

2. Range of values:

<Protocol> := {connected | static | summary | rip | ospf <Domain-No> | bgp }

*<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 [{vlan <vlan id> | <Protocol>}]
```

To delete information:

```
no distribute-list [{prefix-list <prefix list> | route-map <route map>}] out [{vlan <vlan id> | <Protocol>}]
```

### Input mode

(config-rtr-rip)

### Parameters

```
{prefix-list <prefix list> | route-map <route map>}
```

Specifies the prefix-list or route-map used for filtering.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

For <prefix list>, specify a name of no more than 31 characters.

For <route map>, specify a name of no more than 31 characters.

For details, see *Specifiable values for parameters*.

```
vlan <vlan id>
```

Specifies the learning source interface.

1. Default value when this parameter is omitted:

Routes are not filtered by the interface.

2. Range of values:

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

```
<Protocol>
```

Specify the learning source protocol.

1. Default value when this parameter is omitted:

Routes are not filtered by the protocol.

2. Range of values:

```
<Protocol> := { connected | static | summary | rip | ospf <Domain-No> | bgp }
```

```
<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 [OS-L3A]

---

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} <Regex>
```

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 criteria 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`.

<Regex>

Specifies the AS\_PATH attribute in a regular expression. Enclose <Regex> 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 11.10*.

### 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 criteria.  
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 [OS-L3A]

---

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} <Regex>
```

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 criteria.

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 criteria.

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 criteria 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 criteria. 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 criteria.

## 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.

<Regex>

Specifies the `Communities` attribute in a regular expression. Enclose <Regex> 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. or 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 11.10*.

## 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 criteria.

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 criteria 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 criteria. 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 criteria. 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 criteria.  
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**

istribute-list in (RIP) (OSPF) (BGP4)

istribute-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 criteria 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 criteria. 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 criteria. 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 criteria.  
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 [OS-L3A]

---

Configures route-map to use the AS\_PATH attribute as filter criteria.

### 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 criteria. 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 criteria.

### 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 [OS-L3A]

---

Configures route-map to use the `Communities` attribute as filter criteria.

### 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 criteria. 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 criteria.

### 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 criteria.

### 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 criteria. 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

- null 0

### Default behavior

The interface is not used as filter criteria.

### 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 criteria.

### 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 criteria. 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 criteria.

### 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 criteria.

### 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 criteria. 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 criteria.

### 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 criteria.

### 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 criteria. 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 criteria.

### 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 criteria.

### 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 criteria. 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 criteria.

### 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 [OS-L3A]

---

Configures route-map to use the `ORIGIN` attribute as filter criteria.

### 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 criteria. 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 criteria.

### 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 criteria.

### 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 criteria. 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 }
```

```
<Domain-No>: 1 to 65535 in decimal
```

### Default behavior

The protocol is not used as filter criteria.

### 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 [OS-L3A]

---

Configures route-map to use the route type as filter criteria.

### 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 criteria. 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 criteria.

### 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 criteria.

### 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 criteria. 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 criteria.

### 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) [OS-L3A]

---

Filters which BGP4-learned routes are added to the routing table.

### 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)

### 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 * { in | both }` operation command is executed.

### **Notes**

None

### **Related commands**

access-list

ip access-list

ip prefix-list

route-map

---

## neighbor in (BGP4+) [OS-L3A]

---

Filters which BGP4+ learned routes are added to the routing table.

### 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)

### 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 criteria 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 * { in | both }` operation command is executed.

### Notes

None

### Related commands

`ipv6 prefix-list`

`route-map`

---

## neighbor out (BGP4) [OS-L3A]

---

Filters which BGP4 routes are advertised.

### 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)

### 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 }

*<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 * { out | both }` operation command is executed.

### Notes

None

### Related commands

access-list

ip access-list

ip prefix-list

route-map



---

## neighbor out (BGP4+) [OS-L3A]

---

Filters which BGP4+ routes are advertised.

### 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)

### 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 criteria 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:

$\langle Protocol \rangle := \{ \text{connected} \mid \text{static} \mid \text{summary} \mid \text{rip} \mid \text{ospf } \langle Domain-No \rangle \mid \text{bgp} \}$   
 $\langle Domain-No \rangle$ : 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 * { out | both }` operation command is executed.

### Notes

None

### Related commands

ipv6 prefix-list

route-map

---

## redistribute (BGP4) [OS-L3A]

---

Filters which routes learned by other protocols are advertised to BGP4.

### 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)

### 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 }

<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 * { out | both }` operation command is executed.

### **Notes**

None

### **Related commands**

route-map

---

## redistribute (BGP4+) [OS-L3A]

---

Filters which routes learned by other protocols are advertised to BGP4+.

### 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)

### 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 }

<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 * { out | both }` operation command is executed.

### **Notes**

None

### **Related commands**

route-map

---

## redistribute (OSPF) [OS-L3A]

---

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 }

<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) [OS-L3A]

---

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 }

<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.

### 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)

### 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 }

<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 }

<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 criteria 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 [OS-L3A]

---

Sets the number of AS\_PATH numbers added to the routing information.

### Syntax

To set or change information:

```
set as-path prepend count <Count>
```

To delete information:

```
no set as-path prepend count
```

### Input mode

(config-route-map)

### Parameters

<Count>

Specifies the number of AS\_PATH numbers to be added.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

Specify 1 to 25 in decimal.

### Default behavior

The number of AS\_PATH numbers increases.

### Impact on communication

None

### When the change is applied

The change is applied immediately after setting values are changed.

### Notes

None

### Related commands

None

---

## set community [OS-L3A]

---

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 [OS-L3A]

---

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 [OS-L3A]

---

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 [OS-L3A]

---

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 [OS-L3A]

---

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 pim bsr-candidate
ip pim deletion-delay-time
ip pim keep-alive-time
ip pim max-interface
ip pim message-interval (global)
ip pim message-interval (interface)
ip pim mroute-limit
ip pim multiple-negative-cache
ip pim negative-cache-time
ip pim query-interval (global)
ip pim query-interval (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 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 group-limit <number>
```

To delete information:

```
no ip igmp group-limit
```

### Input mode

(config)

### 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 limits, see 3.2 *Capacity limit* in the manual *Configuration Guide Vol. 1 For Version 11.10*.

### 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 of capacity limits, see 3.2 *Capacity limit* in the manual *Configuration Guide Vol. 1 For Version 11.10*.

### 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 groups to exceed the group-limit that is set by this command, the current managed groups remain as such until they are removed from the group. However, they cannot rejoin the group until the number of managed groups on the interface is reduced to less than the group-limit that is set by this command.
3. This function does not limit group participation due to changes in the configuration (when static groups are added). Because the number of static groups is counted in the total number of groups, however, if the number of groups exceeds the limit due to the addition of static groups, additional group participation from hosts is limited.

## **Related commands**

`ip pim sparse-mode`

---

## ip igmp router

---

Runs IGMP on the specified interface.

### 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 source-limit <number>
```

To delete information:

```
no ip igmp source-limit
```

### Input mode

(config)

### 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.

For details of capacity limits, see 3.2 *Capacity limit* in the manual *Configuration Guide Vol. 1 For Version 11.10*.

### 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 within the described capacity limits.

For details of capacity limits, see 3.2 *Capacity limit* in the manual *Configuration Guide Vol. 1 For Version 11.10*.

### 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 ssm-map enable

To delete information:

no ip igmp ssm-map enable

### Input mode

(config)

### 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

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 static <access list> <source address>
```

To delete information:

```
no ip igmp ssm-map static <access list> <source address>
```

### Input mode

(config)

### 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 IPv4 multicast functionality (PIM) on the switch.

### Syntax

To set information:

`ip multicast-routing`

To delete information:

`no ip multicast-routing`

### Input mode

(`config`)

### Parameters

None

### Default behavior

None

### Impact on communication

None

### When the change is applied

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

### Notes

1. If you use the IPv4 multicast functionality on the Switch, this setting is required.
2. If you use the IPv4 multicast functionality on the Switch, you must also specify the IPv4 PIM (`ip pim sparse-mode`) setting for one or more interfaces.

### Related commands

None

---

## ip pim bsr-candidate

---

Sets the Switch as a BSR candidate.

