Sun Ethernet Fabric Operating System

CLI Enterprise Reference Manual

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Review SEFOS command descriptions, syntax, and examples for the switch

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Contents

Using This Documentation

This manual provides SEFOS CLI Enterprise command descriptions, syntax, and examples for the Sun Network 10GbE Switch 72p and Sun Blade 6000 Ethernet Switched NEM 24p 10GbE. You are expected to have a basic knowledge of Ethernet switching and routing administration as a prerequisite to using this manual. SEFOS is accessed through Oracle ILOM. For instructions on connecting to Oracle ILOM and SEFOS, refer to the user's guide for your switch.

Product Notes

For late-breaking information and known issues about the following products, refer to the product notes at:

Oracle Switch ES1-24:

http://www.oracle.com/goto/ES1-24/docs

Sun Blade 6000 Ethernet Switched NEM 24p 10GbE:

http://www.oracle.com/goto/SB6K-24p-10GbE/docs

Sun Network 10GbE Switch 72p:

http://www.oracle.com/goto/SN-10GbE-72p/docs

Related Documentation

Documentation	Links
All Oracle products	http://oracle.com/documentation
Oracle Switch ES1-24	http://www.oracle.com/goto/ES1-24/docs
Sun Network 10GbE Switch 72p	http://www.oracle.com/goto/SN-10GbE-72p/docs
Sun Blade 6000 Ethernet Switched NEM 24p 10GbE	http://www.oracle.com/goto/SB6K-24p-10GbE/docs
Sun Blade 6000 modular system	http://www.oracle.com/pls/topic/lookup?ctx=sb6000
Oracle Integrated Lights Out Manager (Oracle ILOM) 3.0	http://www.oracle.com/pls/topic/lookup?ctx=ilom30

For detailed information about the commands and options described in this document, refer to the *Sun Ethernet Fabric Operating System CLI Base Reference Manual*.

Acronyms and Abbreviations

The following acronyms and abbreviations are used in this book:

Acronym or Abbreviation	Explanation
AARP	AppleTalk Address Resolution
ACL	Access control list
APNIC	Asia-Pacific Network Information Centre
ARIN	American Registry for Internet Addresses
ARP	Address Resolution Protocol
AS	Autonomous system

Acronym or Abbreviation	Explanation
ASBR	Autonomous border system router
BGP	Border Gateway Protocol
BPBDU	Bridge protocol data unit
BSD	Berkeley Software Distribution
CBS	Committed burst size
CEP	Customer edge port
CIDR	Classless inter-domain routing
CIR	Committed information rate
CIST	Common Internal Spanning Tree
CMM	Chassis Management Module
CNA	Converged netwaork adapter
DCB	Data cebter bridging
DCBX	Data Center Exchange Protocol
DEC	Digital Equipment Corporation
DSCP	Differentiated services code point
EBS	Excess burst size
EF DSCP	Expidited forwarding DSCP
EIR	Excess information rate
ETS	Enhancement transmission selection
EIGRP	Enhanced Interior Gateway Protocol
FCoE	Fiber Channel over Ethernet
FDB	Forwarding database
FSAP	Flexible software architecture for portability
GARP	Generic Attribute Registration Protocol
GMRP	GARP Multicast Registration Protocol
GVRP	GARP VLAN Registration Protocol
ICMP	Internet Control Message Protocol
ICMPv4	Internet Control Message Protocol version 4
IGMP	Internet Group Management Protocol
IGS	IGMP snooping
IP TOS	IP type of service

Acronym or Abbreviation	Explanation
ISL	Inter-switch link
IVL	Independent VLAN learning
LA	Link aggregation
LACP	Link aggregation Control Protocol
LACNIC	Latin American and Caribbean Network Information Centre
LLDP	Link Layer Discovery Protocol
MEF	Metro Ethernet Forum
MIB	Management information base
MLD	Multicast listener discovery
MLDS	Multicast listener discovery snooping
MSTP	Multiple Spanning Tree Protocol
NetBIOS	Network Basic Input/Output System
NPAPI	Network processor application programming interface
OPSF	Open Shortest Path First
PDU	Protocol description unit
PFC	Priority-based flow control
PG	Priority group
PHB	Per-hop behavior
PIM	Protocol independent multicast
PMTU	Path MTU
PMTUD	PMTU discovery
PVID	Port VLANI ID
PVRST	Per-VLAN Rapid Spanning Tree
PVRST+	Per-VLAN Rapid Spanning Tree Plus
PVST	Per-VLAN Spanning Tree
RFC	Request for comments
RIP	Routing Information Protocol
RIPE NCC	Reseaux IP Europeens Network Coordination Centre
RMON	Remote monitoring
RRD	Route redistribution
RST	Rapid Spanning Tree

Acronym or Abbreviation	Explanation
RTM	Route table manager
SLA	service-level agreement
SLI	Socket layer interface
SNMP	Simple Network Management Protocol
srTCM	Single rate three color marker
STP	Spanning Tree Protocol
SVL	Shared VLAN learning
TCP/IP	Transmission Control Protocol/Internet Protocol
TCP ACK bit	TCP acknowledgement bit
TCP RST bit	TCP reset bit
TCN	Topology change notification
TFTP	Trivial File Transfer Protocol
trTCM	Two rate three color marker
TSWTCM	Time sliding window three color marker
TLV	Type, length, and value
TTL	Time-to-live value
UDP	User Datagram Protocol
VINES	Virtual integrated network service
VLAN	Virtual LAN
VLAN ID	VLAN identifier
XNS	Xerox network systems
XVLAN	Exclusive VLAN

CLI Command Modes

The following table provides the access and exit methods to various general configuration modes.The following table lists the different CLI command modes.

Command Mode	Access Method	Prompt	Exit Method
User EXEC	Initial mode to start a session.	`SEFOS>`	Use the logout method.
Privileged EXEC	Use the `enable` command from User EXEC mode.	`SEFOS#`	Use the `disable` command to return to User EXEC mode.
Global Configuration	Use the `configure terminal` command from Privileged EXEC mode.	`SEFOS(config)#`	Use the `end` command to return to Privileged EXEC mode.
Interface Configuration	Use the `interface` *interface-type interface-id* from Global Configuration mode command.	`SEFOS(config-if)#`	Use the `exit` command to return to Global Configuration mode
Interface Range Configuration	Use the `interface range` command from Global Configuration mode.	`SEFOS(config-if-range)#`	Use the `exit` command to return to Global Configuration mode.
Config-VLAN	Use the `vlan` *vlan-id* command from Global Configuration mode.	`SEFOS(config-vlan)#`	Use the `exit` command to return to Global Configuration mode.
Line Configuration	Use the `line` command from Global Configuration mode.	`SEFOS(config-line)#`	Use the `exit` command to return to Global Configuration mode.
Profile Configuration	Use the `ip mcast profile` *profile-id* [*description (128)*] from Global Configuration mode.	`SEFOS(config-profile)#`	Use the `exit` command to return to Global Configuration mode.

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CHAPTER 1

CLI

This chapter describes how to configure SEFOS software with the CLI. Access the CLI with a console attached to the SER MGT port of the switch, or from a remote terminal using SSH (refer to the user's guide and software configuration guide for your switch).

1.1 SEFOS Overview

SEFOS is a layer 2 and layer 3 software solution that provides support for Ethernet switching and routing. It comprises the necessary switching, management, and system level features. SEFOS provides the basic bridging functionality and also offers features such as link aggregation, GVRP/GMRP, IGMP snooping, and network access control.

The native SEFOS CLI commands are the main tools for configuring the commonly used layer 2 and layer 3 protocols and switch interface features. In addition to its native CLI commands, SEFOS provides a subset of CLI commands that adhere to the

industry-standard CLI syntax. When an industry-standard command is available, the SEFOS native CLI command is shown first, with the industry-standard command shown after a slash (/).

In the following example, the `set port gvrp` command is the SEFOS native CLI command, and the `set port gvrp enable | disable` command is the industry-standard CLI command:

```
set port gvrp / set port gvrp enable | disable
```

Use the industry-standard CLI command whenever it is available.

1.1.1 Accessing SEFOS

You must access SEFOS through Oracle ILOM. Refer to the user's guide and software configuration guide for your switch for details.

The SEFOS CLI supports a simple login authentication mechanism. The authentication is based on a user name and password you provide during login. The root user is created by default with password `admin123`.

When SEFOS is started, you must enter the root user name and password at the login prompt to access the CLI shell:

```
                Sun Ethernet Fabric Operating System

SEFOS Login: root
Password: ********

SEFOS>
```

The User EXEC mode is now available. The following section provides a detailed description of the various modes available for SEFOS.

- The command prompt always displays the current mode.
- Abbreviated CLI commands are accepted. For example, `show ip global config` can be typed as `sh ip gl co`.
- CLI commands are not case-sensitive.
- CLI commands are successful only if the dependencies are satisfied for the command. The general dependency is that the module specific commands are available only when the respective module is enabled. Appropriate error messages are displayed if the dependencies are not satisfied.

Note – The type of Ethernet interface is determined during system startup. While configuring interface-specific parameters, the Ethernet type must be specified correctly. A FastEthernet interface cannot be configured as an extreme-ethernet interface and vice-versa.

1.2 CLI Command Modes

See the table in "CLI Command Modes" on page xxii for a quick reference of the command modes used in this document.

1.2.1 User EXEC Mode

When you log into the device, you are in User EXEC mode. In general, User EXEC commands temporarily change terminal settings, perform basic tests, and list system information.

1.2.2 Privileged EXEC Mode

Privileged access is protected with a case-sensitive password. The prompt is the device name followed by the hash (#) sign.

1.2.3 Global Configuration Mode

Global Configuration commands apply to features that affect the system as a whole, rather than to any specific interface.

1.2.4 Interface Configuration Mode

1.2.4.1 Physical Interface Mode

Performs interface-specific operations.

1.2.4.2 Port Channel Interface Mode

Performs port-channel-specific operations.

1.2.4.3 VLAN Interface Mode

Performs L3-IPVLAN-specific operations.

1.2.4.4 Tunnel Interface Mode

Performs tunnel-specific operations.

1.2.5 Interface Range Mode

Specifies a range of interfaces, such as consecutive ports, to certain single interface commands. This mode does not specify a single port at a time.

1.2.6 Config-VLAN Mode

Performs VLAN specific operations.

1.2.7 Line Configuration Mode

Modifies the operations of a terminal line. These commands are used to change terminal parameter settings line by line or a range of lines at a time.

1.2.8 Profile Configuration Mode

Performs profile-specific operations.

1.2.9 Protocol-Specific Modes

1.2.9.1 PIM Component Mode

Configures the PIM component. To enter PIM Component mode, use the Global Configuration mode `ip pim component` *`componentid`* command.

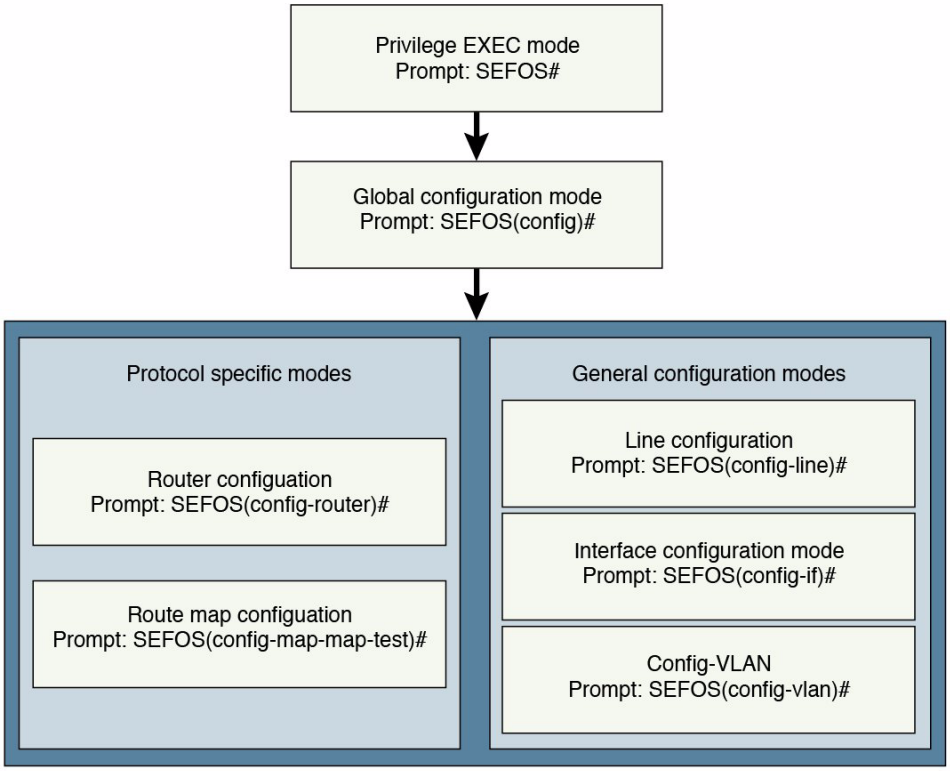
1.2.9.2 Router Configuration Mode

Configures the router protocol. To enter Router Configuration mode, use the Global Configuration mode `router` *`router-protocol`* command.

1.2.9.3 Route Map Configuration Mode

Configure route map parameters. To enter Router Map Configuration mode, use the Global Configuration mode `route-map` *1-20* `[{permit | deny}]` [*1-10*] command.

The following is a flowdiagram that shows the hierarchy of accessing command modes.


Privilege EXEC mode
Prompt: SEFOS#
Global configuration mode
Prompt: SEFOS(config)#
Protocol specific modes
Router configuation
Prompt: SEFOS(config-router)#
Route map configuation
Prompt: SEFOS(config-map-map-test)#
General configuration modes
Line configuration
Prompt: SEFOS(config-line)#
Interface configuration mode
Prompt: SEFOS(config-if)#
Config-VLAN
Prompt: SEFOS(config-vlan)#

CHAPTER 2

IGMP

IGMP is a protocol used by IP hosts to inform adjacent routers about multicast group membership. The SEFOS implementation of IGMP conforms to RFC 3376 for IGMP v3 router functionality and supports the MIBs defined in the Internet Draft `draft-ietfmagma-rfc2933-update-00.txt`.

The deployment of the IGMP router can be within a routing domain that uses any MRP. IGMP informs MRPs about group membership messages and leave messages.

2.1 IGMP Commands

The list of CLI commands for the configuration of IGMP is as follows:

- `set ip igmp`
- `ip igmp immediate-leave`
- `ip igmp version`
- `ip igmp query-interval`
- `ip igmp query-max-response-time`
- `ip igmp robustness`
- `ip igmp last-member-query-interval`
- `ip igmp static-group`
- `no ip igmp`
- `debug ip igmp`
- `show ip igmp global-config`
- `show ip igmp interface`
- `show ip igmp groups`
- `show ip igmp sources`

- show ip igmp statistics

2.1.1 set ip igmp

Enables or disables IGMP globally or on a particular interface.

```
set ip igmp {enable | disable}
```

Syntax Description
enable – Enables IGMP.
disable – Disables IGMP.

Mode
Global Configuration and Interface Configuration
Note - Interface Configuration mode is applicable only in VLAN Interface.

Defaults
Disabled.

Example

```
SEFOS(config)# interface vlan 2

SEFOS(config-if)# set ip igmp enable
```

Related Commands

- ip igmp proxy-service / ip igmp proxy service - Enables IGMP Proxy service in the system

2.1.2 ip igmp immediate-leave

Enables immediate leave processing on the interface and the no form of the command disables immediate-leave processing.

```
ip igmp immediate-leave
```

```
no ip igmp immediate-leave
```

Mode
Interface Configuration
Applicable only in VLAN Interface.

Defaults
Disabled.