### Syntax

To set or change information:

```
ip pim bsr-candidate loopback 0 [priority <value>]
```

To delete information:

```
no ip pim bsr-candidate loopback 0 [priority <value>]
```

### Input mode

(config)

### Parameters

loopback 0

Specifies a loopback interface.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

None

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

None

### 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.

### Syntax

To set or change information:

```
ip pim deletion-delay-time <seconds>
```

To delete information:

```
no ip pim deletion-delay-time
```

### Input mode

(config)

### 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 keep-alive-time

---

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

### Syntax

To set or change information:

```
ip pim keep-alive-time <seconds>
```

To delete information:

```
no ip pim keep-alive-time
```

### Input mode

(config)

### Parameters

<seconds>

Sets the keep-alive time (in seconds) when communication is idle in 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 (0 means infinite)

### Default behavior

The keep-alive time for communication-idle in IPv4 PIM-SM is 210 seconds.

### Impact on communication

None

### When the change is applied

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

### Notes

1. Even during the 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 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 { 32 | 64 | 128 }
```

To delete information:

```
no ip pim max-interface
```

### Input mode

(config)

### Parameters

```
{ 32 | 64 | 128 }
```

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:

32, 64, or 128.

### Default behavior

IPv4 PIM or IGMP runs with a maximum of 128 interfaces.

### Impact on communication

When the value of this command is changed, the IPv4 multicast routing program restarts automatically. Therefore, IPv4 multicast routing stops temporarily.

### When the change is applied

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

### Notes

None

### Related commands

```
ip pim sparse-mode
```

```
ip igmp router
```

---

## ip pim 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.

### Syntax

To set or change information:

`ip pim message-interval <seconds>`

To delete information:

`no ip pim message-interval`

### Input mode

(config)

### 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.

### 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 information entries (total of (S, G) and (\*, G) entries).

### Syntax

To set or change information:

```
ip pim mroute-limit <number>
```

To delete information:

```
no ip pim mroute-limit
```

### Input mode

(config)

### Parameters

<number>

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

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

0 to 1024

### Default behavior

There is no limit on the maximum number of PIM-SM/SSM multicast routing information entries (total of (S, G) and (\*, G) entries). However, you must operate within the described capacity limits.

For details of capacity limits, see 3.2 *Capacity limit* in the manual *Configuration Guide Vol. 1 For Version 11.10*.

### Impact on communication

None

### When the change is applied

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

### Notes

1. Values specified by using this command set the limit for the maximum number of PIM-SM/SSM multicast routing information entries, but do not guarantee operation based on the specified value.
2. If the number of PIM-SM/SSM multicast routing information entries exceeds the setting value of this command due to a change in the configuration, existing entries are maintained until they are deleted. If an entry is deleted in this state, it cannot be recreated until the number of entries becomes the value of this command or less.

### Related commands

ip pim sparse-mode

---

## ip pim multiple-negative-cache

---

The `ip pim multiple-negative-cache` command enables the creation of multiple negative cache entries with the same (S,G) entries for each VLAN.

### Syntax

To set information:

```
ip pim multiple-negative-cache
```

To delete information:

```
no ip pim multiple-negative-cache
```

### Input mode

(config)

### Parameters

None

### Default behavior

Only one negative cache entry can be created for the same (S,G) entries. The negative cache entry that can be created is the one whose receiving-side interface is the VLAN that receives the first packet.

### Impact on communication

None

### When the change is applied

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

### Notes

1. When you set or clear this command, all negative cache entries are deleted.

### Related commands

`ip multicast-routing`

`ip pim sparse-mode`

---

## ip pim negative-cache-time

---

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

### Syntax

To set or change information:

```
ip pim negative-cache-time <seconds>
```

To delete information:

```
no ip pim negative-cache-time
```

### Input mode

(config)

### 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 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.

### Syntax

To set or change information:

```
ip pim query-interval <seconds>
```

To delete information:

```
no ip pim query-interval
```

### Input mode

(config)

### 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.

### 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 register-checksum

---

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

### Syntax

To set or change information:

```
ip pim register-checksum {header | all}
```

To delete information:

```
no ip pim register-checksum
```

### Input mode

(config)

### 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.

### Syntax

To set or change information:

```
ip pim register-probe-time <seconds>
```

To delete information:

```
no ip pim register-probe-time
```

### Input mode

(config)

### 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 five seconds.

### Impact on communication

None

### When the change is applied

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

### Notes

1. If the remaining time of Register-Suppression-Timer becomes the value specified by using this parameter or less, null-Register messages are sent every five seconds.

### Related commands

ip pim sparse-mode

---

## ip pim rp-address

---

Sets the static rendezvous point information.

### Syntax

To set information:

```
ip pim rp-address <ipv4 address> [<access list>]
```

To delete information:

```
no ip pim rp-address <ipv4 address> [<access list>]
```

### Input mode

(config)

### Parameters

*<ipv4 address>*

Specifies the IPv4 address of the rendezvous point.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

Specify an IPv4 address.

*<access list>*

Specifies an access list for the 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's behavior will be the same as 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.

### Syntax

To set or change information:

```
ip pim rp-candidate loopback 0 [priority <value>] [group-list <access list>]
```

To delete information:

```
no ip pim rp-candidate loopback 0 [priority <value>] [group-list <access list>]
```

### Input mode

(config)

### Parameters

loopback 0

Specifies a loopback interface.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

None

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's behavior will be the same as when the access list parameter is omitted.
3. To use this command, set an IPv4 address for 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`

`interface loopback`

`ip access-list standard`

---

## ip pim rp-mapping-algorithm

---

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

### Syntax

To set or change information:

```
ip pim rp-mapping-algorithm {method1 | method2}
```

To delete information:

```
no ip pim rp-mapping-algorithm
```

### Input mode

(config)

### 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 use the IP multicast functionality on the corresponding interface, this setting is required.

### Related commands

ip multicast-routing

ip igmp router

---

## ip pim ssm

---

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

### Syntax

To set information:

```
ip pim ssm {default | range <access list>}
```

To delete information:

```
no ip pim ssm {default | range <access list>}
```

### Input mode

(config)

### 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 address 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`





## 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

---

## 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:

Specify 1 to 64.

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

---

## 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

1. Before you use this command, make sure that you use the `swrt_table_resource` command to set which mode you want to use IPv6 resources in.

### Related commands

`interface vlan`

`ipv6 address`

`swrt_table_resource`

---

## 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> [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**

1. If a static NDP is to be set, the destination MAC addresses must be set at the same time using static MAC addresses. If the destination MAC addresses are not set, IP forwarding might be performed by software processing.

### **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

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

### 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

## Chapter

---

# 17. Loopback Interface (IPv6)

---

interface loopback  
ipv6 address (loopback)

---

## **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

None

### Related commands

interface loopback



## 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

None

## **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 second.

### Impact on communication

None

### When the change is applied

The change is applied immediately after setting values are changed.

### Notes

None

### Related commands

`ipv6 nd ra-interval`

`ipv6 nd reachable-time`

`ipv6 nd ns-interval`

---

## ipv6 nd reachable-time

---

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, 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 a distributed prefix to the routing information table of the Switch by specifying the routing information option of an IPv6 DHCP relay.

### Syntax

To set information:

ipv6 dhcp relay static-route-setting

To delete information:

no ipv6 dhcp relay static-route-setting

### Input mode

(config)

### Parameters

None

### Default behavior

A distributed 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 distributed when no routing information option was set, the distributed prefix is registered in the routing information.
2. If you delete the routing information option, all routing information for the distributed 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  
snmp-server

---

## dns-server

---

Sets the DNS server address used by the IPv6 DHCP server. The DNS server address is distributed in response to requests from IPv6 DHCP clients.

### Syntax

To set information:

```
dns-server <IPv6 Address>
```

To delete information:

```
no dns-server <IPv6 Address>
```

### Input mode

(config-dhcp)

### Parameters

<IPv6 Address>

Sets the IPv6 address of a DNS server that the client can use.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

None

### Default behavior

None

### Impact on communication

None

### When the change is applied

The change is applied immediately after setting values are changed.

### Notes

1. This command can be set more than once.
2. The maximum number of IP addresses that can be configured for the server is 16 per IPv6 DHCP address pool.
3. The maximum number of DNS server addresses that can be configured per device is 512.

### Related commands

None



---

## domain-name

---

Sets the IPv6 DHCP server domain name. The domain name is distributed in response to requests from IPv6 DHCP clients.

### Syntax

To set information:

domain-name *<Domain Name>*

To delete information:

no domain-name *<Domain Name>*

### Input mode

(config-dhcp)

### Parameters

*<Domain Name>*

Specifies a domain name that the client can use.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

A domain name that contains a maximum of 253 characters

### Default behavior

None

### Impact on communication

None

### When the change is applied

The change is applied immediately after setting values are changed.

### Notes

1. This command can be set more than once.
2. The maximum number of domain names that can be configured is 16 per IPv6 DHCP address pool.
3. The maximum number of domain names that can be configured per device is 512.

### Related commands

None

---

## ipv6 dhcp pool

---

Sets information about an IPv6 DHCP address pool.

### Syntax

To set information:

```
ipv6 dhcp pool <Pool Name>
```

To delete information:

```
no ipv6 dhcp pool <Pool Name>
```

### Input mode

(config)

### Parameters

<Pool Name>

Specifies the name used for identifying the IPv6 DHCP address pool on the IPv6 DHCP server.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

Enter a name that contains a maximum of 14 characters.

### Default behavior

None

### Impact on communication

None

### When the change is applied

The change is applied immediately after setting values are changed.

### Notes

1. The maximum number of IPv6 DHCP address pools that can be configured is 128.
2. If <Pool Name> has been set for the `ipv6 dhcp server` command, you cannot delete the `ipv6 dhcp pool` command settings. You need to first delete the `ipv6 dhcp server` command settings, and then delete the `ipv6 dhcp pool` command settings.

### Related commands

None

---

## ipv6 dhcp server

---

Configures the distribution of prefixes.

### Syntax

To set or change information:

```
ipv6 dhcp server <Pool Name> [rapid-commit] [preference <Number>]
```

To delete information:

```
no ipv6 dhcp server <Pool Name>
```

### Input mode

(config-if)

### Parameters

<Pool Name>

Specifies the IPv6 DHCP address pool name set in the IPv6 DHCP address pool setting.

1. Default value when this parameter is omitted:  
This parameter cannot be omitted.
2. Range of values:  
Enter a name that contains a maximum of 14 characters.

rapid-commit

Allows the Rapid Commit option to be accepted when a Solicit message is received from a client.

1. Default value when this parameter is omitted:  
None
2. Range of values:  
None

preference <Number>

Used to notify clients of the priority of the server. The greater the value, the higher the priority.

1. Default value when this parameter is omitted:  
None
2. Range of values:  
1 to 255

### Default behavior

None

### Impact on communication

None

### When the change is applied

The change is applied immediately after setting values are changed.

## Notes

1. You can set this command for a maximum of 128 interfaces.
2. You cannot specify this command more than once for an interface.

## Related commands

`ip dhcp pool`

---

## ipv6 dhcp static-route-setting

---

Automatically adds routing information to a client in a routing information table maintained on the Switch. A prefix is distributed to this client by the IPv6 DHCP server.

### Syntax

To set information:

ipv6 dhcp static-route-setting

To delete information:

no ipv6 dhcp static-route-setting

### Input mode

(config)

### Parameters

None

### Default behavior

None

### Impact on communication

None

### When the change is applied

The change is applied immediately after setting values are changed.

### Notes

1. When a prefix is distributed after this command is set, a route for the prefix is automatically set. If the information set by this command is deleted online, all routing information for the distributed prefixes is immediately deleted. If you set this command after distributing prefixes without setting this command, all information for the distributed 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 distributed 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 IPv6 DHCP address local pool name.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

Enter a name that contains a maximum of 14 characters.

<IPv6 Address>/<Prefixlen>

Specify the prefix used for assignment.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

Specify <IPv6 Address> in colon notation. For <Prefixlen>, specify a prefix length in the range from 1 to 64 in decimal.

<Assigned Length>

Specifies actual prefix length to be assigned.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

1 to 64

### Default behavior

None

### Impact on communication

None

### When the change is applied

The change is applied immediately after setting values are changed.

## Notes

1. A maximum of 1024 prefixes can be configured to be distributed for a Switch.
2. This command cannot be set together with a static IPv6 prefix setting in the same IPv6 DHCP address pool setting.
3. Any non-zero number contained after *<Assigned Length>* is ignored.
4. If *<Local Pool Name>* has been set for the `prefix-delegation pool` command, you cannot delete the `ipv6 local pool` command settings. You need to first delete the `prefix-delegation pool` command settings, and then delete the `ipv6 local pool` command settings.

## Related commands

None

---

## prefix-delegation

---

Configures a static IPv6 prefix, IAID, and lifetime to be used in the specified IPv6 DHCP address pool setting.

### Syntax

To set or change information:

```
prefix-delegation <IPv6 Address>/<Prefixlen> <Client DUID> [iaid <IAID>] [lifetime
{<Valid Lifetime> | infinite} {<Preferred Lifetime> | infinite}]
```

To delete information:

```
no prefix-delegation <IPv6 Address>
```

### Input mode

(config-dhcp)

### Parameters

*<IPv6 Address>/<Prefixlen>*

Specifies a static IPv6 prefix to be used in the specified IPv6 DHCP address pool setting.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

Specify *<IPv6 Address>* in colon notation. For *<Prefixlen>*, specify a prefix length in the range from 1 to 64 in decimal.

*<Client DUID>*

Specifies the DUID of a client.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

Specify a hexadecimal number, separating every two digits by a colon (:).

You can set a maximum of 128 sets of two-digit numbers.

Example: 00:01:00:01:aa:bb

iaid *<IAID>*

Specifies the IAID to be assigned to the specified IPv6 prefix. If this parameter is specified, the prefix that matches the IAID set for IA\_PD by the client will be distributed. If you omit this parameter, the prefixes are sequentially assigned to IA\_PD's 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 distributed for a Switch.
2. This command cannot be set together with the IPv6 DHCP address local pool setting in the same IPv6 DHCP address pool setting.

### Related commands

None

---

## prefix-delegation pool

---

Configures the IAID and lifetime for the range of IPv6 prefixes specified in the IPv6 DHCP address local pool setting.

### Syntax

To set or change information:

```
prefix-delegation pool <Local Pool Name> [iaid <IAID>] [lifetime {<Valid Lifetime> |
infinite} {<Preferred Lifetime> | infinite}]
```

To delete information:

```
no prefix-delegation pool <Local Pool Name>
```

### Input mode

(config-dhcp)

### Parameters

<Local Pool Name>

Sets the IPv6 DHCP address local pool name set in the IPv6 DHCP address local pool setting.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

Enter a name that contains a maximum of 14 characters.

iaid <IAID>

Specifies the IAID to be assigned for the IPv6 prefix range setting. If this parameter is specified, the prefix that matches the IAID set for IA\_PD by the client will be distributed. If you omit this parameter, the prefixes are sequentially assigned to IA\_PDs whose IAID does not match.

1. Default value when this parameter is omitted:

None

2. Range of values:

0 to 4294967295

lifetime {<Valid Lifetime> | infinite} {<Preferred Lifetime> | infinite}

<Valid Lifetime>

Specifies the valid lifetime (in seconds) to be used for the IPv6 prefix range setting. For this parameter, specify a value equal to or greater than the preferred lifetime.

<Preferred Lifetime>

Specifies the preferred lifetime (in seconds) to be used for the IPv6 prefix range setting. For this parameter, specify a value equal to or smaller than the valid lifetime.

infinite

Sets an unlimited valid lifetime or preferred lifetime to be used for the IPv6 prefix range setting. You can specify *infinite* for the preferred lifetime only when *infinite* is specified for the valid lifetime.

1. Default value when this parameter is omitted:

The valid lifetime is set to 2592000 (30 days). The preferred lifetime is set to 604800 (7 days).

2. Range of values:

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 prefix range setting specified in the IPv6 DHCP address local pool setting is not configured. If a lifetime parameter is omitted, the following values are set:

- Valid lifetime: 30 days
- Preferred lifetime: 7 days

### Impact on communication

None

### When the change is applied

The change is applied immediately after setting values are changed.

### Notes

1. An IPv6 DHCP address local pool name set for any other `ipv6 dhcp pool` command setting cannot be used.

### Related commands

`ipv6 local pool`

---

## **service ipv6 dhcp**

---

Enables or disables an IPv6 DHCP server.

### **Syntax**

To set information:

```
no service ipv6 dhcp
```

To delete information:

```
service ipv6 dhcp
```

### **Input mode**

(config)

### **Parameters**

None

### **Default behavior**

The IPv6 DHCP server is enabled.

### **Impact on communication**

Communication is disabled.

### **When the change is applied**

The change is applied immediately after setting values are changed.

### **Notes**

None

### **Related commands**

None

---

## sip-domain-name

---

Sets the SIP domain name provided by an IPv6 DHCP server. The SIP domain name is distributed in response to requests from IPv6 DHCP clients.

### Syntax

To set information:

```
sip-domain-name <Domain Name>
```

To delete information:

```
no sip-domain-name <Domain Name>
```

### Input mode

(config-dhcp)

### Parameters

<Domain Name>

Specifies the SIP domain name that the client can use.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

A domain name that contains a maximum of 253 characters

### Default behavior

None

### Impact on communication

None

### When the change is applied

The change is applied immediately after setting values are changed.

### Notes

1. This command can be set more than once.
2. The maximum number of domain names that can be configured is 16 per IPv6 DHCP address pool.
3. The maximum number of SIP domain names that can be configured per device is 512.

### Related commands

None

---

## sip-server

---

Sets the IPv6 address of the SIP server provided by an IPv6 DHCP server. The IPv6 address of the SIP server is distributed in response to requests from IPv6 DHCP clients.

### Syntax

To set information:

```
sip-server <IPv6 Address>
```

To delete information:

```
no sip-server <IPv6 Address>
```

### Input mode

(config-dhcp)

### Parameters

<IPv6 Address>

Sets the IPv6 address of the SIP server that a client can use.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

None

### Default behavior

None

### Impact on communication

None

### When the change is applied

The change is applied immediately after setting values are changed.

### Notes

1. This command can be set more than once.
2. The maximum number of IP addresses that can be configured for the server is 16 per IPv6 DHCP address pool.
3. The maximum number of IPv6 addresses of the SIP server that can be configured per device is 512.

### Related commands

None

---

## sntp-server

---

Sets the address of the SNTP server provided by the IPv6 DHCP server. The address of the SNTP server is distributed in response to requests from IPv6 DHCP clients.

### Syntax

To set information:

```
sntp-server <IPv6 Address>
```

To delete information:

```
no sntp-server <IPv6 Address>
```

### Input mode

(config-dhcp)

### Parameters

<IPv6 Address>

Sets the IPv6 address of the SNTP server that the client can use.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

None

### Default behavior

None

### Impact on communication

None

### When the change is applied

The change is applied immediately after setting values are changed.

### Notes

1. This command can be set more than once.
2. The maximum number of IP addresses that can be configured for the server is 16 per IPv6 DHCP address pool.
3. The maximum number of SNTP server addresses that can be configured per device is 512.

### Related commands

None





## Chapter

---

# 22. Routing Options (IPv6)

---

Routing Options (IPv6)

---

## Routing Options (IPv6)

---

See 8. *Routing Options (IPv4)*.

## Chapter

---

# 23. Route Summarization (IPv6)

---

ipv6 summary-address

---

## ipv6 summary-address

---

Generates an IPv6 summarized route.

### Syntax

To set or change information:

```
ipv6 summary-address <IPv6-Prefix>/<Prefix-Len> [<Distance>] [as-set] [noinstall]
[summary-only]
```

To delete information:

```
no ipv6 summary-address <IPv6-Prefix>/<Prefix-Len>
```

### Input mode

(config)

### 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 64 in decimal.

*<Distance>*

Specifies the distance of the summarized route.

1. Default value when this parameter is omitted:

130

2. Range of values:

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

as-set

Specifies that AS\_SET is generated when the AS\_PATH attribute for a summarized route is generated.

1. Default value when this parameter is omitted:

AS\_SET is not generated when the AS\_PATH attribute for a summarized route is generated.

2. Range of values:

None

`noinstall`

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

1. Default value when this parameter is omitted:  
Summarized routes are registered in the forwarding table.

2. Range of values:

None

`summary-only`

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

1. Default value when this parameter is omitted:  
Advertisement of summarization source routes is not suppressed.

2. Range of values:

None

### Default behavior

Summarized routes are not generated.

### Impact on communication

None

### When the change is applied

The change is applied immediately after setting values are changed.

### Notes

1. Routes whose next hop has a loopback interface or null interface cannot be used as summarization 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 <IPv6-Prefix>/<Prefix-Len> <Nexthop-Address> [<Distance>] [weight
<Weight>] [tag <Tag>] [{noinstall | reject}] [poll] [noresolve]
```

```
ipv6 route <IPv6-Prefix>/<Prefix-Len> <Nexthop-Address> <interface type> <interface
number> [<Distance>] [weight <Weight>] [tag <Tag>] [{noinstall | reject}] [poll]
[noresolve]
```

```
ipv6 route <IPv6-Prefix>/<Prefix-Len> <interface type> <interface number>
[<Distance>] [weight <Weight>] [tag <Tag>]
```

To delete information:

```
no ipv6 route <IPv6-Prefix>/<Prefix-Len> <Nexthop-Address>
```

```
no ipv6 route <IPv6-Prefix>/<Prefix-Len> <Nexthop-Address> <interface type> <interface
number>
```

```
no ipv6 route <IPv6-Prefix>/<Prefix-Len> <interface type> <interface number>
```

### Input mode

(config)

### 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 1 to 64 or 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.

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

- `null 0`

*<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<sup>#</sup> including directly connected routes are used to resolve the next hop on static routes.

<sup>#</sup>: 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

None

## 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 routing information.

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

### Syntax

To set or change information:

```
ipv6 route static maximum-paths <Number>
```

To delete information:

```
no ipv6 route static maximum-paths
```

### Input mode

(config)

### Parameters

<Number>

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

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

Specify 1 to 16 in decimal.

### Default behavior

The initial value is set to 6.

### Impact on communication

None

### When the change is applied

The change is applied immediately after setting values are changed.

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

### 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 RIPv6. Metrics set by the `redistribute` or `distribute-list out` command have priority 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 RIPv6. 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 RIPv6.

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 RIPv6.

### 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`

To delete information:

`no ipv6 router rip`

### Input mode

(`config`)

### Parameters

None

### 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 | vlan <vlan id>}
```

To delete information:

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

### Input mode

(config-rtr-rip)

### Parameters

```
{default | vlan <vlan id>}
```

Specifies the interface to be prevented from sending RIPng packets.

**default**

Prevents all interfaces from sending RIPng packets.

**vlan <vlan id>**

Specifies the interface to be prevented from sending RIPng packets.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

default or vlan <vlan id>

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

### Default behavior

Routing information is sent in RIPng packets.

### Impact on communication

None

### When the change is applied

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

### Notes

1. Specify the `passive-interface default` command to disable transmission for all interfaces available for RIPng packet transmission. In this state, if you specify the `no passive-interface <vlan id>` 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 [OS-L3A]

---

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---

## area default-cost [OS-L3A]

---

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 [OS-L3A]

---

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 routing information transmitted between areas.

### Syntax

To set or change information:

```
area <Area-ID> range <IPv6-prefix>/<PrefixLen> [{advertise | not-advertise}]
```

To delete information:

```
no area <Area-ID> range <IPv6-prefix>/<PrefixLen>
```

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