Example

```
SEFOS(config-if)# ip igmp immediate-leave
```

Related Commands

- show ip igmp interface - Displays the interface configuration of IGMP

2.1.3 ip igmp version

Sets the IGMP version on the interface. The no form of the command sets the default IGMP version on the interface.

```
ip igmp version {1 | 2 | 3}
```

```
no ip igmp version
```

Syntax Description	**1 | 2 | 3** – IGMP versions.
Mode	Interface Configuration Applicable only in VLAN Interface.
Defaults	2
Example	`SEFOS(config-if)# ip igmp version 1`

Related Commands

- `show ip igmp interface` - Displays the interface configuration of IGMP

2.1.4 ip igmp query-interval

Sets the IGMP query interval for the interface and the no form of the command sets query-interval to the default value.

```
ip igmp query-interval seconds_1-65535
```

```
no ip igmp query-interval
```

Mode	Interface Configuration Applicable only in VLAN Interface.
Defaults	125
Example	`SEFOS(config-if)# ip igmp query-interval 30`

Related Commands

- `show ip igmp interface` - Displays the interface configuration of IGMP

2.1.5 ip igmp query-max-response-time

Sets the IGMP max query response value for the interface. The no form of the command sets the max query response to the default value.

```
ip igmp query-max-response-time seconds_1-255
```

```
no ip igmp query-max-response-time
```

Mode	Interface Configuration Applicable only in VLAN Interface.
Defaults	100
Example	`SEFOS(config-if)# ip igmp query-max-response-time 20`

Related Commands

- `show ip igmp interface` - Displays the interface configuration of IGMP

2.1.6 ip igmp robustness

Sets the IGMP robustness value for the interface. The `no` form of the command sets the robustness value to default value.

```
ip igmp robustness 1-255
```

```
no ip igmp robustness
```

Mode	Interface Configuration Applicable only in VLAN Interface.
Defaults	2
Example	`SEFOS(config-if)# ip igmp robustness 100`

Related Commands

- `show ip igmp interface` - Displays the interface configuration of IGMP

2.1.7 ip igmp last-member-query-interval

Sets the IGMP last member query interval for the interface. The no form of the command sets the last member query interval to the default value.

```
ip igmp last-member-query-interval 1-255
```

```
no ip igmp last-member-query-interval
```

Mode Interface Configuration
Applicable only in VLAN Interface.

Defaults 10

Example
```
SEFOS(config-if)# ip igmp last-member-query-interval 100
```

Notes The igmp on this interface must be set to version 2 or 3. For example:

```
SEFOS(config-if)# ip igmp version 1
SEFOS(config-if)# ip igmp last-member-query-interval 100
% CLI Command Failed
SEFOS(config-if)# ip igmp version 2
SEFOS(config-if)# ip igmp last-member-query-interval 10
SEFOS(config-if)# ip igmp version 3
SEFOS(config-if)# ip igmp last-member-query-interval 100
```

Related Commands

- show ip igmp interface - Displays the interface configuration of IGMP

2.1.8 ip igmp static-group

Adds the static group membership on the interface. The no form of the command deletes the static group membership on the interface.

```
ip igmp static-group group-address [source source-address]
```

```
no ip igmp static-group group-address [source source-address]
```

Syntax Description	*group-address* – Group IP address *source-address* – Source IP address
Mode	Interface Configuration Applicable only in VLAN Interface.
Example	`SEFOS(config-if)# ip igmp static-group 224.1.2.3 source 12.0.0.1`
Notes	The `igmp version` on this interface must be set to 3 for configuring static group along with source information.

Related Commands

- `show ip igmp groupsshow ip igmp sources` - Displays the IGMP groups information
- `show ip igmp sources` - Displays the IGMP sources information
- `show ip igmp interface` - Displays the interface configuration of IGMP

2.1.9 no ip igmp

Deletes the IGMP capable interface.

```
no ip igmp
```

Mode	Interface Configuration Applicable only in VLAN Interface.
Example	`SEFOS(config-if)# no ip igmp`

Notes	At least one of the interface configuration commands must have been executed to create the IGMP interface. If not, the following error message is displayed:
	`% Interface Entry not found`
	For example:
	`SEFOS(config)# int vlan 3`
	`SEFOS(config-if)# no ip igmp`
	`% Interface Entry not found`
	`SEFOS(config-if)#`

Related Commands

- `show ip igmp interface` - Displays the interface configuration of IGMP

2.1.10 debug ip igmp

Enables the IGMP trace. The no form of the command disables the IGMP trace.

```
debug ip igmp {[i/o] [grp] [qry] [tmr] [mgmt] | [all]}
```

```
no debug ip igmp {[i/o] [grp] [qry] [tmr] [mgmt] | [all]}
```

Syntax Description

i/o – Input/output messages.
grp – Group related messages.
qry – Query related messages.
tmr – Timer related messages.
mgmt – Management configuration messages.
all – All traces.

Mode Privileged EXEC

Defaults Disabled.

Example

```
SEFOS# debug ip igmp all
```

2.1.11 show ip igmp global-config

Displays the global configuration of IGMP.

```
show ip igmp global-config
```

Mode Privileged EXEC

Example

```
SEFOS# show ip igmp global-config

IGMP is globally enabled
```

Related Commands

- set ip igmp - Enables or disables IGMP
- ip igmp proxy-service / ip igmp proxy service - Enables IGMP Proxy service in the system

2.1.12 show ip igmp interface

Displays the interface configuration of IGMP.

```
show ip igmp interface [{Vlan vlan-id | interface-type
interface-id}]
```

Syntax Description

Vlan – VLAN identifier.
interface-type – Interface type.
interface-id – Interface identifier.

Mode

Privileged EXEC

Example

```
SEFOS# show ip igmp interface

vlan1, line protocol is up
 Internet Address is 10.0.0.1/8
 IGMP is enabled on interface
 Current IGMP router version is 2
 IGMP query interval is 125 seconds
 Last member query response interval is 10 seconds
 IGMP max query response time is 100 seconds
Robustness value is 2
 IGMP querying router is 10.0.0.1 (this system)
 Fast leave is disabled on this interface

No multicast groups joined

vlan2, line protocol is up
 Internet Address is 20.0.0.1/8
 IGMP is enabled on interface
 Current IGMP router version is 2
 IGMP query interval is 125 seconds
 Last member query response interval is 10 seconds
 IGMP max query response time is 100 seconds
 Robustness value is 2
 IGMP querying router is 20.0.0.1 (this system)
 Fast leave is disabled on this interface
 No multicast groups joined
```

Related Commands

- `set ip igmp` - Enables or disables IGMP
- `ip igmp immediate-leave` - Enables immediate leave processing on the interface

- `ip igmp version` - Sets the IGMP version on the interface
- `ip igmp query-interval` - Sets the IGMP query interval for the interface
- `ip igmp query-max-response-time` - Sets the IGMP max query response value for the interface
- `ip igmp robustness` - Sets the IGMP robustness value for the interface
- `ip igmp last-member-query-interval` - Sets the IGMP last member query interval for the interface
- `no ip igmp` - Deletes the IGMP capable interface

2.1.13 show ip igmp groups

Displays the IGMP groups information.

```
show ip igmp groups
```

Mode Privileged EXEC

Example

```
SEFOS# show ip igmp groups

I - Include Mode,   E - Exclude Mode
S - Static Mbr,     D - Dynamic Mbr

GroupAddress   Flg Iface    UpTime            ExpiryTime    LastReporter
------------   ----------   ------            -----------   -------------
224.5.5.5       S    vlan2   [0d 00:00:22.28] [0d 00:00:00.00] 20.0.0.1
226.7.7.7       IS   vlan3   [0d 00:00:04.59] [0d 00:00:00.00] 30.0.0.1
```

Related Commands

- `ip igmp static-group` - Adds the static group membership on the interface

2.1.14 show ip igmp sources

Displays the IGMP source information.

```
show ip igmp sources
```

Mode Privileged EXEC

Example

```
SEFOS# show ip igmp sources

I - Include Mode,  E - Exclude Mode
S - Static Mbr, D - Dynamic Mbr
F - Forward List, N - Non-Forward List

GroupAddress   Iface   SrcAddress    Flg   ExpiryTime         LastReporter
------------   -----   ----------    ---   ----------         ------------
226.7.7.7       vlan3   12.0.0.1     ISF   [0d 00:00:00.00]   30.0.0.1
```

Related Commands

- `ip igmp static-group` - Adds the static group membership on the interface

2.1.15 show ip igmp statistics

Displays the IGMP statistics information.

```
show ip igmp statistics [{Vlan vlan-id | interface-type
interface-id}]
```

Mode Privileged EXEC

Example

```
SEFOS# show ip igmp statistics

IGMP Statistics for vlan1
  Number of General queries received 1
  Number of Group Specific queries received 0
  Number of Group and Source Specific queries received 0
  Number of v1/v2 reports received 0
  Number of v3 reports received 8
  Number of v2 leaves received 0
  Number of General queries transmitted 1
  Number of Group Specific queries transmitted 1
  Number of Group and Source Specific queries
transmitted 2

IGMP Statistics for vlan3
  Number of General queries received 0
  Number of Group Specific queries received 0
  Number of Group and Source Specific queries received 0
  Number of v1/v2 reports received 0
  Number of v3 reports received 6
  Number of v2 leaves received 0
  Number of General queries transmitted 1
  Number of Group Specific queries transmitted 0
  Number of Group and Source Specific queries
transmitted 0
```

CHAPTER 3

IGMP Proxy

IGMP Proxy implementation is used to learn and proxy group membership information, and then forward multicast packets based on the learned membership information. The IGMP Proxy learns membership information from IGMP hosts in downstream interfaces (interface to which hosts are connected) and substitutes (proxy) the information to upstream interface (interface to which upstream router is connected), based on the requirements of IGMP hosts.

IGMP Proxy is used mainly in edge devices. It reduces not only the cost of the devices, but also the operational overhead because, it does not need to support more complicated multicast routing protocols such as PIM.

3.1 IGMP Proxy Commands

The list of CLI commands for the configuration of IGMP is as follows:

- `ip igmp proxy-service`
- `ip igmp proxy service`
- `ip igmp-proxy mrouter`
- `ip igmp mroute proxy`
- `ip igmp-proxy mrouter-time-out`
- `ip igmp-proxy mrouter-version`
- `show ip igmp-proxy mrouter`
- `show ip igmp-proxy forwarding-database`

3.1.1 ip igmp proxy-service

Enables IGMP Proxy service in the system. The no form of the command disables IGMP proxy service in the system.

```
ip igmp proxy-service
```

```
no ip igmp proxy-service
```

Mode	Global Configuration
Defaults	IGMP proxy service is disabled.
Example	`SEFOS(config)# ip igmp proxy-service`
Notes	• IGMP module must be enabled globally. • PIM module must be disabled.

Related Commands

- `set ip igmp` - Enables or disables IGMP
- `set ip pim` - Enables or disables PIM
- `ip multicast` - Enables PIM globally
- `show ip igmp global-config` - Displays the global configuration of IGMP

3.1.2 ip igmp proxy service

Enables IGMP Proxy service in the system. This command operates similar to the `ip igmp proxy-service` command.

```
ip igmp proxy service
```

Mode	Global Configuration
Defaults	IGMP proxy service is disabled.
Example	`SEFOS(config)# ip igmp proxy service`
Notes	• IGMP module must be enabled globally. • PIM module must be disabled. If enabling IGMP proxy module failed with PIM/DVMRP not disabled, ignore the error message.

Related Commands

- `set ip igmp` - Enables or disables IGMP

- `set ip pim` - Enables or disables PIM
- `show ip igmp global-config` - Displays the global configuration of IGMP

3.1.3 ip igmp-proxy mrouter

This command configures the interface as an upstream interface. The `no` form of the command removes the interface from the upstream interface list.

```
ip igmp-proxy mrouter
```

```
no ip igmp-proxy mrouter
```

Mode	Interface Configuration Mode. This command is applicable only in the VLAN interface mode.
Defaults	The interface is configured as downstream interface.
Example	`SEFOS(config-if)# ip igmp-proxy mrouter`
Notes	IGMP must be enabled in the interface on which this configuration is executed.

Related Commands

- `show ip igmp-proxy mrouter` - Displays the upstream interface configuration of IGMP Proxy

3.1.4 ip igmp mroute proxy

Configures the interface as an upstream interface. This command operates similar to the command `ip igmp-proxy mrouter`.

```
ip igmp mroute proxy
```

Mode	Interface Configuration Mode. This command is applicable only in the VLAN interface mode.
Defaults	The interface is configured as downstream interface.
Example	`SEFOS(config-if)# ip igmp mroute proxy`
Notes	IGMP must be enabled in the interface on which this configuration is executed.

Related Commands

- `ip igmp-proxy mrouter` - Displays the upstream interface configuration of IGMP Proxy

3.1.5 ip igmp-proxy mrouter-time-out

Configures the upstream interface purge interval time limit. When the time limit is reached, the IGMP version on the upstream interface switches back to the configured version.

```
ip igmp-proxy mrouter-time-out <(60 - 600) seconds>
```

Mode	Interface Configuration
Defaults	125
Example	`SEFOS(config-if)# ip igmp-proxy mrouter-time-out 100`
Notes	This configuration must be executed on an upstream interface.

Related Commands

- `ip igmp-proxy mrouter` - Displays the upstream interface configuration of IGMP Proxy

3.1.6 ip igmp-proxy mrouter-version

Configures the version of IGMP on upstream interface.

```
ip igmp-proxy mrouter-version {1 | 2 | 3}
```

Syntax Description	**1** – IGMP Version 1. **2** – IGMP Version 2. **3** – IGMP Version 3.
Mode	Interface Configuration
Defaults	3
Example	`SEFOS(config-if)# ip igmp-proxy mrouter-version 2`
Notes	The interface, on which this configuration is executed, must be an upstream interface.

Related Commands

- `show ip igmp-proxy mrouter`- Displays the upstream interface configuration of IGMP Proxy

3.1.7 show ip igmp-proxy mrouter

Displays the upstream interface configuration of IGMP Proxy.

```
show ip igmp-proxy mrouter [Vlan <vlan-id>]
```

Syntax **`Vlan`** – VLAN identifier

Mode Privileged EXEC

Example

```
SEFOS# show ip igmp-proxy mrouter

IfName/IfId OperVersion CfgVersion UpTime/VersionExpiryTime PurgeIntvl
------------------- ---------- ------------------------ ----------
vlan3    /35     IGMPv3         IGMPv3       [0d 00:08:01.31]/0         125
vlan4    /36     IGMPv2         IGMPv2       [0d 00:00:25.67]/0         100

SEFOS# show ip igmp-proxy mrouter vlan 4

IfName/IfId OperVersion CfgVersion UpTime/VersionExpiryTime  PurgeIntvl
--------    ----------  --------   ------------------------  ----------
vlan4 /36    IGMPv2      IGMPv2     [0d 00:00:48.40]/0        100
```

Notes IGMP proxy module must be enabled globally.

Related Commands

- `ip igmp-proxy mrouter` / `ip igmp mroute proxy` - Configures the interface as an upstream interface
- `ip igmp-proxy mrouter-time-out` - Configures the upstream interface purge interval
- `ip igmp-proxy mrouter-version` - Configures the version of IGMP on upstream interface

3.1.8 show ip igmp-proxy forwarding-database

Displays the multicast forwarding information.

show ip igmp-proxy forwarding-database {[Vlan *vlan-id*] | **[group** *group-address*] | **[source** *source-address*]}

Syntax Description

vlan – VLAN identifier.
group *group-address* – Multicast group address.
source *source-address* – Multicast source address.

Mode Privileged EXEC

Example

```
SEFOS# show ip igmp-proxy forwarding-database

IGMP Proxy Multicast Routing table
----------------------------------
(Source, Group), Uptime/Expires(seconds)
Incoming Interface: Interface
Outgoing Interface:
Interface, State

(13.0.0.10, 234.0.0.3) ,[0d 00:23:55.65]/ 26
  Incoming Interface : vlan3
  Outgoing InterfaceList :
    vlan1,  Forwarding
    vlan4,  Forwarding

(13.0.0.10, 234.0.0.4) ,[0d 00:23:55.65]/ 13
  Incoming Interface : vlan3
  Outgoing InterfaceList :
    vlan1,  Forwarding
    vlan2,  Forwarding
    vlan4,  Forwarding

(13.0.0.11, 234.0.0.3) ,[0d 00:23:55.65]/ 107
  Incoming Interface : vlan3
  Outgoing InterfaceList :
    vlan2,  Forwarding
    vlan4,  Forwarding
```

```
SEFOS# show ip igmp-proxy forwarding-database group
234.0.0.4

IGMP Proxy Multicast Routing table
----------------------------------
(Source, Group) , Uptime/Expires(seconds)
Incoming Interface: Interface
Outgoing Interface:
Interface, State

(13.0.0.10, 234.0.0.4) ,[0d 00:24:30.29]/ 77
  Incoming Interface : vlan3
  Outgoing InterfaceList :
    vlan1,  Forwarding
    vlan2,  Forwarding
    vlan4,  Forwarding

SEFOS# show ip igmp-proxy forwarding-database source
13.0.0.11

IGMP Proxy Multicast Routing table
----------------------------------
(Source, Group) , Uptime/Expires(seconds)
Incoming Interface: Interface
Outgoing Interface:
Interface, State

(13.0.0.11, 234.0.0.3) ,[0d 00:24:49.36]/ 53
  Incoming Interface : vlan3
  Outgoing InterfaceList :
    vlan2,  Forwarding
    vlan4,  Forwarding
```

Notes IGMP proxy module must be enabled globally.

Related Commands

- `show ip igmp-proxy mrouter` - Displays the upstream interface configuration of IGMP proxy

CHAPTER 4

IPv6

IPv6 is a new version of IP which is designed to be an evolutionary step from IPv4. It can be installed as a normal software upgrade in Internet devices and is interoperable with the current IPv4. It has expanded routing and addressing capabilities because of the 128-bit addressing as compared to the 32-bit addressing in IPv4. Its deployment strategy is designed to not have any flag days or other dependencies. IPv6 is designed to run well on high performance networks (for example, extreme-Ethernet, OC-12, ATM, and so on.) and at the same time still be efficient for low-bandwidth networks (such as wireless). In addition, it provides a platform for new Internet functionality that will be required in the near future.

IPv6 includes a transition mechanism, which is designed to allow users to adopt and deploy IPv6 in a highly diffuse fashion and to provide direct interoperability between IPv4 and IPv6 hosts. The IPv6 transition allows the users to upgrade their hosts to IPv6, and the network operators to deploy IPv6 in routers, with very little coordination between the two.

The changes from IPv4 to IPv6 fall primarily into the following categories.

- Expanded routing and addressing capabilities
- Usage of anycast address
- Header format simplification
- Improved support for options
- Quality-of-service capabilities
- Authentication and privacy capabilities

4.1 IPv6 Commands

The list of CLI commands for the configuration of IPv6 is as follows:

- `ipv6 enable`

- ipv6 unicast-routing
- ipv6 address - prefix prefix-len
- ipv6 address - ipv6-prefix | prefix-length
- ipv6 - link-local address
- ipv6 - static routes
- ipv6 - neighbor
- ipv6 default - hop limit
- ipv6 nd suppress-ra
- ipv6 nd managed-config flag
- ipv6 nd other-config flag
- ipv6 hop-limit
- ipv6 nd ra-lifetime
- ipv6 nd dad attempts
- ipv6 nd reachable-time
- ipv6 nd ns - interval
- ipv6 nd ra-mtu
- ipv6 nd ra-interval
- ipv6 nd prefix
- ping ipv6
- debug ipv6
- traceroute
- clear ipv6 neighbors
- clear ipv6 traffic
- clear ipv6 route
- show ipv6 interface
- show ipv6 route
- show ipv6 route summary
- show ipv6 neighbors
- show ipv6 traffic

4.1.1 ipv6 enable

Enables IPv6 processing on an interface that has not been configured with an explicit IPv6 address. The no form of the command disables IPv6 processing on the interface that has not been configured with an explicit IPv6 address.

```
ipv6 enable
```

```
no ipv6 enable
```

Mode	Interface Configuration
Defaults	Disabled.
Example	`SEFOS(config-if)# ipv6 enable`
Notes	IPv6 is enabled on the default VLAN interface.

Related Commands

- `ipv6 address - prefix prefix-len` - Configures IPv6 address on the interface
- `show ipv6 interface` - Displays the IPv6 interfaces
- `ipv6 router rip` / `ipv6 router rip - name` - Enables RIP6 and enters into the router configuration mode

4.1.2 ipv6 unicast-routing

Enables unicast routing. The no form of the command disables unicast routing.

```
ipv6 unicast-routing
```

```
no ipv6 unicast-routing
```

Mode	Global Configuration
Defaults	Enabled.
Example	`SEFOS(config)# ipv6 unicast-routing`

Related Commands

- `ipv6 router rip` / `ipv6 router rip - name` - Enables RIP6 and enters into the router configuration mode

4.1.3 ipv6 address - *prefix prefix-len*

Configures IPv6 address on the interface. The `no` form of the command deletes the configured IPv6 address.

```
ipv6 address prefix prefix-len [{unicast | anycast | eui64}]
```

```
no ipv6 address prefix prefix-len [{unicast | anycast | eui64}]
```

Syntax Description

prefix – IPv6 prefix for the interface.
prefix-len – IPv6 prefix length.
unicast – Unicast type of prefix.
anycast – Anycast type of prefix.
eui64 – Type of prefix where the latter 64 bits are formed from the link layer address.

Mode Interface Configuration

Defaults `unicast`

Example

```
SEFOS(config-if)# ipv6 address 3333::1111 64 unicast
```

Notes The prefix length for eui64 type must be 64.

Related Commands

- `show ipv6 interface` - Displays the IPv6 interfaces

4.1.4 ipv6 address - *ipv6-prefix | prefix-length*

Configures IPv6 address on the interface.

```
ipv6 address {ipv6-prefix | prefix_length} [{unicast | anycast |
eui-64 | link-local}]
```

Syntax Description	*ipv6-prefix* – IPv6 prefix for the interface. *prefix-length* – IPv6 prefix length. **unicast** – Unicast type of prefix. **anycast** – Anycast type of prefix. **eui64** – Type of Prefix where the latter 64 bits are formed from the link layer address. **link-local** – Link local type prefix.
Mode	Interface Configuration
Defaults	unicast
Example	SEFOS(config-if)# **ipv6 address 3333::1111/64 unicast**
Notes	The prefix length for eui64 type must be 64.

Related Commands

- show ipv6 interface - Displays the IPv6 interfaces

4.1.5 ipv6 - link-local address

Configures the IPv6 link-local address on the interface. The no form of the command deletes the configured IPv6 link-local address.

ipv6 address *prefix* **link-local**

no ipv6 address *prefix* **link-local**

Syntax Description	**prefix** – IPv6 Prefix for the interface. **link-local** – Type of address.
Mode	Interface Configuration
Example	SEFOS(config-if)# **ipv6 address fe80::2222 link-local**
Notes	The prefix specified must be a valid link-local prefix.

Related Commands

- show ipv6 interface - Displays the IPv6 interfaces

4.1.6 ipv6 - static routes

Configures static routes. The no form of the command deletes the configured static routes.

```
ipv6 route prefix prefix-len ([next-hop] {[vlan vlan-id]})
[administrative-distance] [unicast]
```

```
no ipv6 route prefix prefix-len ([nex-hop] {[vlan vlan-id]})
[administrative-distance] [unicast]
```

Syntax Description

prefix – IPv6 prefix of the destination.

*prefix-le*n – Destination prefix length.

next-hop – IPv6 prefix of the next hop that is used to reach the destination network.

vlan – VLAN identifier.

administrative-distance – Metric to reach the destination.

unicast – Unicast type of prefix.

Mode Global Configuration

Defaults *administrative-distance* – 1

unicast

Example

```
SEFOS(config)# ipv6 route 2111::1111 64 3111::1111
```

Notes A route will be configured only when a proper route exists for the next-hop prefix in the route table.

Related Commands

- ipv6 - link-local address - Configures the IPv6 link-local address on the interface
- show ipv6 route - Displays the IPv6 routes

4.1.7 ipv6 - neighbor

Configures a static entry in the IPv6 neighbor cache table. The no form of the command removes the static entry from the IPv6 neighbor cache table.

```
ipv6 neighbor prefix {vlan vlan-id} mac-address
```

```
no ipv6 neighbor prefix {vlan vlan-id} mac-address
```

Syntax Description	**prefix** – IPv6 prefix of the neighbor **vlan** – VLAN identifier *mac-address* – Link layer address of the interface
Mode	Global Configuration
Example	SEFOS(config)# **ipv6 neighbor 3333::1111 vlan 1 00:11:22:33:44:55**

Related Commands

- show ipv6 neighbors - Displays the IPv6 neighbor cache entries

4.1.8 ipv6 default - hop limit

Defaults hop limit for IPv6 datagrams. The no form of command resets default hop limit for IPv6 datagrams.

ipv6 default-hop limit *hop-limit_1-255*

no ipv6 default-hop limit

Mode	Global Configuration
Example	SEFOS(config)# **ipv6 default-hop limit 100**

ipv6 nd suppress-ra

Suppresses IPv6 router advertisement. The no form of the command enables IPv6 router advertisement.

ipv6 nd suppress-ra

no ipv6 nd suppress-ra

Mode	Interface Configuration
Defaults	Router advertisements are suppressed.
Example	SEFOS(config-if)# **ipv6 nd suppress-ra**

Related Commands

- show ipv6 interface - Displays the IPv6 interfaces
- show ipv6 traffic - Displays the IPv6 ICMP and UDP statistics

4.1.9 ipv6 nd suppress-ra

Suppresses IPv6 router advertisement. The no form of the command enables IPv6 router advertisement.

```
ipv6 nd suppress-ra
```

```
no ipv6 nd suppress-ra
```

Mode	Interface Configuration
Defaults	Router advertisements are suppressed.
Example	`SEFOS(config-if)# ipv6 nd suppress-ra`

Related Commands

- `show ipv6 interface` - Displays the IPv6 interfaces
- `show ipv6 traffic` - Displays the IPv6 ICMP and UDP statistics

4.1.10 ipv6 nd managed-config flag

Sets the `managed-config flag` which allows the host to use DHCP for address configuration. The `no` form of the command resets the `managed-config flag` which in turn does not allow the host to use DHCP for address configuration.

```
ipv6 nd managed-config flag
```

```
no ipv6 nd managed-config flag
```

Mode	Interface Configuration
Example	`SEFOS(config-if)# ipv6 nd managed-config flag`

Related Commands

- `no ipv6 nd suppress-ra` - Enables IPv6 router advertisement

4.1.11 ipv6 nd other-config flag

Sets the other-config flag, which allows the host to use DHCP for other stateful configuration. The no form of the command resets the other-config flag, which in turn does not allow the host to use DHCP for other stateful configuration.

```
ipv6 nd other-config flag
```

```
no ipv6 nd other-config flag
```

Mode Interface Configuration

Example SEFOS(config-if)# **ipv6 nd other-config flag**

Related Commands

- no ipv6 nd suppress-ra - Enables IPv6 router advertisement

4.1.12 ipv6 hop-limit

Configures the maximum hoplimit for all IPv6 packets originating from the interface and the configured hop limit is also used in router advertisement packet current hop limit field. The no form of the command resets the hop limit to the default value for all IPv6 packets originating from the interface and also the value in the router advertisement packet current hop limit field is reset to the default value.

```
ipv6 hop-limito-limit_0-255
```

```
no ipv6 hop-limit
```

Mode Interface Configuration

Defaults 64

Example SEFOS(config-if)# **ipv6 hop-limit 100**

4.1.13 ipv6 nd ra-lifetime

Sets the IPv6 router advertisement lifetime.

```
ipv6 nd ra-lifetime seconds_0-9000
```

Mode	Interface Configuration
Defaults	1800 seconds.
Example	`SEFOS(config-if)# ipv6 nd ra-lifetime 1000`
Notes	The ND RA lifetime value must be greater than or equal to the RA interval.

Related Commands

- `no ipv6 nd suppress-ra` - Enables IPv6 router advertisement
- `show ipv6 interface` - Displays the IPv6 interfaces

4.1.14 ipv6 nd dad attempts

Sets the number of duplicate address detection attempts. The `no` form of the command resets the duplicate address detection attempts to its default value.

```
ipv6 nd dad attempts number-of-attempts_1-10
```

```
no ipv6 nd dad attempts
```

Mode	Interface Configuration
Defaults	1
Example	`SEFOS(config-if)# ipv6 nd dad attempts 5`

Related Commands

- `show ipv6 interface` - Displays the IPv6 interfaces
- `no ipv6 nd suppress-ra` - Enables IPv6 router advertisement

4.1.15 ipv6 nd reachable-time

Sets the advertised reachability time. The `no` form of the command resets the advertised reachability time to default value.

```
ipv6 nd reachable-time seconds_0-3600 | msec miliseconds_0-3600000
```

```
no ipv6 nd reachable-time
```

Mode	Interface Configuration
Defaults	30
Example	`SEFOS(config-if)# ipv6 nd reachable-time 500`

Related Commands

- show ipv6 interface - Displays the IPv6 interfaces
- no ipv6 nd suppress-ra - Enables IPv6 router advertisement

4.1.16 ipv6 nd ns - interval

Sets the advertised retransmission time. The `no` form of the command resets the advertised retransmission time to default value.

```
ipv6 nd ns-interval retranmission-time-miliseconds_1000-3600000
```

```
no ipv6 nd ns-interval
```

Mode	Interface Configuration
Example	`SEFOS(config-if)# ipv6 nd ns-interval 1000`

Related Commands

- `show ipv6 interface` - Displays the IPv6 interfaces

4.1.17 ipv6 nd ra-mtu

Sets router advertisement MTU optional value. The value ranges between 1280 and 1500. The `no` form of command resets the router advertisement MTU option value to the default value.

```
ipv6 nd ra-mtu router-advertisement-MTU
```

```
no ipv6 nd ra-mtu
```

Mode	Interface Configuration
Example	`SEFOS(config-if)# ipv6 nd ra-mtu 1400`

Related Commands

- `show ipv6 interface` - Displays the IPv6 interfaces

4.1.18 ipv6 nd ra-interval

Sets the IPv6 router advertisement interval. The `no` form of the command resets the IPv6 Router Advertisement interval to its default value.

```
ipv6 nd ra-interval maximum-interval-seconds_4-1800
[minimum-interval-seconds_3-1350]
```

```
no ipv6 nd ra-interval
```

Syntax Description	*minimum-interval-seconds_3-1350* – Minimum router advertisement interval time in seconds. *maximum-interval-seconds_4-1800* – Maximum router advertisement interval time in seconds.
Mode	Interface Configuration
Defaults	600 seconds.
Example	`SEFOS(config-if)# ipv6 nd ra-interval 200`

Related Commands

- `show ipv6 interface` - Displays the IPv6 interfaces
- `no ipv6 nd suppress-ra` - Enables IPv6 router advertisement

4.1.19 ipv6 nd prefix

Configures the prefix to be advertised in IPv6 router advertisement. The `no` form of the command removes the prefix from the IPv6 router advertisement.

```
ipv6 nd prefix {prefix-addr prefix-len | default}
[{{valid-lifetime> | infinite | at var-valid-lifetime}
{preferred-lifetime | infinite | at var-preferred-lifetime} |
no-advertise}] [off-link] [no-autoconfig]
```

```
no ipv6 nd prefix {prefix-addr prefix-len | default}
```

Syntax Description	*prefix-addr* – IPv6 prefix to be advertised. *prefix-len* – Length of the configured prefix. **default** – Changes the default value of the rest of the parameters. *valid-lifetime* – Sets the valid lifetime value for the prefix. **infinite** – Sets the infinite valid lifetime value for the prefix. **at** – Sets the variable valid lifetime value for the prefix. *preferred-lifetime* – Sets the preferred lifetime value for the prefix. **infinite** – Sets the infinite Preferred lifetime value for the prefix. **at** – Sets the variable valid lifetime value for the prefix. **no-advertise** – Sets the No-Advertise flag. **off-link** – Sets the off-link flag. **no-autoconfig** – Sets the no-autoconfig flag.
Mode	Interface Configuration
Defaults	RA *valid-lifetime* – 25,9200 seconds. RA *preferred-lifetime* – 60,4800 seconds.
Example	`SEFOS(config-if)# ipv6 nd prefix 3333::1111 64 500 400`
Notes	*valid-lifetime* must be greater than or equal to *preferred-lifetime*.