```
no area <Area-ID>
```

### Input mode

(config-rtr)

### Parameters

<Area-ID>

Specifies the area to which the Switch belongs.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

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

<IPv6-prefix>

Specifies the IPv6 prefix.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

Specifies the IPv6 prefix.

Note: Set all the bits following the bits specified for <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 64 or 128 in decimal.

{advertise | not-advertise}

Specifies whether to advertise inter-area routes. All of the routing information that matches the range of the network indicated by the specified IPv6 prefix and prefix length is not advertised to other areas as inter-area routes. Instead, this command allows you to advertise only a specified range as inter-area routes to other areas. However, if you specify

`not-advertise`, nothing will be advertised.

1. Default value when this parameter is omitted:  
`advertise` (Information is advertised as inter-area routes).
2. Range of values:  
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 [OS-L3A]

---

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 routing information) are advertised.

2. Range of values:

None

### Default behavior

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

### Impact on communication

Adjacency with neighboring routers within the area is briefly disconnected.

**When the change is applied**

The change is applied immediately after setting values are changed.

**Notes**

None

**Related commands**

None

---

## area virtual-link [OS-L3A]

---

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 [OS-L3A]

---

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 [OS-L3A]

---

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 priority over the information specified by this command.

### Syntax

To set or change information:

`default-metric <Metric>`

To delete information:

`no default-metric`

### Input mode

(`config-rtr`)

### Parameters

*<Metric>*

Specifies a metric.

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 [OS-L3A]**

---

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 [OS-L3A]

---

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 [OS-L3A]

---

In OSPFv3, the `graceful-restart mode` command specifies the helper functionality for graceful restarts.

### Syntax

To set information:

`graceful-restart mode helper`

To delete information:

`no graceful-restart mode`

### Input mode

(`config-rtr`)

### Parameters

`helper`

Specifies the helper functionality.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

None

### Default behavior

The restart router functionality and helper router functionality are disabled.

### Impact on communication

None

### When the change is applied

The helper functionality is activated when a neighboring router performs a graceful restart.

### Notes

None

### Related commands

None

---

## graceful-restart strict-lsa-checking [OS-L3A]

---

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 [OS-L3A]

---

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 [OS-L3A]

---

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 [OS-L3A]

---

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 [OS-L3A]

---

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 [OS-L3A]

---

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 [OS-L3A]

---

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 [OS-L3A]

---

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 five 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 [OS-L3A]

---

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 [OS-L3A]

---

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>
```

To delete information:

```
no ipv6 router ospf <Domain-No>
```

### 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.

### 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 [OS-L3A]

---

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 or restart.

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 or restart.

1. Default value when this parameter is omitted:

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

2. Range of values:

Specify 5 to 86400 (seconds) in decimal.

### Default behavior

The switch does not 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. 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 restarts is operating, the graceful restart fails.

### Related commands

None



---

## maximum-paths [OS-L3A]

---

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.

The maximum number of paths that can be generated as a multipath OSPFv3 route is the value specified in this command or the upper limit of the Switch, whichever is smaller.

### Syntax

To set or change information:

```
maximum-paths <Number>
```

To delete information:

```
no maximum-paths
```

### Input mode

(config-rtr)

### Parameters

<Number>

Specifies the maximum number of paths.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

Specify 1 to 16 in decimal.

### Default behavior

The initial value is set to 4.

### Impact on communication

None

### When the change is applied

The change is applied immediately after setting values are changed.

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

### Notes

None

### Related commands

None

---

## passive-interface [OS-L3A]

---

Specifies that the OSPFv3 network (connected to the interface for which `ipv6 ospf area` is specified in `config-if` mode) will be used as a stub network, which does not send or receive OSPFv3 packets.

### Syntax

To set information:

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

To delete information:

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

Note: Use the following procedure to specify `default`:

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

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

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

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

### Input mode

```
(config-rtr)
```

### Parameters

```
{default | vlan <vlan id> }
```

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

`default`

Sets all OSPFv3 networks as a passive interface.

`vlan <vlan id>`

Specifies the interface in the OSPFv3 network.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

`default` or `vlan <vlan id>`

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

3. Note on using this parameter:

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

### Default behavior

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

### Impact on communication

None

**When the change is applied**

The change is applied immediately after setting values are changed.

**Notes**

None

**Related commands**

ipv6 ospf area

---

## router-id [OS-L3A]

---

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 order shown below. 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, 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 [OS-L3A]

---

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
```

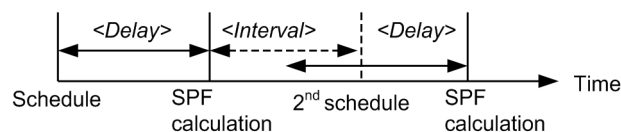
### Input mode

(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+ [OS-L3A]**

---

BGP4+ [OS-L3A]

---

**BGP4+ [OS-L3A]**

---

See 13. *BGP4 [OS-L3A]*.

## Chapter

---

# 28. Route Filtering (IPv6)

---

Route Filtering (IPv6)

---

## Route Filtering (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)  
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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 mroute-limit  
ipv6 pim negative-cache-time  
ipv6 pim register-probe-time  
ipv6 pim rp-address  
ipv6 pim rp-mapping-algorithm  
ipv6 pim ssm

---

## 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 group-limit <number>
```

To delete information:

```
no ipv6 mld group-limit
```

### Input mode

(config)

### 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 perform operations 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 perform operations 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 query-interval <seconds>
```

To delete information:

```
no ipv6 mld query-interval
```

### Input mode

(config)

### 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 source-limit <number>
```

To delete information:

```
no ipv6 mld source-limit
```

### Input mode

(config)

### Parameters

<number>

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

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

0 to 256

### Default behavior

There is no limit on source participation in groups. However, you must operate multicast routing entries within the described capacity limits.

### Impact on communication

None

### When the change is applied

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

### Notes

1. This function does not limit source participation due to changes in the configuration (when static groups are added and ssm-join settings are added). Because this source participation is counted in the total number of sources, however, if the number of sources exceeds the limit due to changes in the configuration, additional source participation from hosts in groups is limited.

### Related commands

ipv6 mld router

---

## ipv6 mld 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 multicast routing entries within the described capacity limits.

### Impact on communication

None

### When the change is applied

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

### Notes

1. This function does not limit source participation due to changes in the configuration (when static groups are added and ssm-join settings are added). Because this source participation is counted in the total number of sources, however, if the number of sources exceeds the limit due to changes in the configuration, additional source participation from hosts in groups is limited.

### Related commands

ipv6 mld router

---

## ipv6 mld ssm-map enable

---

The `ipv6 mld ssm-map enable` command runs PIM-SSM with MLDv1 or MLDv2 (EXCLUDE mode).

### Syntax

To set information:

`ipv6 mld ssm-map enable`

To delete information:

`no ipv6 mld ssm-map enable`

### Input mode

(`config`)

### 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

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 static <access list name> <source address>
```

To delete information:

```
no ipv6 mld ssm-map static <access list name> <source address>
```

### Input mode

(config)

### 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 the `ipv6 access-list` command cannot be specified.
4. If an access list that has not set by the `ipv6 access-list` command 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 *29.3.1 Addresses subject to forwarding* in the manual *Configuration Guide Vol. 3 For Version 11.10*.
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 the `ipv6 access-list` command cannot be specified.
4. If an access list that has not set by the `ipv6 access-list` command 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

---

Enables the IPv6 multicast functionality.

### Syntax

To set information:

ipv6 multicast-routing

To delete information:

no ipv6 multicast-routing

### Input mode

(config)

### Parameters

None

### Default behavior

None

### Impact on communication

None

### When the change is applied

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

### Notes

1. If you use the 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 device address (loopback 0 interface address).
3. If you use the IPv6 multicast functionality on the Switch, you must also specify the IPv6 PIM (ipv6 pim) setting for one or more interfaces.

### 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 multicast-routing

ipv6 mld router

---

## ipv6 pim assert-metric

---

Specifies the metric to be used in IPv6 PIM assert messages.

### Syntax

To set or change information:

```
ipv6 pim assert-metric {<metric> | unicast-routing}
```

To delete information:

```
no ipv6 pim assert-metric
```

### Input mode

(config)

### Parameters

```
{<metric> | unicast-routing}
```

Specifies the metric used in assert messages.

<metric>

Specifies a metric.

unicast-routing

Metric 1 of the unicast routing protocol is used.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

For <metric>, a numeric value from 0 to 65535 or the string `unicast-routing` can be specified.

### Default behavior

The metric 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 assert-preference {<preference> | unicast-routing}
```

To delete information:

```
no ipv6 pim assert-preference
```

### Input mode

(config)

### Parameters

```
{<preference> | unicast-routing}
```

Specifies the preference information to be used in assert messages.

```
<preference>
```

Specifies the preference value.

```
unicast-routing
```

Uses the first distance of the unicast routing protocols.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

For `<preference>`, a numeric value from 0 to 255 or the string `unicast-routing` can be specified.