Related Commands

- `show ipv6 interface` - Displays the IPv6 interfaces

4.1.20 ping ipv6

Sends IPv6 echo messages.

```
ping ipv6 prefix [data hex-str] [repeat count] [size value]
[anycast] [source {vlan vlan-id | source-prefix}] [timeout
seconds_1-100]
```

Syntax Description

prefix – IPv6 Destination prefix.
data – Data to be sent in ping message.
repeat – Number of ping messages.
size – Size of the ping message.
anycast – Type of prefix.
source – Source interface of the ping message can be as follows:
- *vlan*
- *source-prefix*

timeout – Duration to wait for the reply.

Mode Privileged EXEC

Defaults

data – a5a5
repeat *count* – 5
size – 100 bytes.
timeout – 5 seconds.

Example

```
SEFOS# ping ipv6 3333::1111 data a6b6
```

4.1.21 debug ipv6

Enables IPv6 trace. The no form of the command disables IPv6 trace.

```
debug ipv6 {IP6 | ICMP | UDP6 | ND | PING6}
```

```
no debug ipv6
```

Syntax Description

IP6 – IP6 trace.
ICMP – ICMP trace.
UDP6 – UDP6 trace.
ND – Neighbor discovery trace.
PING6 – PING6 trace.

Mode Privileged EXEC

Defaults Disabled.

Example

```
SEFOS# debug ipv6 IP6
```

4.1.22 traceroute

Traces route to the destination.

```
traceroute [ipv6 prefix]
```

Syntax Description **ipv6** – IPv6 destination prefix.

Mode Privileged EXEC

Example

```
SEFOS# traceroute ipv6  4444::1111
```

4.1.23 clear ipv6 neighbors

Removes all the entries in the IPv6 neighbor table.

```
clear ipv6 neighbors
```

Mode Privileged EXEC

Example

```
SEFOS# clear ipv6 neighbors
```

Related Commands

- show ipv6 neighbors - Displays the IPv6 Neighbor Cache Entries

4.1.24 clear ipv6 traffic

Removes all the entries in the IPv6 traffic table.

```
clear ipv6 traffic
```

Mode Privileged EXEC

Example

```
SEFOS# clear ipv6 traffic
```

Related Commands

- show ipv6 traffic - Displays the IPv6 ICMP and UDP statistics

4.1.25 clear ipv6 route

Removes all the entries in IPv6 route table.

```
clear ipv6 route
```

Mode Privileged EXEC

Example

```
SEFOS# clear ipv6 route
```

Related Commands

- `show ipv6 route` - Displays the IPv6 routes

4.1.26 show ipv6 interface

Displays the IPv6 interfaces.

```
show ipv6 interface [{vlan vlan-id}[prefix]]
```

Syntax Description

vlan – VLAN identifier.
prefix – Prefix information.

Mode Privileged EXEC

Example

```
SEFOS# show ipv6 interface vlan 1 prefix
Codes: A - Address ,  P - Prefix-Advertisement
        D - Default , N - Not Advertised

AD  2222::  64 [LA] Valid lifetime 2592000 , Preferred
lifetime 604800

AD  2223:1:2:3::  64 [LA] Valid lifetime 2592000 ,
Preferred lifetime 604800

P   3333::  64 [LA] Valid lifetime 700     , Preferred
lifetime 600

PD  3334::  64 [LA] Valid lifetime 2592000 , Preferred
lifetime 604800

PN  3335::  64 [] Valid lifetime 2592000 , Preferred
lifetime 604800

SEFOS# show ipv6 interface
vlan1 is up, line protocol is up
     IPv6 is Enabled
```

```
Link local address:
        fe80::201:2ff:fe03:405
    Global unicast address(es):
Not Configured.
    Joined group address(es):
        ff02::1
 ff02::2
        ff02::1:ff03:405
 MTU is 1500
    ICMP redirects are enabled
 ND DAD is enabled, Number of DAD attempts: 1
    ND router advertisement is enabled
```

Related Commands

- `ipv6 enable` - Enables IPv6 processing on an interface that has not been configured with an explicit IPv6 address
- `ipv6 address - prefix` prefix-len / `ipv6 address - ipv6-prefix` | prefix-length - Configures IPv6 address on the interface
- `ipv6 - link-local address` - Configures the IPv6 link-local address on the interface
- no `ipv6 nd suppress-ra` - Enables IPv6 router advertisement
- `ipv6 nd ra-lifetime` - Sets the IPv6 router advertisement lifetime
- `ipv6 nd dad attempts` - Sets duplicate address detection attempts
- `ipv6 nd reachable-time` - Sets the advertised reachability time
- `ipv6 nd ra-interval` - Sets the IPv6 router advertisement interval
- `ipv6 nd prefix` - Configures the prefix to be advertised in IPv6 router advertisement

4.1.27 show ipv6 route

Displays the IPv6 routes.

```
show ipv6 route
```

Mode Privileged EXEC

Example

```
SEFOS# show ipv6 route

IPv6 Routing Table  -  4 entries
Codes : C - Connected, S - Static
        O - OSPF, R - RIP, B - BGP
C    2222::/64    [1/1]
        via ::, vlan1
C    2223:1:2:3::/64    [1/1]
        via ::, vlan1
S    4444::/64    [1/20]
        via 2222::2222, vlan1
S    4445::/64    [1/20]
        via 2222::2222, vlan1
```

Related Commands

- `ipv6 - static routes` - Configures static routes

4.1.28 show ipv6 route summary

Displays the summary of IPv6 routes.

```
show ipv6 route summary
```

Mode Privileged EXEC

Example

```
SEFOS# show ipv6 route summary
IPv6 Routing Table Summary - 4 entries
     2 Connected, 2 Static, 0 RIP, 0 BGP, 0 OSPF
     Number of prefixes:
     /64: 4
```

Related Commands

- `show ipv6 route` - Displays the IPv6 routes

4.1.29 show ipv6 neighbors

Displays the IPv6 neighbour cache entries.

```
show ipv6 neighbors
```

Mode Privileged EXEC

Example

```
SEFOS# show ipv6 neighbors

IPv6 Address    Age     Link-layer Addr      State
Interface

5555::1111      58      00:11:22:33:44:55    Static
vlan1
5556::1111      58      11:22:33:44:55:66    Static
vlan1
```

Related Commands

- ipv6 - neighbor - Configures a static entry in the IPv6 neighbor cache table

4.1.30 show ipv6 traffic

Displays the IPv6 ICMP and UDP statistics.

```
show ipv6 traffic [interface {vlan vlan-id | tunnel tunnel-id |
interface-type if-num}] [hc]
```

Syntax Description

vlan-id – Vlan identifier.
tunnel-id – Tunnel identifier.
interface-type – Interface type.
interface-id – Interface identifier.
hc – High counters (64-bit).

Mode Privileged EXEC

Example

```
SEFOS# show ipv6 traffic

     IPv6 Statistics
     ***************
0     Rcvd            0    HdrErrors       0    TooBigErrors
0     AddrErrors     0    FwdDgrams       0    UnknownProtos
0     Discards        0    Delivers        1    OutRequests
0     OutDiscards    0    OutNoRoutes    0    ReasmReqds
0     ReasmOKs        0    ReasmFails
0     FragOKs         0    FragFails       0    FragCreates
0     RcvdMCastPkt   1    SentMcastPkts  0    TruncatedPkts
0     RcvdRedirects         0     SentRedirects

 0    InOctets        0    InNoRoutes             0    OutFwdDatgrms
     0    OutFrgRqds     1    OutTrnsmit           64    OutOctets
     0    InMcstOctets   24    OutMcastOctets       0    InBcstPkts
     0    OutBcstPkts    0    DiscntTime         1000    RefrshRate

     ICMP Statistics
     ***************

 Received :
0    ICMPPkts       0  ICMPErrPkt        0  DestUnreach   0  TimeExcds
0    ParmProbs      0  PktTooBigMsg      0  ICMPEchoReq   0  ICMPEchoReps
0    RouterSols     0  RouterAdv         0  NeighSols     0  NeighAdv
0    Redirects      0  AdminProhib       0  ICMPBadCode
     Sent :
0    ICMPMsgs       0  ICMPErrMsgs       0  DstUnReach    0  TimeExcds
0    ParmProbs      0  PktTooBigs        0  EchoReq        0  EchoReply
0    RouterSols     0  RouterAdv         1  NeighSols     0  NeighborAdv
0    RedirectMsgs  0  AdminProhibMsgs

 UDP statistics
     **************
     Received :
0  UDPDgrams     1  UDPNoPorts         0  UDPErrPkts
     Sent :
0  UDPDgrams
```

```
SEFOS# show ipv6 traffic interface vlan 1

IPv6 Statistics for interface vlan1
-------------------------------------

0    Rcvd                  0    InOctets               0    HdrErrors
0    InNoRoutes            0    AddrErrors             0    UnknownProtos
0    TruncatedPkts         0    FwdDatagrms            0    ReasmReqds
0    ReasmOKs              0    ReasmFails             0    Discards
0    Delivers              0    OutRequests            0    OutFwdDgrms
0    OutDiscards           0    FragReqds              0    FragOKs
0    FragFails             0    FragCreates            0    OutTrnsmits
0    OutOctets             0    InMcstPkts             0    InMcstOctets
0    OutMcstPkts           0    OutMcstOctets          0    InBcstPkts
0    OutBcstPkts           0    DiscntTime          1000    RefrshRate
SEFOS# show ipv6 traffic hc

     IPv6 Statistics
     ***************
0    InRcvs                0    InOctets               0    InFwdDgrms
0    InDelivers            2    OutRequests            0    OutFwdDgrms
2    OutTrnsmits         128    OutOctets              0    InMcstPkts
0    InMcstOctets          2    OutMcstPkts           48    OutMcstOctets
0    InBcast               0    OutBcast

UDP statistics
**************
0    HC InDatagrams        0    HC OutDatagrams
```

CHAPTER 5

PIMv6

PIMv6 is a portable software implementation of the PIM (sparse mode) specification for IPv6 networks. PIMv6 provides support for inter-domain routing between domains using PIMv6-SM. It also avoids the performance problems of earlier multicast routing protocols. This software provides multicast routing and forwarding capabilities to a router that runs the IPv6 protocol along with MLD. PIMv6 routes multicast data packets independent of any unicast routing protocol.

5.1 PIMv6 Commands

The list of CLI commands for the configuration of PIMv6 is as follows:

- `set ip pim`
- `set ipv6 pim`
- `set ip pim threshold`
- `set ip pim spt-switchperiod`
- `set ip pim rp-threshold`
- `set ip pim rp-switchperiod`
- `set ip pim regstop-ratelimit-period`
- `set ip pim pmbr`
- `set ip pim static-rp`
- `ip pim component`
- `ipv6 pim rp-candidate rp-address`
- `ipv6 pim rp-static rp-address`
- `ipv6 pim query-interval`
- `ipv6 pim message-interval`

- ipv6 pim bsr-candidate
- ipv6 pim componentId
- ipv6 pim dr-priority
- ipv6 pim override-interval
- ipv6 pim lan-delay
- set ipv6 pim lan-prune-delay
- no ipv6 pim interface
- debug ipv6 pim
- show ipv6 pim interface
- show ipv6 pim neighbor
- show ipv6 pim rp-candidate
- show ipv6 pim rp-set
- show ipv6 pim bsr
- show ipv6 pim rp-static
- show ipv6 pim component
- show ipv6 pim thresholds
- show ipv6 pim mroute

5.1.1 set ip pim

Enables or disables PIM globally.

Note – In addition to the **set ipv6 pim** enable command, the **set ip pim** enable command must be executed to enable PIMv6.

```
set ip pim {enable | disable}
```

Syntax Description

enable – Enables PIM.
disable – Disables PIM.

Mode

Global Configuration

Defaults

Disabled.

Example

```
SEFOS(config)# set ip pim enable
```

Notes

- PIM mode will be set as sparse, when PIM is enabled globally.
- IGMP proxy service must be disabled in the system, before enabling the PIM globally.

5.1.2 set ipv6 pim

Enables or disables PIMv6 globally.

```
set ipv6 pim {enable | disable}
```

Syntax Description	**enable** – Enables PIMv6. **disable** – Disables PIMv6.
Mode	Global Configuration
Defaults	Disabled.
Example	`SEFOS (config)# set ipv6 pim enable`
Notes	When PIMv6 is globally enabled, the mode will be sparse.

Related Commands

- `no ipv6 pim interface` - Displays the PIMv6 interfaces of the router

5.1.3 set ip pim threshold

Configures the SPT group or source threshold, when exceeded, switching to shortest path tree is initiated.

```
set ip pim threshold {spt-grp | spt-src}
number-of-packets_0-2147483647
```

Syntax Description	**spt-grp** – The threshold of data rate for any group. When exceeded, source specific counters are initiated for that particular group. It is based on number of bits per second. **spt-src** – The switching to shortest path tree is initiated when the threshold of data rate for any source is exceeded. It is based on number of bits per second. *number-of-packets_0-2147483647* – Number of packets.
Mode	Global Configuration
Defaults	0
Example	`SEFOS (config)# set ip pim threshold spt-grp 50`

Related Commands

- `show ipv6 pim thresholds` - Displays threshold configured for SPT, RP thresholds, rate limit values for both SM and DM

5.1.4 set ip pim spt-switchperiod

Configures the period (in seconds) over which the data rate is to be monitored for switching to shortest path tree.

```
set ip pim spt-switchperiod seconds_0-2147483647
```

Mode Global Configuration

Defaults 0

Example
```
SEFOS (config)# set ip pim spt-switchperiod 60
```

Notes
- The same period is used for monitoring the data rate for both source and group. To switch to SPT, this period must be configured.
- The SPT is used for multicast transmission of packets with the shortest path from sender to recipients.

Related Commands

- `show ipv6 pim thresholds` - Displays threshold configured for SPT, RP thresholds, rate limit values for both SM and DM

5.1.5 set ip pim rp-threshold

Sets the threshold at which RP initiates switching to source specific shortest path tree.

```
set ip pim rp-threshold number-of-reg-pkts_0-2147483647
```

Mode Global Configuration

Example
```
SEFOS (config)# set ip pim rp-threshold 200
```

Related Commands

- `show ipv6 pim thresholds` - Displays threshold configured for SPT, RP thresholds, rate limit values for both SM and DM

5.1.6 set ip pim rp-switchperiod

Sets the period (in seconds) over which RP monitors register packets for switching to the source specific shortest path tree.

```
set ip pim rp-switchperiod seconds_0-2147483647
```

Mode	Global Configuration
Defaults	0
Example	`SEFOS (config)# set ip pim rp-switchperiod 100`
Notes	• To switch to SPT, this period must be configured • RP-tree is a pattern that multicast packets are sent to a PIM-SM router by unicast and then forwarded to actual recipients from RP

Related Commands

- `show ipv6 pim thresholds` - Displays threshold configured for SPT, RP thresholds, rate limit values for both SM and DM

5.1.7 set ip pim regstop-ratelimit-period

Sets the period over which RP monitors the number of register packets after sending the register stop message.

```
set ip pim regstop-ratelimit-period seconds_0-2147483647
```

Mode	Global Configuration
Defaults	5
Example	`SEFOS (config)# set ip pim regstop-ratelimit-period 100`
Notes	The register stop message is used to avoid encapsulation of multicast data packets from the first hop router to the RP.

Related Commands

- `show ipv6 pim thresholds` - Displays threshold configured for SPT, RP thresholds, rate limit values for both SM and DM

5.1.8 set ip pim pmbr

Enables or disables the PMBR (PIM multicast border router) status.

```
set ip pim pmbr {enable | disable}
```

Syntax Description	**enable** – Enables the PMBR status. **disable** – Disables the PMBR status.
Mode	Global Configuration
Defaults	Disabled.
Example	`SEFOS (config)# set ip pim pmbr enable`
Notes	• A PMBR integrates two different PIM domains (either PIM-SM or PIM-DM). • A PMBR connects a PIM domain to other multicast routing domain(s).

Related Commands

- `show ipv6 pim thresholds` - Displays threshold configured for SPT, RP thresholds, rate limit values for both SM and DM

5.1.9 set ip pim static-rp

Enables or disables the static RP configuration status. This command specifies whether to use the configured static RP.

```
set ip pim static-rp {enable | disable}
```

Syntax Description	**enable** – Enables the static RP configuration status. **disable** – Disables the static RP configuration status.
Mode	Global Configuration
Defaults	Disabled.
Example	`SEFOS (config)# set ip pim static-rp enable`

Related Commands

- `show ipv6 pim rp-set` - Displays the RP-set information
- `show ipv6 pim rp-static` - Displays the RP-static information

5.1.10 ip pim component

Configures the PIMv6 component in the router. The `no` form of the command destroys the PIMv6 component.

```
ip pim component component-id_1-255
```

```
no ip pim component component-id_1-255
```

Mode Global Configuration

Example `SEFOS(config)# ip pim component 1`

Notes
- PIMv6 component 1 cannot be deleted, as it is the default component.
- The PIMv6 component corresponds to each instance of a PIMv6 domain and classifies it as sparse or dense mode. Currently, only sparse mode is supported.

Related Commands

- `show ipv6 pim component` - Displays the component information

5.1.11 ipv6 pim rp-candidate rp-address

Sets the address of the interface, which will be advertised as a candidate-RP. The `no` form of the command disables the address of the interface, which will be advertised as a candidate-RP.

```
ipv6 pim rp-candidate rp-address group-address group-mask
rp-address
```

```
no ipv6 pim rp-candidate rp-address group-address group-mask
rp-address
```

Syntax Description
group-address – IPv6 multicast group address.
group-mask – IPv6 multicast group address mask that gives the group prefix for which the entry contains information about RP.
rp-address – IPv6 address of the rendezvous point.

Mode PIM Component

Example
```
SEFOS(pim-comp)# ipv6 pim rp-candidate rp-address
ff02::e001:0000 112 3333::1111
```

Notes A candidate-RP is a router configured to send periodic candidate-RP-advertisement messages to the BSR, and processes join/prune or register messages for the advertised group prefix, when it is elected as a RP.

Related Commands

- `show ipv6 pim rp-set` - Displays the PIMv6 RP-set information
- `show ipv6 pim rp-candidate` - Displays the PIMv6 RP-candidate information

5.1.12 ipv6 pim rp-static rp-address

Sets the address of the IPv6 interface, which will be advertised as a Static-RP. The no form of the command disables the address of the IPv6 interface, which will be advertised as a Static-RP.

```
ipv6 pim rp-static rp-address group-address group-mask rp-address
```

```
no ipv6 pim rp-static rp-address group-address group-mask
rp-address
```

Syntax Description

group-address – IPv6 multicast group address.

group-mask – IPv6 multicast group address mask that gives the group prefix for which the entry contains information about RP.

rp-address – IPv6 address of the rendezvous point.

Mode PIM Component

Example

```
SEFOS(pim-comp)# ipv6 pim rp-static rp-address
ff02::e001:0000 112 3333::1111
```

Notes The static configuration allows additional structuring of the multicast traffic by directing the multicast join or prune messages to statically configured RPs.

Related Commands

- show ipv6 pim rp-static - Displays the RP-static information

5.1.13 ipv6 pim query-interval

Sets the frequency at which PIMv6 hello messages are transmitted on the interface. The no form of the command sets the default hello timer interval for the interface.

```
ipv6 pim query-interval seconds_0-65535
```

```
no ipv6 pim query-interval
```

Mode Interface Configuration

Defaults 30

Example

```
SEFOS (config-if)# ipv6 pim query-interval 60
```

Notes The query message informs the presence of a PIMv6 router on the interface to the neighboring PIMv6 routers.

Related Commands

- `show ipv6 pim interface` - Displays the PIMv6 interfaces of the router

5.1.14 ipv6 pim message-interval

Sets the frequency at which the PIMv6 join or prune messages are transmitted on the PIMv6 interface. The `no` form of the command sets the default value for the PIMv6 join/prune messages.

ipv6 pim message-interval *seconds_0-65535*

no ipv6 pim message-interval

Mode	Interface Configuration
Defaults	60
Example	`SEFOS (config-if)#` **ipv6 pim message-interval 120**
Notes	The join/prune message interval used on all the PIMv6 routers in the PIMv6 domain must be the same. If all the routers do not use the same timer interval, the performance of PIMv6 sparse can be adversely affected.

Related Commands

- `show ipv6 pim interface` - Displays the PIMv6 interfaces of the router.

5.1.15 ipv6 pim bsr-candidate

Sets the preference value for the local PIMv6 interface as a candidate bootstrap router. The `no` form of the command sets the default preference value for the local PIMv6 interface as a candidate bootstrap router.

ipv6 pim bsr-candidate *0-255*

no ipv6 pim bsr-candidate

Mode	Interface Configuration
Defaults	0
Example	`SEFOS (config-if)#` **ipv6 pim bsr-candidate 1**
Notes	A BSR is a dynamically elected router within the PIMv6 domain.

Related Commands

- `show ipv6 pim bsr` - Displays the PIMv6 BSR information

5.1.16 ipv6 pim componentId

Adds the interface to the component.

```
ipv6 pim component-id_1-255
```

Mode	Interface Configuration
Defaults	1
Example	`SEFOS (config-if)# ipv6 pim componentId 1`
Notes	This command adds the current VLAN into the specified PIMv6 component.

Related Commands

- `debug ipv6 pim` - Enables or disables PIMv6 globally
- `show ipv6 pim component` - Displays the component information

5.1.17 ipv6 pim dr-priority

Sets the designated router priority value configured for the PIMv6 router interface. The `no` form of the command sets the default designated router priority value for the PIMv6 router interface.

```
ipv6 pim dr-priority 1-65535
```

```
no ipv6 pim dr-priority
```

Mode	Interface Configuration
Defaults	1
Example	`SEFOS (config-if)# ipv6 pim dr-priority 100`
Notes	The DR sets up multicast route entries and sends corresponding join/prune and register messages on behalf of directly-connected receivers and sources, respectively.

Related Commands

- `show ipv6 pim interface` - Displays the PIMv6 interfaces of the router

5.1.18 ipv6 pim override-interval

Sets the override interval configured for the PIMv6 router interface. The `no` form of the command sets the default override interval for the PIMv6 router interface.

ipv6 pim override-interval *seconds_0-65535*

no ipv6 pim override-interval

Mode	Interface Configuration
Defaults	0
Example	`SEFOS (config-if)#` **ipv6 pim override-interval 100**
Notes	The override interval is the random amount of time delayed for sending override messages to avoid synchronization of override messages when multiple downstream routers share a multi-access link.

Related Commands

- `show ipv6 pim interface` - Displays the PIMv6 interfaces of the router.

5.1.19 ipv6 pim lan-delay

Sets the LanDelay configured for the PIMv6 router interface. The `no` form of the command sets the default LanDelay for the PIMv6 router per interface.

ipv6 pim lan-delay *seconds_0-65535*

no ipv6 pim lan-delay

Mode	Interface Configuration

Defaults	0
Example	`SEFOS (config-if)# ipv6 pim lan-delay 120`
Notes	The LAN delay inserted by a router in the LAN prune delay option expresses the expected message propagation delay on the interface. It is used by upstream routers to find out the delayed time interval for a Join override message before pruning an interface.

Related Commands

- `show ipv6 pim interface` - Displays the PIMv6 interfaces of the router.

5.1.20 set ipv6 pim lan-prune-delay

Sets the LanPruneDelay bit configured for the PIMv6 router interface to advertise the LAN delay. The command specifies whether to use LAN prune delay or not.

```
set ipv6 pim lan-prune-delay {enable | disable}
```

Syntax Description	**enable** – Enables LAN-prune-delay. **disable** – Disables LAN-prune-delay.
Mode	Interface Configuration
Defaults	Disabled.
Example	`SEFOS (config-if)# set ipv6 pim lan-prune-delay enable`

Related Commands

- `show ipv6 pim interface` - Displays the PIMv6 interfaces of the router

5.1.21 no ipv6 pim interface

Deletes the IPv6 PIM Interface. That is, this command destroys the interface at PIMv6.

```
no ipv6 pim interface
```

Mode	Interface Configuration
Example	`SEFOS (config-if)# no ipv6 pim interface`

Related Commands

- `show ipv6 pim interface` - Displays the PIMv6 interfaces of the router.

5.1.22 debug ipv6 pim

Enables PIMv6 trace. The `no` form of the command disables PIMv6 trace.

```
debug ipv6 pim {[nbr] [grp] [jp] [ast] [bsr] [io] [pmbr] [mrt]
[mdh] [mgmt] | [all]}
```

```
no debug ipv6 pim {[nbr] [grp] [jp] [ast] [bsr] [io] [pmbr] [mrt]
[mdh] [mgmt] | [all]}
```

Syntax Description

nbr – Neighbor Discovery traces
grp – Group Membership traces
jp – Join or Prune traces
ast – Assert state traces
bsr – Bootstrap/RP traces
io – Input Output traces
pmbr – Interoperability traces
mrt – Multicast Route Table Update traces
mdh – Multicast Data Handling traces
mgmt – Configuration traces
all – All traces

Mode

Privileged EXEC

Example

```
SEFOS# debug ipv6 pim all
```

Notes

A 4-byte integer value is specified for enabling the level of debugging. Each bit in the 4-byte integer variable represents a level of debugging. Combinations of levels are also allowed. The user has to enter the corresponding integer value for the bit set.

Related Commands

- `show ipv6 pim interface` - Displays the PIMv6 interfaces of the router.

5.1.23 show ipv6 pim interface

Displays the PIMv6 interfaces of the router. The command shows the list of interface addresses, the mode of the interface, designated router on that interface, hello interval, join or prune interval of the interface.

show ipv6 pim interface [{Vlan *vlan-id* **| detail}]**

Syntax Description

Vlan – VLAN identifier.

detail – Detailed information of the interface.

Mode

Privileged EXEC

Example

```
SEFOS# show ipv6 pim interface
Address          IfName/     Ver/    Nbr     Qry        DR        DR
                 IfId         Mode    Count  Interval   Address   Prio-
---------       -----       -----   ------   -------   -------   -----
fe80::2:a00:1    vlan1/33   2/Sparse   0    150    fe80::2:a00:1     1
fe80::2:1400:1   vlan2/34   2/Sparse   0    30     fe80::2:1400:1    1
fe80::2:1e00:1   vlan3/35   2/Sparse   0    30     fe80::2:1e00:1    1

SEFOS# show ipv6 pim interface vlan 1
Address          IfName/     Ver/     Nbr    Qry         DR           DR
                 IfId        Mode     Count  Interval   Address      Prio-
---------       -----       ------    ------ -------    ------       -----
fe80::2:a00:1    vlan1/33   2/Sparse   0      150      fe80::2:a00:1    1

SEFOS# show ipv6 pim interface detail
vlan1 33 is up
  Internet Address is fe80::2:a00:1
  Muticast Switching : Enabled
  PIM : Enabled
  PIMv6 : Enabled
    PIM version : 2, mode: Sparse
    PIM DR : fe80::2:a00:1
    PIM DR Priority : 1
    PIM Neighbour Count : 0
    PIM Hello/Query Interval : 150
    PIM Message Interval : 200
    PIM Override Interval : 0
    PIM Lan Delay : 0
    PIM Lan-Prune-Delay : Disabled
    PIM Component Id : 1
    PIM domain border : disabled
```

Related Commands

- `set ipv6 pim` - Enables or disables PIMv6
- `ipv6 pim query-interval` - Sets the frequency at which PIMv6 hello messages are transmitted on the interface
- `ipv6 pim message-interval` - Sets the frequency at which PIMv6 Join/Prune messages are transmitted on the PIMv6 interface
- `ipv6 pim bsr-candidate` - Sets the preference value for the local PIMv6 interface as a candidate bootstrap router
- `ipv6 pim dr-priority` - Sets the designated router priority value configured for the PIMv6 router interface
- `ipv6 pim override-interval` - Sets the override interval configured for the PIMv6 router interface
- `ipv6 pim lan-delay` - Sets the LanDelay configured for the PIMv6 router interface
- `set ipv6 pim lan-prune-delay` - Sets the LanPruneDelay bit configured for the PIMv6 router interface to advertise the lan delay
- `no ipv6 pim interface` - Deletes an interface at PIMv6 level
- `debug ipv6 pim` - Enables PIMv6 trace

5.1.24 show ipv6 pim neighbor

Displays the PIMv6 neighbor(s) information of the router. It displays the neighbor address, the interface used to reach the PIMv6 neighbor, the up time (the time since this neighbor became the neighbor of the local router), expiry time (the minimum time remaining before this PIMv6 neighbor will be aged out), LAN delay and override interval.

```
show ipv6 pim neighbor [Vlan vlan-id]
```

Syntax Description

`Vlan` – VLAN identifier.

Mode

Privileged EXEC

Example

```
SEFOS# show ipv6 pim neighbor
Nbr              If        Uptime/        Ver   DRPri/  Comp Over-   Lan
Address        Name       Expiry              Mode     Id  ride    Delay
                 /Idx                                             Interval
------------- ---------   ------------   --- ------   ----   ---- -----
fe80::2:a00:a  vlan1/33   00:02:33/0     v2   0/S        1     0       0
fe80::2:1400:a vlan2/34   00:02:33/0     v2   0/S        1     0       0

SEFOS# show ipv6 pim neighbor vlan 1

Nbr              If        Uptime/        Ver   DRPri/  Comp Over-   Lan
Address        Name       Expiry              Mode     Id  ride    Delay
                 /Idx                                             Interval
------------- ---------   ------------   --- ------   ----   ---- -----
fe80::2:a00:a  vlan1/33   00:02:58/0     v2   0/S        1     0       0
```

Related Commands

- `ipv6 pim query-interval` - Sets the frequency at which PIMv6 hello messages are transmitted on the interface
- `ipv6 pim message-interval` - Sets the frequency at which PIMv6 Join/Prune messages are transmitted on the PIMv6 interface
- `ipv6 pim bsr-candidate` - Sets the preference value for the local PIMv6 interface as a candidate bootstrap router

5.1.25 show ipv6 pim rp-candidate

Displays the PIMv6 RP-candidate information. It displays the group addresses, the group mask and the RP address that indicates the IP address of the rendezvous point (RP) for the listed PIM Sparse group.

show ipv6 pim rp-candidate *component-id_1-255*

Mode Privileged EXEC

Example

```
SEFOS# show ipv6 pim rp-candidate 1
CompId     GroupAddress/PrefixLength         RPAddress/Priority
------     -------------------------         ----------- -------
  1        ff02::e000:0/112                 3333::a00:1/192
```

Related Commands

- `ipv6 pim rp-candidate rp-address` - Sets the address of the interface, which will be advertised as a candidate-RP
- `ipv6 pim rp-static rp-address` - Sets the address of the interface, which will be advertised as a static-RP

5.1.26 show ipv6 pim rp-set

Displays the PIMv6 RP-set information. It displays details of the group prefix, RP address, hold time, and expiry time.

```
show ipv6 pim rp-set rp-address
```

Syntax Description *rp-address* – Indicates the IPv6 address of the rendezvous point (RP) for the listed PIM sparse group.