### Default behavior

The preference value used in assert messages is 0 for directly connected source addresses, or 101 for indirectly connected source addresses.

### Impact on communication

None

### When the change is applied

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

### Notes

None

### Related commands

```
ipv6 pim
```

---

## ipv6 pim bsr candidate bsr

---

Sets the Switch as a BSR candidate.

### Syntax

To set or change information:

```
ipv6 pim bsr candidate bsr <ipv6 address> [priority <value>]
```

To delete information:

```
no ipv6 pim bsr candidate bsr <ipv6 address> [priority <value>]
```

### Input mode

(config)

### Parameters

<ipv6 address>

Specifies the loopback address of the Switch.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

Set the same loopback address as that assigned to the target loopback interface.

priority <value>

Specify the priority for determining the BSR. The router that has the highest priority becomes the BSR.

1. Default value when this parameter is omitted:

0

2. Range of values:

0 to 255

### Default behavior

None

### Impact on communication

None

### When the change is applied

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

### Notes

1. Specify the same address for all of the loopback addresses of the Switch that is specified in the `ipv6 pim bsr candidate bsr` or `ipv6 pim bsr candidate rp` command.

### Related commands

ipv6 pim

interface loopback



---

## ipv6 pim bsr candidate rp

---

Sets the Switch as a rendezvous point candidate.

### Syntax

To set or change information:

```
ipv6 pim bsr candidate rp <ipv6 address> [priority <value>] [group-list <access list name>]
```

To delete information:

```
no ipv6 pim bsr candidate rp <ipv6 address> [priority <value>] [group-list <access list name>]
```

### Input mode

(config)

### Parameters

<ipv6 address>

Specifies the loopback address of the Switch.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

Set the same loopback address as that assigned to the target loopback interface of the Switch.

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 *29.3.1 Addresses subject to forwarding* in the manual *Configuration Guide Vol. 3 For Version 11.10*.
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 the `ipv6 access-list` 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.

## 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 deletion-delay-time <seconds>
```

To delete information:

```
no ipv6 pim deletion-delay-time
```

### Input mode

(config)

### 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. A maximum of 128 source addresses are valid per interface.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

Specify a name that is no more than 31 characters long.

For details, see *Specifiable values for parameters*.

### Default behavior

None

### Impact on communication

None

### When the change is applied

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

### Notes

1. For <access list name>, specify access lists that have been set by using the `ipv6 access-list` command. Access lists that have been set by using commands other than the `ipv6 access-list` command cannot be specified.
2. If an access list that has not set by the `ipv6 access-list` command is specified, this command is not valid.
3. For the address specified in <access list name>, use the source IPv6 address of the corresponding access list.
4. If the same IPv6 source address is used for multiple interfaces on a switch, some of the settings will become invalid.
5. The maximum number of source IPv6 addresses that are valid in the specified access list is the upper limit per interface (128).
6. An error occurs if the total number of source IPv6 addresses set in the access list specified by this command exceeds the upper limit per switch (256), regardless of whether the addresses

are valid.

7. Source IPv6 addresses in the access list become valid in the order in which they are specified. If you use the `ppupdate` operation command to update software or the `copy` operation command to copy configuration entries on the target switch, source IPv6 addresses become valid in the order of the sequence numbers in the access list.

### **Related commands**

`ipv6 pim`

`ipv6 access-list`

---

## ipv6 pim hello-interval (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 hello-interval <seconds>
```

To delete information:

```
no ipv6 pim hello-interval
```

### Input mode

(config)

### 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 join-prune-interval <seconds>
```

To delete information:

```
no ipv6 pim join-prune-interval
```

### Input mode

(config)

### 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 keep-alive-time <seconds>
```

To delete information:

```
no ipv6 pim keep-alive-time
```

### Input mode

(config)

### 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 { 32 | 64 | 128 }
```

To delete information:

```
no ipv6 pim max-interface
```

### Input mode

(config)

### Parameters

```
{ 32 | 64 | 128 }
```

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

32, 64, or 128

### Default behavior

IPv6 PIM or MLD runs with a maximum of 128 interfaces.

### Impact on communication

When the value of this command is changed, the IPv6 multicast routing program restarts automatically. Therefore, IPv6 multicast routing stops temporarily.

### When the change is applied

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

### Notes

None

### Related commands

ipv6 pim

ipv6 mld router

---

## ipv6 pim mroute-limit

---

Specifies the maximum number of IPv6 PIM-SM/SSM multicast routing information entries (total of (S, G) and (\*, G) entries).

### Syntax

To set or change information:

```
ipv6 pim mroute-limit <number>
```

To delete information:

```
no ipv6 pim mroute-limit
```

### Input mode

(config)

### Parameters

<number>

Specifies the maximum number of IPv6 PIM-SM/SSM multicast routing information entries (total of (S, G) and (\*, G) entries).

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

0 to 128

### Default behavior

There is no limit on the maximum number of IPv6 PIM-SM/SSM multicast routing information entries (total of (S, G) and (\*, G) entries). However, you must operate multicast routing entries within the described capacity limits.

For details about capacity limits or number of table entries, see *3.2 Capacity limit* in the manual *Configuration Guide Vol. 1 For Version 11.10*.

### Impact on communication

None

### When the change is applied

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

### Notes

1. Values specified by using this command set the maximum number of IPv6 PIM-SM/SSM multicast routing information entries that can be created for each interface, but do not guarantee operation with the specified value. If the number of IPv6 PIM-SM/SSM multicast routing information entries exceeds the value of this parameter due to a change in the configuration, existing entries are retained until they are deleted. If an entry is deleted in this state, it cannot be recreated until the number of entries that are managed by the corresponding interface falls below or is equal to the value of this parameter.

### Related commands

ipv6 pim

---

## ipv6 pim negative-cache-time

---

Sets the retention time for negative caches in IPv6 PIM-SM.

### Syntax

To set or change information:

```
ipv6 pim negative-cache-time <seconds>
```

To delete information:

```
no ipv6 pim negative-cache-time
```

### Input mode

(config)

### Parameters

<seconds>

Sets the retention time (in seconds) for negative caches in IPv6 PIM-SM.

1. Default value when this parameter is omitted:

This parameter cannot be omitted.

2. Range of values:

10 to 3600 (seconds)

### Default behavior

The retention time for negative caches in IPv6 PIM-SM is 210 seconds.

### Impact on communication

None

### When the change is applied

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

### Notes

1. The retention time for negative caches in IPv6 PIM-SSM is fixed as 3600 seconds.

### Related commands

ipv6 pim

---

## ipv6 pim register-probe-time

---

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

### Syntax

To set or change information:

```
ipv6 pim register-probe-time <seconds>
```

To delete information:

```
no ipv6 pim register-probe-time
```

### Input mode

(config)

### 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 five seconds.

### Impact on communication

None

### When the change is applied

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

### Notes

1. If the remaining time of Register-Suppression-Timer becomes the value specified by using this parameter or less, null-Register messages are sent every five seconds.

### Related commands

ipv6 pim

---

## ipv6 pim rp-address

---

Performs settings for the static rendezvous point.

### Syntax

To set information:

```
ipv6 pim rp-address <ipv6 address> [<access list name>]
```

To delete information:

```
no ipv6 pim rp-address <ipv6 address> [<access list name>]
```

### Input mode

(config)

### 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 *29.3.1 Addresses subject to forwarding* in the manual *Configuration Guide Vol. 3 For Version 11.10*.
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 the `ipv6 access-list` 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 rp-mapping-algorithm { method1 | method2 }
```

To delete information:

```
no ipv6 pim rp-mapping-algorithm
```

### Input mode

(config)

### 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 ssm { default | range <access list name> }
```

To delete information:

```
no ipv6 pim ssm { default | range <access list name> }
```

### Input mode

(config)

### 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 *29.3.1 Addresses subject to forwarding* in the manual *Configuration Guide Vol. 3 For Version 11.10*.
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 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



## **Chapter**

---

# **30. Error Messages Displayed When Editing the Configuration**

---

30.1 Error messages displayed when editing the configuration

## 30.1 Error messages displayed when editing the configuration

### 30.1.1 IPv4, ARP, and ICMP information

Table 30-1: IPv4, ARP, and ICMP error messages

Message	Description
Can not change IP subnetmask configuration when NTP broadcast configuration has existed.	NTP broadcast information exists. Delete the NTP broadcast information, and then change the IP subnet information.
Can not delete a primary IP address when a secondary IP address is existing.	A secondary IP address exists. Delete the secondary IP address, and then delete the primary IP address.
Can not delete IP configuration referred by Virtual Router configuration.	Virtual router information exists. Delete the virtual router information, and then delete the IP information.
Can not delete IP configuration when NTP broadcast configuration has existed.	NTP broadcast information exists. Delete the NTP broadcast information, and then delete the IP information.
Can not delete IP configuration with ARP configuration.	ARP information exists. Delete the ARP information, and then delete the IP information.
Can not set a secondary IP address on an interface which does not have a primary IP address.	An attempt is being made to set a secondary IP address on an interface on which a primary IP address is not set. Set a primary IP address first.
Cannot assign IPv4 address over maximum number for this switch mode.	The maximum number of IPv4 addresses per mode was exceeded. Change the mode or reduce the number of IPv4 addresses.
Cannot change switch mode because the number of static ARP entries exceed the maximum number for this mode.	The mode cannot be changed because the number of static ARP entries that are currently set exceeds the upper limit in the new mode. Delete static ARP entries.
Cannot delete static ARP because entry assigned same IP address exists.	The static ARP entry cannot be deleted because a static ARP entry that has the same IP address exists. When a static ARP entry that has the same IP address exists, specify the static ARP entry to be deleted including the interface.
Cannot set no ip routing command when GSRP layer 3 redundancy is enable.	The no ip routing command cannot be set when the GSRP Layer 3 redundancy switching functionality is enabled. Disable the GSRP Layer 3 redundancy switching functionality.
Cannot set static ARP entry over maximum number for this mode.	The number of static ARP entries exceeded the upper limit in the mode. Change the mode or delete static ARP entries.
Duplicate network address.	The same IP address of the network address has been set. Set the IP address so that all network addresses are unique.
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.

Message	Description
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.

### 30.1.2 Policy-based routing information [AX3640S] [OS-L3A]

Table 30-2: Policy-based routing error messages

Message	Description
Cannot change IP address because there is an inconsistency between IP address and policy based routing configuration.	The IP address cannot be changed for the following reasons: <ul style="list-style-type: none"> <li>When the IP address is changed, the changed IP address and the next hop IPv4 address that is set in the policy-based routing are not on the same network.</li> <li>When the IP address is changed, the next hop IPv4 address that is set for the policy-based routing becomes the direct broadcast address of the network connecting to the specified destination interface.</li> </ul>
Cannot delete IP address because policy based routing is set.	The IP address cannot be deleted.
Cannot set policy based routing entry because specified interface is invalid.	Policy-based routing cannot be set for the following reasons: <ul style="list-style-type: none"> <li>The specified destination interface does not exist.</li> <li>No IP address is specified for the specified destination interface.</li> </ul> Check for the above problems, fix the problems, and then set policy-based routing.
Cannot set policy based routing entry because specified next-hop address is invalid.	The entry cannot be set because policy-based routing does not support the specified next-hop IP address. If you use IPv4 policy-based routing, for the next-hop IP address, specify an IP address that satisfies the following conditions: <ul style="list-style-type: none"> <li>The address of a network connected to the specified destination interface</li> <li>Not the direct broadcast address of a network connected to the specified destination interface</li> <li>Not the address set for the specified destination interface</li> </ul> An IPv6 address cannot be specified.
Can't execute command it because data is not corresponding.	The list number specified by using the <code>policy-list resequence</code> command is not found.
The list number specified by resequence of policy base routing does not have the target route.	The list number specified by using the <code>policy-list resequence</code> command does not have the target route.
Trial count should be more than failure count.	The number of times polling is attempted for Down state judgment must be larger than the threshold value of the polling failure count for the state to be judged Down.
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.

### 30.1.3 DHCP relay functionality

Table 30-3: 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.

### 30.1.4 DHCP server functionality

Table 30-4: 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.
<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.



### 30.1.5 Route summarization (IPv4) information

Table 30-5: 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.

### 30.1.6 Static routing (IPv4) information

Table 30-6: 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.

### 30.1.7 RIP information

Table 30-7: List of RIP error messages

Message	Description
Inconsistent ipv4-prefix and wildcard. Masked bits should be zero.	1 is set for the wildcard mask bits of the specified prefix. Set 0 for the wildcard mask bits.

### 30.1.8 OSPF information [OS-L3A]

Table 30-8: 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 <code>no area nssa</code> 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 <code>no area stub</code> command.
Inconsistent ipv4-prefix and mask. Non-masked bits should be zero.	1 is set for the unmasked bits of the specified prefix. Set 0 for the unmasked bits.
Inconsistent ipv4-prefix and wildcard. Masked bits should be zero.	1 is set for the wildcard mask bits of the specified prefix. Set 0 for the wildcard mask bits.
invalid range <IPv4-Prefix>/<Mask>.	An invalid value (0.0.0.0) is specified for the network range of the area. Make sure that the <Mask> range of <IPv4-Prefix> is not 0.0.0.0.  <IPv4-Prefix>: Specified network <Mask>: Specified mask
The source router ID and the neighbor router ID belonging to a virtual link must be different.	The source router ID and the neighbor router ID of a virtual link must be different. Specify a different value from the source router ID.
Virtual links can not be assigned to the NSSA.	Because an NSSA is set, the area cannot be specified as an area through which a virtual link passes. Do not specify the area as an area through which a virtual link passes.
Virtual links can not be assigned to the stub area.	Because a stub area is set, the area cannot be specified as an area through which a virtual link passes. Do not specify the area as an area through which a virtual link passes.

### 30.1.9 BGP4 information [OS-L3A]

Table 30-9: 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.
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 <code>network</code> command is invalid. <ul style="list-style-type: none"> <li>Make sure that the mask length specified with <code>le</code> is equal to or longer than that of the specified prefix.</li> <li>Make sure that the mask length specified with <code>ge</code> is equal to or shorter than that of the mask length specified with <code>le</code>.</li> </ul>
Invalid Max-suppress-time. Set the Max-suppress-time greater than the Half-life.	The <code>Max-suppress-time</code> value is equal to or smaller than the <code>Half-life</code> value. Specify the <code>Max-suppress-time</code> value with a value which is larger than the <code>Half-life</code> value.
Invalid Suppress value. Set the Suppress value greater than the Reuse value.	The <code>Suppress</code> value is equal to or smaller than the <code>Reuse</code> value. Specify the <code>Suppress</code> value as larger than the <code>Reuse</code> 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 <code>neighbor always-nexthop-self</code> 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 <code>neighbor always-nexthop-self</code> 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 <code>neighbor as-override</code> command is specified for an internal peer or a peer group of internal peers. Specify the <code>neighbor as-override</code> 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 <code>neighbor ebgp-multihop</code> command is specified for an internal peer or a peer group of internal peers. Specify the <code>neighbor ebgp-multihop</code> command for an external peer or a peer between member ASs, and the peer group of external peers and peers between member ASs.

Message	Description
The graceful-restart is not set. Specify the restart-time after set the graceful-restart.	The <code>bgp graceful-restart mode</code> command is not set. Set the <code>bgp graceful-restart mode</code> command, and then the <code>bgp graceful-restart restart-time</code> command.
The graceful-restart is not set. Specify the stalepath-time after set the graceful-restart.	The <code>bgp graceful-restart mode</code> command is not set. Set the <code>bgp graceful-restart mode</code> command, and then the <code>bgp graceful-restart stalepath-time</code> command.