Mode Privileged EXEC

Example

```
SEFOS# show ipv6 pim rp-set 3333::a00:a
PIM Group-to-RP mappings
------------------------
Group Address : ff00::Group Mask : 8
   RP: 3333::a00:a
   Component-Id : 1
      Hold Time : 102, Expiry Time : 00:00:35
```

Related Commands

- `ipv6 pim rp-candidate rp-address` - Enables the address of the interface, which will be advertised as a candidate-RP
- `ipv6 pim rp-static rp-address` - Sets the address of the interface, which will be advertised as a static-RP

5.1.27 show ipv6 pim bsr

This command displays the PIMv6 BSR information.

```
show ipv6 pim bsr component-id_1-255
```

Mode Privileged EXEC

Example

```
SEFOS# show ipv6 pim bsr 1
PIMv2 Bootstrap Configuration For Component 1
---------------------------------------------
Elected BSR for Component  1
  V6 BSR Address : 3333::a00:1
  V6 BSR Priority : 100, Hash Mask Length : 126
  This System is V6 Candidate BSR for Component 1
  V6 BSR Address : 3333::a00:1
  V6 BSR Priority : 100
```

Related Commands

- `ipv6 pim bsr-candidate` - Sets the preference value for the local interface as a candidate bootstrap router

5.1.28 show ipv6 pim rp-static

Displays the static RP information.

show ipv6 pim rp-static *component-id_1-255*

Mode Privileged EXEC

Example

```
SEFOS# show ipv6 pim rp-static
Static-RP Enabled

CompId     GroupAddress/PrefixLength        RPAddress
------     -------------------------        ---------
    1      ff02::1111:2222/64               3333::4444
```

Related Commands

- `ipv6 pim rp-static rp-address` - Enables or disables the Static RP configuration status

5.1.29 show ipv6 pim component

Displays the component information.

show ipv6 pim component *component-id_1-255*

Mode Privileged EXEC

Example

```
SEFOS# show ipv6 pim component 1

PIM Component Information
-------------------------
Component-Id: 1
   PIM Mode: sparse,    PIM Version: 2
   Elected BSR: 10.0.0.1
   Candidate RP Holdtime: 0
```

Related Commands

- `ipv6 pim componentId` - Adds the interface to the component

5.1.30 show ipv6 pim thresholds

Displays threshold configured for SPT, RP thresholds, and rate limit values for both SM and DM.

```
show ipv6 pim thresholds
```

Mode Privileged EXEC

Example

```
SEFOS# show ipv6 pim thresholds

PIM SPT Threshold Information
-----------------------------
   Group Threshold  : 111
   Source Threshold : 222
   Switching Period : 100

PIM SPT-RP Threshold Information
--------------------------------
   Register Threshold        : 333
   RP Switching Period       : 300
   Register Stop rate limit : 400
```

Related Commands

- `set ip pim threshold` - Configures the SPT group or source threshold
- `set ip pim spt-switchperiod` - Configures the period (in seconds) over which the data rate is to be monitored for switching to shortest path tree

- `set ip pim threshold` - Sets the threshold at which the RP initiates switching to source specific shortest path tree
- `set ip pim rp-switchperiod` - Sets the period (in seconds) over which RP monitors register packets for switching to the source specific shortest path tree
- `set ip pim regstop-ratelimit-period` - Sets the period over which RP monitors number of register packets after sending the register stop message
- `set ip pim pmbr` - Enables or disables the PMBR status
- `ipv6 pim dr-priority` - Sets the designated router priority value configured for the router interface

5.1.31 show ipv6 pim mroute

Displays the IPv6 PIM mroute information.

show ipv6 pim mroute [{*component-id_1-255* **| group** *group-address* **| source** *source-address***} summary]**

Syntax Description

component-id_1-255 – Component identifier.

group-address – Indicates the PIMv6 multicast group address using the listed RP.

source-address – The network address which identifies the sources for which this entry contains multicast routing information.

summary – Summary of PIMv6 `mroute` information.

Mode

Privileged EXEC

Example

```
SEFOS# show ipv6 pim mroute
IP Multicast Routing Table
--------------------------
Route Flags S: SPT Bit W: Wild Card Bit R: RPT Bit
Timers: Uptime/Expires
Interface State: Interface, State/Mode
PIM Multicast Routing Table For Component 1
(*, ff02::e001:0) ,00:03:54/---3401:510a::3401:51a)
Incoming Interface : vlan1
,RPF nbr :     fe80::2:a00:a ,Route Flags : WR
  Outgoing InterfaceList :
    vlan2, Forwarding/Sparse ,00:03:54/---
```

```
SEFOS# show ipv6 pim mroute group ff02::e001:0 summary
IP Multicast Routing Table
--------------------------
Route Flags S: SPT Bit W: Wild Card Bit R: RPT Bit
Timers: Uptime/Expires
PIM Multicast Routing Table For Component 1
(*, ff02::e001:0) ,00:02:49/---3401:510a::3401:51a)
,Route Flags : WR

SEFOS# show ipv6 pim mroute source ca8d:5102::ca8d:5102
summary

IP Multicast Routing Table
--------------------------
Route Flags S: SPT Bit W: Wild Card Bit R: RPT Bit
Timers: Uptime/Expires

(ca8d:5102::ca8d:5102,ff02::e001:0) ,00:01:04/04:01:45
,Route Flags : ---
```

Notes It shows details of the (S ,G) ,(*,G) and (*,*,RP) entries.

Related Commands

- `ipv6 pim bsr-candidate` - Sets the preference value for the local IPv6 interface as a candidate bootstrap router

CHAPTER 6

RIP

RIP is a widely used protocol for managing router information within a self-contained network, such as a corporate LAN or an interconnected group of such LANs. RIP is classified by the IETF as one of several internal gateway protocols.

RIP sends routing-update messages at regular intervals and when the network topology changes. When a router receives a routing update that includes changes to an entry, it updates its routing table to reflect the new route. The metric value for the path is increased by 1, and the sender is indicated as the next hop. RIP routers maintain only the best route (the route with the lowest metric value) to a destination. After updating its routing table, the router immediately begins transmitting routing updates to inform other network routers of the change. These updates are sent independently of the regularly scheduled updates that RIP routers send. RIP uses a hop count as a way to determine network distance. Each host with a router in the network uses the routing table information to determine the next host to route a packet to for a specified destination.

6.1 RIP Commands

The list of CLI commands for the configuration of RIP is as follows:

- `router rip`
- `ip rip security`
- `ip rip retransmission`
- `network`
- `neighbor`
- `passive-interface vlan`
- `output-delay`
- `output-delay` **delay**

- validate-update-source
- redistribute
- default-metric
- auto-summary - enable | disable
- auto-summary
- ip rip default route originate
- default-information originate
- ip rip summary-address
- ip summary-address rip
- ip rip default route install
- ip rip send version
- ip rip receive version
- version
- ip rip authentication mode
- ip rip authentication mode {text | md5}
- ip rip authentication key-chain
- timers basic - update-value
- timers basic - update-interval
- ip split-horizon
- debug ip rip
- debug ip rip {database | events | triggers}
- show ip rip

6.1.1 router rip

Enters the router configuration mode. The no form of the command disables RIP on all the interfaces.

```
router rip
```

```
no router rip
```

Syntax Description	**router rip**– Enables router configuration mode. **no router rip**– Disables RIP on all interfaces.
Mode	Global Configuration
Example	`SEFOS(config)# router rip`

Related Commands

- `network` - Enables RIP on an IP network
- `show ip rip` - Displays IP RIP protocol database or statistics

6.1.2 ip rip security

Accepts or ignores RIP1 packets when authentication is in use. The `no` form of the command sets the security level to its default value.

```
ip rip security {minimum | maximum}
```

```
no ip rip security
```

Syntax Description	**minimum** – Denotes that the RIP1 packets will be accepted even when authentication is in use. **maximum** – Denotes that the RIP1 packets will be ignored when authentication is in use.
Mode	Router Configuration
Defaults	**maximum**
Example	`SEFOS(config-router)# ip rip security minimum`

Related Commands

- `show ip rip` - Displays IP RIP protocol database or statistics

6.1.3 ip rip retransmission

Configures the timeout interval and number of retries to retransmit the update request packet or an unacknowledged update response packet. The `no` form of the command sets the retransmission timeout interval or the number of retransmission retries to its default value.

```
ip rip retransmission {interval timeout_5-10 | retries 10-40}
```

```
no ip rip retransmission {interval | retries}
```

Syntax Description

interval – The timeout interval to be used to retransmit the update request packet or an unacknowledged update response packet.

retries – The maximum number of retransmissions of the update request and update response packets.

Mode

Router Configuration

Defaults

interval – 5

retries – 36

Example

```
SEFOS(config-router)# ip rip retransmission interval 6
SEFOS(config-router)# no ip rip retransmission retries
```

Notes

During retries, if no response is received the routes through the next hop router are marked unreachable.

Related Commands

- `show ip rip` - Displays IP RIP protocol database or statistics

6.1.4 network

Enables RIP on an IP network or an unnumbered interface. The `no` form of the command disables RIP on an IP network or an unnumbered interface.

```
network ip-address [unnum {vlan 1-4094 | iftype ifnum}]
```

```
no network ip-address [unnum {vlan 1-4094 | iftype ifnum}]
```

Syntax Description

ip-address – IP address for the entry.

unum vlan – VLAN identifier for which no IP address is configured.

iftype – Interface type.

ifnum – Interface identifier.

Mode Router Configuration

Example

```
SEFOS(config)# interface vlan 1
SEFOS(config-if)# shutdown
SEFOS(config-if)# ip address 10.0.0.1 255.255.0.0
SEFOS(config-if)# no shutdown
SEFOS(config-if)# exit
SEFOS(config)# router rip
SEFOS(config-router)# network 10.0.0.1
```

Notes

- The network number specified must not contain any subnet information. RIP routing updates will be sent and received only through interfaces on this network.
- RIP sends updates to the interfaces in the specified networks. Also, if the network of an interface is not specified, the interface will not be advertised in any RIP update.

Related Commands

- `show ip rip` - Displays IP RIP protocol database or statistics

6.1.5 neighbor

Adds a trusted neighbor router. The `no` form of the command deletes a trusted neighbor router.

neighbor *ip-address*

no neighbor *ip-address*

Syntax Description *ip-address* – IP address of the trusted neighbor router.

Mode Router Configuration

Example

```
SEFOS(config-router)# neighbor 10.0.0.5
```

Notes

- This command is used to configure the IP address of the router from which this router can accept RIP Packets.
- Multiple neighbor commands can be used to specify additional trusted neighbors or peers.

Related Commands

- `show ip rip` - Displays IP RIP protocol database or statistics

6.1.6 passive-interface vlan

Suppresses routing updates on an interface. The no form of the command does not suppress routing updates from an interface.

```
passive-interface {vlan 1-4094 | interface-type interface-id}
```

```
no {vlan 1-4094 | interface-type interface-id}
```

Syntax Description

vlan – VLAN identifier.
interface-type – Interface type.
interface-id – Interface identifier.

Mode Router Configuration

Example

```
SEFOS(config-router)# passive-interface vlan 1
```

Notes If the sending of routing updates is disabled on an interface, the particular subnet will continue to be advertised to other interfaces, and updates from other routers on that interface continue to be received and processed.

Related Commands

- `show ip rip` - Displays IP RIP protocol database or statistics

6.1.7 output-delay

Enables interpacket delay for RIP updates. The **no** form of the command disables interpacket delay for RIP updates. This command also helps in preventing the routing table from losing information by enabling the interpacket delay.

```
output-delay
```

```
no output-delay
```

Mode Router Configuration

Example

```
SEFOS(config-router)# output-delay
```

Related Commands

- `show ip rip` - Displays IP RIP protocol database or statistics

6.1.8 output-delay *delay*

This command configures the interpacket delay for the RIP updates. The interpacket delay ranges between 8 and 50 milliseconds. This command also helps in preventing the routing table from losing information by configuring the interpacket delay.

```
output-delay milliseconds_8-50
```

Syntax Description	**output-delay** – Configures the interpacket delay for RIP updates.
Mode	Router Configuration
Example	`SEFOS(config-router)# output-delay 10`

Related Commands

- `show ip rip` - Displays IP RIP protocol database or statistics

6.1.9 validate-update-source

Configures the validate source option for RIP. That is, this command enables the source IP address validation of incoming routing updates for RIP and IGRP routing protocols.

```
validate-update-source
```

Mode	Router Configuration
Example	`SEFOS(config-router)# validate-update-source`

6.1.10 redistribute

Enables redistribution of corresponding protocol routes into RIP. The `no` form of the command disables redistribution of corresponding protocol routes into RIP.

```
redistribute {all | connected | ospf | static} [ route-map
name_1-20]
```

```
no redistribute {all | connected | ospf | static} [ route-map
name_1-20]
```

Syntax Description	**all** – Advertises all routes learned in the RIP process. **connected** – Connected routes redistribution. **ospf** – Advertises routes learned by OSPF in the RIP process. **static** – Statically configured routes to advertise in the RIP process. **route-map** – Name of the Route Map to be applied during redistribution of routes from Route Table Manager to RIP. If this is not specified, all routes are redistributed.
Mode	Router Configuration
Example	`SEFOS(config-router)# redistribute all`

Related Commands

- `default-metric` - Sets the RIP default metric
- `show ip rip` - Displays IP RIP protocol database or statistics

6.1.11 default-metric

Sets the metric to be used for redistributed routes. The `no` form of the command sets the metric used with redistributed routes to its default value. The metric value ranges between 1 and 16. The metric value given in the `no` form of the command is ignored during the execution of the command.

default-metric *1-16*

no default-metric *1-16*

Mode	Router Configuration
Defaults	3
Example	`SEFOS(config-router)# default-metric 1`
Notes	The default-metric command is used in conjunction with the redistribute router configuration command to cause the current routing protocol to use the same metric value for all redistributed routes.

Related Commands

- `redistribute` - Enables redistribution of corresponding protocol routes into RIP
- `show ip rip` - Displays IP RIP protocol database or statistics

6.1.12 auto-summary - enable | disable

Enables or disables the auto-summarization of routes in RIP.

```
auto-summary {enable | disable}
```

Syntax Description	**enable** – Enables the auto-summarization feature in RIP. **disable** – Disables the auto-summarization feature in RIP.
Mode	Router Configuration
Defaults	Enabled
Example	`SEFOS(config-router)# auto-summary disable`
Notes	The auto-summarization feature must be disabled to configure interface specific aggregation with RIP version 2.

Related Commands

- `show ip rip` - Displays IP RIP protocol database or statistics

6.1.13 auto-summary

Enables the auto-summarization feature in RIP. The `no` form of the command disables the auto-summarization feature in RIP. This command operates similarly to the command `auto-summary - enable | disable`.

```
auto-summary
```

```
no auto-summary
```

Mode	Router Configuration
Defaults	Autosummarization is enabled.
Example	`SEFOS(config-router)# no auto-summary`
Notes	The auto-summarization feature must be disabled to configure interface specific aggregation with RIP version 2.

Related Commands

- `show ip rip` - Displays IP RIP protocol database or statistics

6.1.14 ip rip default route originate

Sets the metric to be used for default route propagated over the interface. The no form of the command disables origination of default route over the interface.

```
ip rip default route originate metric_1-15
```

```
no ip rip default route originate
```

Mode	Interface Configuration Applicable only in VLAN Interface.
Defaults	**no ip rip default route originate**
Example	SEFOS(config)# **interface vlan 1** SEFOS(config-if)# **ip rip default route originate 10**
Notes	RIP must be enabled on the interface before executing this command.

Related Commands

- show ip rip - Displays IP RIP protocol database or statistics
- network - Enables RIP on an IP network

6.1.15 default-information originate

Sets the metric to be used for default route propagated over the interface. The no form of the command disables origination of default route over the interface.

This command operates similarly to the command ip rip default route originate.

```
default-information originate metric_1-15 [route-map string_32]
```

```
no default-information originate
```

Syntax Description	*metric_1-15* – Specifies the metric value. This value ranges between 1 and 15. **route-map** – Identifies the specified route-map in the list of route-maps. The length of the string ranges between 1 and 32. The keyword route-map is not supported.
Mode	Interface Configuration Applicable in VLAN Interface only.
Defaults	Origination of default route over the interface is disabled.
Example	`SEFOS(config)# interface vlan 1` `SEFOS(config-if)# default-information originate 10`
Notes	RIP must be enabled on the interface before executing this command.

Related Commands

- `show ip rip` - Displays IP RIP protocol database or statistics
- `network` - Enables RIP on an IP network

6.1.16 ip rip summary-address

Sets route aggregation over an interface for all subnet routes that fall under the specified IP address and mask. The `no` form of the command disables route aggregation with the specified IP address and mask.

```
ip rip summary-address ip-address mask
```

```
no ip rip summary-address ip-address mask
```

Syntax Description	*ip-address* – IP Address of the interface specific aggregation. *mask* – Subnet mask.

Mode Interface Configuration
Applicable only in VLAN interface.

Example
```
SEFOS(config)# router rip
SEFOS(config-router)# auto-summary disable
SEFOS(config-router)# exit
SEFOS(config)# interface vlan 1
SEFOS(config-if)# ip rip summary-address 60.0.0.0
255.0.0.0
```

Notes
- This command must not be used with RIPv1 send version.
- Auto-summarization overrides interface specific aggregation. Therefore, auto-summarization must be disabled for interface specific route aggregation.

6.1.17 ip summary-address rip

Sets the route aggregation for all subnet routes that fall under the specified IP address and mask. The no form of the command disables route aggregation with the specified IP address and mask. This command operates similarly to the command ip rip summary-address.

```
ip summary-address rip ip-address mask
```

```
no ip summary-address rip ip-address mask
```

Syntax Description *ip-address* – IP address of the interface specific aggregation.
mask – Subnet mask.

Mode Interface Configuration
Applicable only in VLAN Interface.

Example
```
SEFOS(config-if)# ip summary-address rip 60.0.0.0
255.0.0.0
```

Notes
- This command must not be used with RIPv1 send version.
- Auto-summarization overrides interface specific aggregation. Therefore, auto-summarization must be disabled for interface specific route aggregation.

6.1.18 ip rip default route install

Installs the default route received in updates to the RIP database. The no form of the command does not install default route received in updates to the RIP database.

```
ip rip default route install
```

```
no ip rip default route install
```

Mode Interface Configuration
Applicable only in VLAN Interface.

Defaults **no ip rip default route install**

Example

```
SEFOS(config)# interface vlan 1
SEFOS(config-if)# shutdown
SEFOS(config-if)# ip address 10.0.0.1 255.255.0.0
SEFOS(config-if)# no shutdown
SEFOS(config-if)# exit
SEFOS(config)# router rip
SEFOS(config-router)# network 10.0.0.1
SEFOS(config-router)# exit
SEFOS(config)# interface vlan 1
SEFOS(config-if)# ip rip default route install
```

Notes RIP must be enabled on the interface on which this command is executed.

6.1.19 ip rip send version

Sets the IP RIP version number for transmitting advertisements and the no form of the command sets IP RIP send version number to its default value.

```
ip rip send version  {1 | 2 | 1 2 | none}
```

```
no ip rip send version
```

Syntax Description	**1 | 2 | 1 2 | none** – Indicates which version of RIP updates are to be sent. • **1** - Sends RIP updates compliant with RFC 1058. • **2** - Sends multicasting RIP updates. • **1 2** - Sends both multicasting RIP updates and RIP updates compliant with RFC 1058. • **none** - No RIP updates are send.
Mode	Interface Configuration Applicable only in VLAN Interface.
Defaults	**1 2**
Example	`SEFOS(config-if)# ip rip send version 1`

Related Commands

- `ip rip receive version` - Sets IP RIP version number for receiving advertisements
- `show ip rip` - Displays IP RIP protocol database or statistics

6.1.20 ip rip receive version

Sets the IP RIP version number for receiving advertisements. The `no` form of the command sets the IP RIP receive version number to its default value.

```
ip rip receive version  {1 | 2 | 1 2 | none}
```

```
no ip rip receive version
```

Syntax Description	**1 | 2 | 1 2 | none** – Indicates which version of RIP updates are to be sent. • **1** - Sends RIP updates compliant with RFC 1058. • **2** - Sends multicasting RIP updates. • **1 2** - Sends both multicasting RIP updates and RIP updates compliant with RFC 1058. • **none** - No RIP updates are send.
Mode	Interface Configuration Applicable only in VLAN Interface.

Defaults	**1 2**
Example	`SEFOS(config-if)#` **`ip rip receive version 1`**
Notes	The command indicates which version of RIP updates are to be accepted. `rip2` and `rip1 2` implies reception of multicast packets.

Related Commands

- `ip rip send version`- Sets IP RIP version number for transmitting advertisements
- `show ip rip` - Displays IP RIP protocol database or statistics

6.1.21 version

Configures global version of the RIP. The no form of the command restores the default version for the RIP. This command operates similarly to the commands `ip rip send version` and `ip rip receive version`.

```
version {1 | 2 | 1 2 | none}
```

```
no version
```

Syntax Description	**1 | 2 | 1 2 | none** – Indicates which version of RIP updates are to be sent. • **1** - Sends RIP updates compliant with RFC 1058. • **2** - Sends multicasting RIP updates. • **1 2** - Sends both multicasting RIP updates and RIP updates compliant with RFC 1058. • **none** - No RIP updates are send.
Mode	Router Configuration
Defaults	**1 2**
Example	`SEFOS(config-router)#` **`version 1`**

Related Commands

- `show ip rip` - Displays IP RIP protocol database or statistics

6.1.22 ip rip authentication mode

Configures authentication mode and key. The no form of the command disables authentication.

```
ip rip authentication mode {text | md5} key-chain
key-chain-name_16
```

```
no ip rip authentication
```

Syntax Description

text – Clear text authentication.

md5 – Keyed Message Digest 5 (MD5) authentication. More than one entry can be configured for an interface.

key-chain – The value to be used as the Authentication Key.

Mode

Interface Configuration

Applicable only in VLAN Interface.

Defaults

No authentication

Example

```
SEFOS(config-if)# ip rip authentication mode text
key-chain asdf123
```

Notes

If a string shorter than 16 octets is supplied, it will be left-justified and padded to 16 octets, on the right, with nulls (0x00).

Related Commands

- show ip rip - Displays IP RIP protocol database or statistics

6.1.23 ip rip authentication mode {text | md5}

Configures the authentication mode. The no form of the command disables authentication. This command operates similarly to the command ip rip authentication mode.

```
ip rip authentication mode {text | md5}
```

```
no ip rip authentication mode
```

Syntax Description	**text** – Clear text authentication. **md5** – Keyed Message Digest 5 (MD5) authentication. This command will configure mode text and key-chain with defaults.
Mode	Interface Configuration Applicable only in VLAN Interface.
Defaults	Authentication is disabled.
Example	`SEFOS(config-if)# ip rip authentication mode text`

Related Commands

- `show ip rip` - Displays IP RIP protocol database or statistics

6.1.24 ip rip authentication key-chain

Configures the authentication key. The `no` form of the command disables authentication. This command operates similarly to the command `ip rip authentication mode`.

ip rip authentication key-chain *key-chain-name_16*

no ip rip authentication key-chain *key-chain-name_16*

Syntax Description	**key-chain** – Name of the authentication key to be used for authentication.
Mode	Interface Configuration Applicable only in VLAN Interface.
Defaults	Authentication is disabled.
Example	`SEFOS(config-if)# ip rip authentication key-chain test`

Related Commands

- `show ip rip` - Displays IP RIP protocol database or statistics

6.1.25 timers basic - *update-value*

Sets update, route age, and garbage collection timers. The no form of the command resets update, route age, and garbage collection timers to the default values.

```
timers basic update-value_10-3600 routeage-value_30-500
garbage-value_120-180
```

```
no timers basic
```

Syntax Description

update-value_10-3600 – 30

routeage-value_30-500– 180

garbage-value_120-180– 120

Mode

Interface Configuration

Applicable only in VLAN Interface.

Defaults

update-value_10-3600 – Interval time between updates.

routeage-value_30-500– Time after which the entry is put into garbage-collect interval.

garbage-value_120-180– Interval before deleting an entry after not hearing it.

Example

```
SEFOS(config-if)# timers basic 20 40 150
```

Notes

The advertisements of garbage-value entry is set to INFINITY, while sending to others.

Related Commands

- show ip rip - Displays IP RIP protocol database or statistics

6.1.26 timers basic - update-interval

Configures the update, invalid, hold down, and flush timers for RIP. This command operates similarly to the command timers basic - update-value.

```
timers basic update-interval_10-3600 invalid_30-500
holddown_10-3600 flush_120-180 sleep_10-3600
```

Syntax Description

update-interval_10-3600 – Rate (in seconds) at which the updates are sent. This is the fundamental timing parameter of the routing protocol. This value ranges between 10 and 3600 seconds.

invalid_30-500 – Time interval (in seconds) after which a route is declared as invalid. This value ranges between 30 and 500 seconds.

holddown_10-3600 – Interval (in seconds) during which the routing information regarding better paths are suppressed.

This value ranges between 10 and 3600 seconds. The keyword `holddown` is not supported.

flush_120-180 – Time interval (in seconds) after which the route is removed from the routing table. This value ranges between 120 and 180 seconds.

sleep_10-3600 – Interval (in milliseconds) for postponing routing updates in the event of a flash update. This value ranges between 10 and 3600 milliseconds. The keyword sleep is not supported.

Mode

Interface Configuration

Applicable only in VLAN Interface.

Defaults

update-interval_10-3600 – 30

invalid_30-500 – 180

holddown_10-3600 – 180

flush_120-180 – 240

Example

```
SEFOS(config-if)# timers basic 20 40 180
```

Related Commands

- `show ip rip` - Displays IP RIP protocol database or statistics

6.1.27 ip split-horizon

Sets the `split-horizon` status and the `no` form of the command disables the split-horizon status.

```
ip split-horizon [poisson]
```

```
no ip split-horizon
```

Syntax Description

poisson – `split-horizon` with `poisson` reverse is enabled.

Mode	Interface Configuration Applicable only in VLAN Interface.
Example	`SEFOS(config-if)# ip split-horizon`
Notes	The value `split-horizon` denotes that `split-horizon` must be applied in the response packets that are going out.

Related Commands

- `show ip rip` - Displays IP RIP protocol database or statistics

6.1.28 debug ip rip

Sets the debug level for RIP module. The `no` form of the command resets the debug level for RIP module.

```
debug ip rip {all | init | data | control | dump | os | mgmt |
failure | buffer}
```

```
no debug ip rip {all | init | data | control | dump | os | mgmt |
failure | buffer}
```

Syntax Description	**all** – All resources. **init** – Initialization and shutdown messages. **data** – Data path messages. **control** – Control plane messages. **dump** – Packet dump messages. **os** – OS resource Messages. **mgmt** – Management messages. **failure** – All failure messages. (All failures including packet validation.) **buffer** – Buffer messages.
Mode	Privileged EXEC
Defaults	**init**
Example	`SEFOS# debug ip rip all`

Related Commands

- `show ip rip` - Displays IP RIP protocol database or statistics

6.1.29 debug ip rip {database | events | triggers}

Sets the debug level for RIP module. The no form of the command resets the debug level for RIP module. This command operates similarly to the command debug ip rip.

```
debug ip rip {database | events | triggers}
```

```
no debug ip rip {database | events | triggers}
```

Syntax Description

database – Database debug messages.
events – Trace management messages.
triggers – Triggers debug messages.

Mode Privileged EXEC

Example

```
SEFOS# debug ip rip database
```

Related Commands

- show ip rip - Displays IP RIP protocol database or statistics

6.1.30 show ip rip

Displays IP RIP protocol database or statistics.

```
show ip rip {database ip-address ip-mask | statistics}
```

Syntax Description

database – RIP protocol database for the specified IP address and IP mask of the RIP interface entry.
statistics – RIP statistics on the router.

Mode Privileged EXEC

Example

```
SEFOS# show ip rip database 40.0.0.0  255.0.0.0

40.0.0.0/8 directly connected, vlan1

SEFOS# show ip rip statistics

Vrf default

RIP Global Statistics:
----------------------
Total number of route changes is 0
Total number of queries responded is 0
Total number of dropped packets is 0

RIP Interface Statistics:
-------------------------

Interface    Periodic       BadRoutes Triggered      BadPackets Admin
IP Address   Updates Sent   Received  Updates Sent   Received   Status
----------   ------------   --------- ------------   ---------- ------
10. 0.0.1     0              0          1              0        Enabled
```

Related Commands

- `router rip` - Enables RIP on all the interfaces
- `ip rip security` - Accepts/ignores RIP1 packets when authentication is in use
- `ip rip retransmission` - Configures the timeout interval and number of retries to retransmit the update request packet or an unacknowledged update response packet
- `network` - Enables RIP on an IP network
- `neighbor` - Adds a neighbor router
- `passive-interface vlan` - Suppresses routing updates on an interface
- `output-delay` / `output-delay delay` - Enables interpacket delay for RIP updates
- `redistribute` - Enables redistribution of corresponding protocol routes into RIP
- `default-metric` - Sets the RIP default metric
- `auto-summary - enable | disable` - Enables/disables auto-summarization of routes in RIP
- `auto-summary` - Enables auto-summarization feature in RIP
- `ip rip default route originate` / `default-information originate` - Sets the metric to be used for default route propagated over the interface

- `ip rip send version` - Sets IP RIP version number for transmitting advertisements
- `ip rip receive version` / `version` - Sets IP RIP version number for receiving advertisements
- `ip rip authentication mode` - Configures authentication mode and key
- `ip rip authentication mode {text | md5}` - Configures authentication mode
- `ip rip authentication key-chain` - Configures authentication key
- `timers basic - update-value` - Sets update, route age, and garbage collection timers
- `timers basic - update-interval` - Sets update timer, invalid timer, and flush timers
- `ip split-horizon` - Sets the split-horizon status
- `debug ip rip` / `debug ip rip {database | events | triggers}` - Sets the debug level for RIP module

CHAPTER 7

OSPF

OSPF protocol is an IGP used to distribute routing information within a single autonomous system. Routers use link-state algorithms to send routing information to all nodes in an inter-network by calculating the shortest path to each node based on topography of the Internet constructed by each node. Each router sends that portion of the routing table (keeps track of routes to particular network destinations), which describes the state of its own links, and it also sends the complete routing structure (topography).

The advantage of shortest-path-first algorithms is that they result in smaller, more frequent updates everywhere. They converge quickly, thus preventing such problems as routing loops and count-to-infinity (when routers continuously increment the hop count to a particular network). This makes for a stable network.

All OSPF interface related configurations can be done only when the global OSPF is enabled.

The multiple instances feature is not supported.

7.1 OSPF Commands

The list of CLI commands for the configuration of OSPF is as follows:

- `router ospf`
- `router ospf - process-id`
- `router-id`
- `area - stability interval`
- `area - translation-role`
- `compatible rfc1583`
- `abr-type`

- neighbor
- area area-id default-cost
- area area-id nssa
- area area-id stub
- default-information originate always
- default-information originate
- area - virtual-link
- asbr router
- area - range
- area - range - cost
- summary-address
- redistribute
- redist-config
- network
- network - wildcard-mask
- set nssa asbr-default-route translator
- passive-interface vlan
- passive-interface default
- timers spf
- ip ospf demand-circuit
- ip ospf retransmit-interval
- ip ospf transmit-delay
- ip ospf priority
- ip ospf hello-interval
- ip ospf dead-interval
- ip ospf cost
- ip ospf network
- ip ospf authentication-key
- ip ospf authentication
- ip ospf message-digest-key
- debug ip ospf
- show ip ospf interface
- show ip ospf neighbor
- show ip ospf request-list
- show ip ospf retransmission-list

- show ip ospf virtual-links
- show ip ospf border-routers
- show ip ospf - summary address
- show ip ospf
- show ip ospf route
- show ip ospf - database summary
- show ip ospf - database

7.1.1 router ospf

Enables OSPF routing process. The no form of the command disables OSPF routing process.

```
router ospf
```

```
no router ospf
```

Mode	Global Configuration
Example	SEFOS(config)# **router ospf**
Notes	The command no router ospf disables the OSPF router admin status to terminate the OSPF process.

Related Commands

- router-id - Sets the router-id for the OSPF process
- network / network - wildcard-mask - Defines the interfaces on which OSPF runs and the area ID for those interfaces
- show ip ospf route - Displays routes learned by OSPF process
- show ip ospf - database - Displays OSPF database summary for the LSA type

7.1.2 router ospf - process-id

Note - This command is not supported.