The maximum-paths (all-as) must be set bgp always-compare-med.	To specify multipath by using the <code>maximum-paths</code> command with the <code>all-as</code> parameter, you need to set the <code>bgp always-compare-med</code> command first. To specify multipath by using the <code>maximum-paths</code> command with the <code>all-as</code> parameter, set the <code>bgp always-compare-med</code> command first.
The permit-asloop is not supported for this peer or peer group type.	The <code>neighbor permit-asloop</code> command is specified for an internal peer or the peer group of internal peers. Specify the <code>neighbor permit-asloop</code> 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 <code>neighbor remote-as</code> 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 <code>neighbor remove-private-as</code> command is specified for an internal peer or the peer group of internal peers. Specify the <code>neighbor remove-private-as</code> 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 <code>neighbor route-reflector-client</code> 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 <code>neighbor route-reflector-client</code> command for an internal peer or a peer group of internal peers.

### 30.1.10 Route filtering information

Table 30-10: Route filtering error messages

Message	Description
already configured as different type.	The specified <code>ip community-list</code> type is different from the type that has already been specified. Make sure that the <code>ip community-list</code> type matches the type that has already been specified.
Can not change permit/deny.	The <code>permit/deny</code> 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 <code>ge</code> is equal to or shorter than that of the mask length specified with <code>le</code> .
	The specified range of the prefix length is invalid. Make sure that the prefix length specified with <code>ge</code> is equal to or shorter than that of the prefix length specified with <code>le</code> .

Message	Description
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.
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.

Message	Description
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.

### 30.1.11 IPv4 multicast routing protocol information

Table 30-11: 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. <sup>#</sup>

<sup>#</sup>: The following table shows the number of interfaces on which IPv4 PIM or IGMP can be configured.

Table 30-12: Maximum number of interfaces for which IPv4 PIM/IGMP can be set

#	Specified max-interface value	Configurable number of interfaces	
		PIM	IGMP
1	32	31	31
2	64	63	63
3	128	127	127

### 30.1.12 IPv6, NDP, and ICMPv6 information

Table 30-13: IPv6, NDP, and ICMPv6 error messages

Message	Description
Can not delete IP configuration referred by Virtual Router configuration.	Virtual router information exists. Delete the virtual router information, and then delete the IP information.
Can not delete IP configuration with NDP configuration.	NDP information exists. Delete the NDP information, and then delete the IP information.
Cannot delete static NDP because entry assigned same IPv6 address exists.	The static NDP entry cannot be deleted because a static NDP entry that has the same IP address exists. When a static NDP entry that has the same IP address exists, specify the static NDP entry to be deleted including the interface.
Duplicate prefix.	An IP address with the same prefix has been set. Make sure that prefixes are unique.
Inconsistency has occurred in a setting of IPv6 address and NDP.	There is an inconsistency between the address prefixes of an address set in the IP information and an address set in the NDP information. Specify the address prefixes correctly.

Message	Description
IP address is duplicate between interface and static NDP entry.	An address set by using IP information and an address set by using NDP information are the same. Set the addresses that do not duplicate one another.
Maximum number of interfaces that can use IPv6 are already defined.	No more IPv6 addresses can be set for the interface. Check the network configuration again.
Maximum number of IP address are already defined.	No more IP addresses can be set. Check the network configuration again.
Maximum number of linklocal address are already defined.	No more link-local 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 relation with the specified address again.

### 30.1.13 RA information

Table 30-14: 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.

### 30.1.14 IPv6 DHCP relay information [OP-DH6R]

Table 30-15: 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.

Message	Description
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 <code>ipv6 dhcp relay destination</code> or <code>ipv6 dhcp relay hop-limit</code> for an interface in which no IPv6 address exist. Set an IPv6 address, and then set <code>ipv6 dhcp relay destination</code> or <code>ipv6 dhcp relay hop-limit</code> .
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 <code>no service ipv6 dhcp</code> command to disable the IPv6 DHCP server functionality, and then use IPv6 DHCP relays.

### 30.1.15 IPv6 DHCP server functionality

Table 30-16: IPv6 DHCP server functionality error messages

Message	Description
Cannot delete the definition because referred to by <i>&lt;value 1&gt;</i> .	This configuration cannot be deleted because it is referred to by <i>&lt;value 1&gt;</i> . 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 <code>Prefix-delegation</code> or <code>Prefix-delegation pool</code> .
ipv6 dhcp server is specified in the interface which an IPv6 address doesn't exist in.	An attempt is being made to set <code>ipv6 dhcp server</code> for an interface in which no IPv6 address exist. Set an IPv6 address, and then set <code>ipv6 dhcp server</code> .
Ipv6 local pool not found at <i>&lt;Local Pool Name&gt;</i> .	The <code>ipv6 local pool</code> of the specified local pool name cannot be found. Specify the local pool name of the <code>ipv6 local pool</code> 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.

### 30.1.16 Route summarization (IPv6) information

Table 30-17: 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.

### 30.1.17 Static routing (IPv6) information

Table 30-18: 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.

### 30.1.18 OSPFv3 information [OS-L3A]

Table 30-19: OSPFv3 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 range <Prefix>/<Prefixlen>.	An invalid value (::/0) is specified for the network range of the area. Make sure that the <Prefixlen> range of <Prefix> is not ::/0.  <Prefix>: Specified prefix <Prefixlen>: Specified prefix length
The source router ID and the neighbor router ID belonging to a virtual link must be different.	The source router ID and the neighbor router ID of a virtual link must be different. Specify a different value from the source router ID.
Virtual links can not be assigned to the stub area.	Because a stub area is set, the area cannot be specified as an area through which a virtual link passes. Do not specify the area as an area through which a virtual link passes.

### 30.1.19 BGP4+ information [OS-L3A]

Table 30-20: 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. <ul style="list-style-type: none"> <li>Make sure that the mask length specified with le is equal to or longer than that of the specified prefix.</li> <li>Make sure that the mask length specified with ge is equal to or shorter than that of the mask length specified with le.</li> </ul>
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.



Message	Description
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-overrides command is specified for an internal peer or the peer group of internal peers. Specify the neighbor as-override command for an external peer or a peer between member ASs, and the peer group of external peers or the peer group of peers between member ASs.
The ebgp-multihop is not supported for this peer or peer group type.	The neighbor ebgp-multihop command is specified for an internal peer or a peer group of internal peers. Specify the neighbor ebgp-multihop command for an external peer or a peer between member ASs, and the peer group of external peers and peers between member ASs.
The maximum-paths (all-as) must be set bgp always-compare-med.	To specify multipath by using the maximum-paths command with the all-as parameter, you need to set the bgp always-compare-med command first. To specify multipath by using the maximum-paths command with the all-as parameter, set the bgp always-compare-med command first.
The peer option is link-local address, but the internal peer is not supported link-local address peering.	A link-local address is set for the peer address of the internal peer. Set a global address or site-local address for the peer address of the internal peer.
The permit-asloop is not supported for this peer or peer group type.	The neighbor permit-asloop command is specified for an internal peer or the peer group of internal peers. Specify the neighbor permit-asloop command for an external peer or a peer between member ASs, and the peer group of external peers or the peer group of peers between member ASs.
The remote-as cannot be set, because it is already being set for peer or peer group.	The neighbor remote-as command cannot be set. It is already being set for a peer group or a peer belonging to a peer group.
The remove-private-as is not supported for this peer or peer group type.	The neighbor remove-private-as command is specified for an internal peer or the peer group of internal peers. Specify the neighbor remove-private-as command for an external peer or a peer between member ASs, and the peer group of external peers or the peer group of peers between member ASs.
The route-reflector-client is being specified to external peer or peer group. The route-reflector-client can be specified to only internal peer or peer group.	The neighbor route-reflector-client command is specified for an external peer or a peer between member ASs, or the peer group of external peers and peers between member ASs. Specify the neighbor route-reflector-client command for an internal peer or the peer group of internal peers.

### 30.1.20 IPv6 multicast routing protocol information

*Table 30-21: 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. <sup>#</sup>

<sup>#</sup>: The following table shows the number of interfaces on which IPv6 PIM or MLD can be configured.

*Table 30-22: 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	63	127

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