Enables the OSPF routing process. The no form of the command disables the OSPF routing process. This command operates similarly to the command router ospf.

```
router ospf process-id_1-65535
```

```
no router ospf process-id_1-65535
```

Syntax Description	*process-id_1-65535* – OSPF process identifier. This value ranges between 1 and 65535. This parameter is not currently supported.
Mode	Global Configuration The no form of the command can also be executed in Router Configuration.
Example	`SEFOS(config)# router ospf 1`

Related Commands

- `router-id` - Sets the router ID for the OSPF process
- `network` - Defines the interfaces on which OSPF runs and the area ID for those interfaces
- `show ip ospf route` - Displays the routes learned by the OSPF process
- `show ip ospf - database` - Displays the OSPF Database summary for the LSA type

7.1.3 router-id

Sets the router identifier for the OSPF process.

```
router-id <router ip address>
```

Syntax Description	**router ip address** – Specifies the OSPF router ID as an IP address.
Mode	Router Configuration
Example	`SEFOS(config-router)# router-id 10.0.0.1`
Notes	An arbitrary value for the IP address for each router can be configured. However, each router ID must be unique. To ensure uniqueness, the router identifier must match one of the router's IP interface addresses.

Related Commands

- `router ospf` - Enables OSPF routing process
- `router ospf - process-id` - Enables the OSPF routing process
- `show ip ospf route` - Displays routes learned by OSPF process

7.1.4 area - stability interval

Configures the stability interval NSSA. The no form of the command configures default stability interval for NSSA.

```
area area-id stability-interval interval-value_0-0x7fffffff
```

```
no area area-id stability-interval
```

Syntax Description

area-id – Area associated with the OSPF address range. It is specified as an IP address.

stability-interval – The number of seconds after an elected translator determines its services are no longer required, during which time it must continue to perform its translation duties.

Mode

Router Configuration

Defaults

40

Example

```
SEFOS(config-router)# area 10.0.0.1 stability-interval
10000
```

Notes

Area identifier 0.0.0.0 is used for the OSPF backbone.

The OSPF sequence number is a 32-bit signed integer. It starts with the value '80000001'h, -- or -'7FFFFFFF'h, and increments until '7FFFFFFF'h. Thus, a typical sequence number will be very negative.

Related Commands

- area area-id nssa - Configures an area as a NSSA and other parameters related to that area

7.1.5 area - translation-role

Configures the translation role for the NSSA. The no form of the command configures the default translation role for the NSSA.

```
area area-id translation-role {always | candidate}
```

```
no area area-id translation-role
```

Syntax Description	*area-id* – Area associated with the OSPF address range. It is specified as an IP address. **translation-role** – An NSSA Border router's ability to perform NSSA Translation of Type-7 LSAs to Type-5 LSAs.
Mode	Router Configuration
Defaults	**candidate**
Example	SEFOS(config-router)# **area 10.0.0.1 translation-role always**
Notes	Type-5 LSAs - Originated by AS boundary routers, and flooded throughout the AS. Each AS-external-LSA describes a route to a destination in another autonomous system. Default routes for the AS can also be described by AS-external-LSAs.

Related Commands

- area area-id nssa - Configures an area as a NSSA and other parameters related to that area

7.1.6 compatible rfc1583

Sets the OSPF compatibility list compatible with RFC 1583. The no form of the command disables RFC 1583 compatibility.

```
compatible rfc1583
```

```
no compatible rfc1583
```

Mode	Router Configuration
Defaults	**compatible rfc1583**
Example	SEFOS(config-router)# **compatible rfc1583**
Notes	• This command enables support of RFC1583 compatibility in products that support later standards. • It controls the preference rules, when choosing among multiple AS external LSAs advertising the same destination. When set to compatible rfc1583, the preference rules remain those specified by RFC 1583. When set to no compatible rfc1583, the preference rules are those stated in RFC 2178. • To minimize the chance of routing loops, all OSPF routers in an OSPF routing domain must have RFC compatibility set identically.

7.1.7 abr-type

Sets the alternative ABR type.

```
abr-type {standard | cisco | ibm}
```

Syntax Description

standard – Standard ABR type as defined in RFC 2328.

cisco – CISCO ABR type as defined in RFC 3509.

ibm – IBM ABR type as defined in RFC 3509.

Mode Router Configuration

Defaults **standard**

Example

```
SEFOS(config-router)# abr-type standard
```

Notes

- RFC 2328 - OSPF version 2.
- RFC-3509 - Alternative implementations of OSPF area border routers.

Related Commands

- `router ospf` - Enables OSPF routing process
- `show ip ospf` - Displays general information about the OSPF routing process

7.1.8 neighbor

Specifies a neighbor router and its priority. The `no` form of the command removes the neighbor set default value for the neighbor priority.

```
neighbor neighbor-id [priority 0-255]
```

```
no neighbor neighbor-id [priority]
```

Syntax Description

neighbor-id – Neighbor router identifier.

priority – A number value that specifies the router priority.

poll-interval *seconds* – A number value that represents the poll interval time.

cost *1-65535* – Assigns a cost value to the neighbor. This value ranges between 1 and 65535.

database-filter all – Filters the outgoing link-state advertisements provided to an OSPF neighbor.

Mode Router Configuration

Defaults	**priority**
Example	`SEFOS(config-router)#` **`neighbor 20.0.0.1 priority 25`**
Notes	The value 0 signifies that the neighbor is not eligible to become the designated router on this particular network.

Related Commands

- `ip ospf priority` - Sets the router priority
- `ip ospf network` - Configures the OSPF network type to a type other than the default for a given media
- `show ip ospf neighbor` - Displays OSPF neighbor information list

7.1.9 area *area-id* default-cost

Specifies a cost for the default summary route sent into a stub or NSSA. The `no` form of the command removes the assigned default route cost.

`area` *`area-id`* **`default-cost`** *`cost`* **`[tos`** *`0-30`***`]`**

`no area` *`area-id`* **`default-cost`** *`cost`* **`[tos`** *`0-30`***`]`**

Syntax Description	*`area-id`* – Area associated with the OSPF address range. It is specified as an IP address. **`default-cost`** – Cost for the default summary route used for a stub area. **`tos`** – Type of service of the route being configured.
Mode	Router Configuration
Defaults	**`default-cost`** – 10 **`tos`** – 0
Example	`SEFOS(config-router)#` **`area 10.0.0.1 default-cost 5`**
Notes	• A default cost can be defined only for a valid area. • The only supported **`tos`** value is 0. • In the area 0.0.0.0, the **`default-cost`** and the **`tos`** must be set at the same time. If setting only the **`default-cost`**, SEFOS does not accept the command and a message similar to the following is displayed: `Invalid Metric.Exceeded the range` • The **`tos`** range of 0-30 is also not accepted.

Related Commands

- `area area-id stub` - Specifies an area as a stub area and other parameters related to that area
- `area - range` / `area - range - cost` - Consolidates and summarizes routes at an area boundary
- `ip ospf cost` - Specifies the cost of sending a packet on an interface
- `ip ospf authentication` - Specifies the authentication type for an interface

7.1.10 area *area-id* nssa

Configures an area as a NSSA and other parameters related to that area.

```
area area-id nssa [{no-summary | default-information-originate
[metric value] [metric-type type_1-3] [tos 0-30]]
```

Syntax Description

area-id – Area associated with the OSPF address range. It is specified as an IP address.

nssa – Configures an area as a not-so-stubby area (NSSA).

no-summary – Allows an area to be a not-so-stubby area without requiring injection of summary routes.

default-information-originate – Default route into OSPF. Possible values:

- **metric** - The Metric value applied to the route before it is advertised into the OSPF domain.
- **metric-type** - The metric type applied to the route before it is advertised into the OSPF domain.
- **tos** - Type of service of the route being configured. The only supported **tos** value is 0.

Mode Router Configuration

Defaults

metric – 10

metric-type – 1

tos – 0

Example

```
SEFOS(config-router)# area 40.0.0.1 nssa
SEFOS(config-router)# area 40.0.0.1 nssa no-sum
SEFOS(config-router)# area 40.0.0.1 nssa
default-information-originate metric 8
```

Notes The `no area area-id [{stub | nssa}]` command removes an area or converts `stub` or `nssa` to normal area.

Related Commands

- `area - range` / `area - range - cost` - Consolidates and summarizes routes at an area boundary
- `area - translation-role` - Configures the translation role for the NSSA

7.1.11 area *area-id* stub

Specifies an area as a stub area and other parameters related to that area. The `no` form of the command removes an area or converts stub/nssa to normal area.

```
area area-id stub [no-summary]
```

```
no area area-id [{stub [no-summary] | nssa [no-redistribution]
[default-information-originate [metric value] [metric-type
type_1-3]] [no-summary]}]]
```

Syntax Description

area-id – Area associated with the OSPF address range. It is specified as an IP address.

stub – Configures an area as a stub area.

no-summary – The router will neither originate nor propagate summary LSAs into the stub area. This option is not currently supported with the no form of the command.

nssa – Configures an area as a not-so-stubby area (NSSA).

no-redistribution – Imports routes only into the normal areas, but not into the NSSA area.

default-information-originate – Default route into OSPF.

metric - The metric value applied to the route before it is advertised into the OSPF domain.

metric-type - The metric type applied to the route before it is advertised into the OSPF domain.

Mode Router Configuration

Example

```
SEFOS(config-router)# area  10.0.0.1  stub
```

Notes The command must be configured on all routers and access servers in the stub area.

Related Commands

- `area area-id default-cost` - Specifies a cost for the default summary route sent into a stub or NSSA
- `area - range` / `area - range - cost` - Consolidates and summarizes routes at an area boundary
- `ip ospf authentication` - Specifies the authentication type for an interface

7.1.12 default-information originate always

Enables generation of a default external route into an OSPF routing domain and other parameters related to that area. The no form of the command disables generation of a default external route into an OSPF routing domain.

```
default-information originate always [metric
metric-value_0-0xffffff] [metric-type type_1-2]
```

```
no default-information originate always [metric
metric-value_0-0xffffff] [metric-type type_1-2]
```

Syntax Description

metric – The metric value applied to the route before it is advertised into the OSPF domain.

metric-type – The metric type applied to the route before it is advertised into the OSPF domain.

Mode

Router Configuration

Defaults

metric – 10

metric-type – 2

Example

```
SEFOS(config-router)# default-information originate
always metric 1 metric-type 1
```

Notes

The [**route-map** *route-map-name*] option is not supported.

Related Commands

- redistribute - Configures the protocol from which the routes have to be redistributed into OSPF.

7.1.13 default-information originate

Enables the generation of a default external route into an OSPF routing domain. The no form of the command disables the generation of a default external route into an OSPF routing domain. This command operates similarly to the command default-information originate always.

```
default-information originate {[always] [metric
metric-value_0-0xffffff] [metric-type type_1-2] [route-map
route-map-name]}
```

```
no default-information originate {[always] [metric
metric-value_0-0xffffff] [metric-type type_1-2] [route-map
route-map-name]}
```

Syntax Description	**always** – Always advertises the default route regardless of whether the software has a default route. **metric** *metric-value* – Metric value to be applied to the route before it is advertised into the OSPF Domain. This value ranges between 0 and 0xffffff. **metric-type** – Metric type to be applied to the route before it is advertised into the OSPF Domain. The type can be as follows: • 1 - Type 1 external route. • 2 - Type 2 external route. **route-map** – Route map name to be satisfied for the routing process to generate the default route.
Mode	Router Configuration
Defaults	**metric** – 10 **metric-type** – 2
Example	`SEFOS(config-router)# default-information originate always metric 1 metric-type 1`
Notes	The [**route-map** *route-map-name*] option is not supported.

Related Commands

- `redistribute` - Configures the protocol from which the routes have to be redistributed into the OSPF

7.1.14 area - virtual-link

Defines an OSPF virtual link and its related parameters. The no form of removes an OSPF virtual link.

```
area area-id virtual-link router-id [authentication {simple |
message-digest | null}] [hello-interval 1-65535]
[retransmit-interval 0-3600] [transmit-delay 0-3600]
[dead-interval value] [{authentication-key key_8 |
message-digest-key key-id_0-255 md5 key_16}]
```

```
no area area-id virtual-link router-id [authentication]
[hello-interval] [retransmit-interval] [transmit-delay]
[dead-interval] [{authentication-key | message-digest-key
key-id_0-255}]
```

Syntax Description

area-id – The Transit Area that the Virtual Link traverses. It is specified as an IP address.

virtual-link – The Router ID of the Virtual Neighbor.

authentication – The authentication type for an interface.

hello-interval – The interval between hello packets that the software sends on the OSPF virtual link interface.

retransmit-interval – The time between link-state advertisement (LSA) retransmissions for adjacencies belonging to the OSPF virtual link interface.

transmit-delay – The time the router will stop using this key for packets generation.

dead-interval – The interval at which hello packets must not be seen before its neighbors declare the router down. (The range of values for the dead interval is 0-0x7fffffff.)

authentication-key – Identifies the secret key used to create the message digest appended to the OSPF packet.

message-digest-key – OSPF MD5 authentication. Enables Message Digest 5 (MD5) authentication on the area specified by the area-id.

md5 – The secret key which is used to create the message digest appended to the OSPF packet.

Mode

Router Configuration

Defaults

authentication – null

hello-interval – 10

retransmit-interval – 5

transmit-delay – 1

dead-interval – 40

Example

```
SEFOS(config-router)# area 10.0.0.1 virtual-link
20.0.0.1 authentication message-digest hello-interval
100 retransmit-interval 100 transmit-delay 50
dead-interval 200 authentication-key asdf
```

Notes

- In OSPF, all areas must be connected to a backbone area. If the connection to the backbone is lost, it can be repaired by establishing a virtual link.
- hello-interval and dead-interval: The value must be the same for all routers and access servers on a specific network.

Related Commands

- `area - range` / area - range - cost - Consolidates and summarizes routes at an area boundary
- `ip ospf authentication` - Specifies the authentication type for an interface.
- `show ip ospf` - Displays general information about OSPF routing process
- `show ip ospf virtual-links` - Displays OSPF Virtual link information

7.1.15 asbr router

Specifies this router as ASBR. The no form of the command disables this router as ASBR.

```
asbr router
```

```
no asbr router
```

Mode	Router Configuration
Example	`SEFOS(config-router)# asbr router`
Notes	Routers that act as gateways (redistribution) between OSPF and other routing protocols (IGRP, EIGRP, RIP, BGP, Static) or other instances of the OSPF routing process are called (ASBR).

Related Commands

- `set nssa asbr-default-route translator` - Enables or disables setting of P bit in the default Type-7 LSA generated by NSSA internal ASBR
- `show ip ospf` - Displays general information about the OSPF routing process

7.1.16 area - range

Consolidates and summarizes routes at an area boundary. The no form of the command deletes the summary address.

```
area area-id range network mask {summary | type7} [{advertise |
not-advertise}] [tag value]
```

```
no area area-id range network mask [{advertise | not-advertise}]
[tag tag-value] [cost value]
```

Syntax Description

area-id – Area associated with the OSPF address range. It is specified as an IP address.

range – OSPF address range.

network – The IP address of the Net indicated by the range.

Mask – The subnet mask that pertains to the range.

summary – Summary LSAs.

type7 – Type-7 LSA.

advertise – When associated area identifier (area-id) is 0.0.0.0, aggregated Type-5 are generated. Otherwise if associated area-id is x.x.x.x (other than 0.0.0.0) aggregated Type-7 is generated in NSSA x.x.x.x.

not-advertise – When associated area-id is 0.0.0.0, Type-5 is not generated for the specified range, while aggregated Type-7 are generated in all attached NSSA. While if associated area-id is x.x.x.x (other than 0.0.0.0), Type-7 are not generated in NSSA x.x.x.x for the specified range.

tag – The Tag Type describes whether Tags will be automatically generated or will be manually configured This parameter is currently not supported in the no form of the command.

cost – Metric or cost for a summary route, which is used during OSPF SPF (Shortest Path First) calculation to determine the shortest paths to the destination. This value ranges between 0 and 16777215.

Mode

Router Configuration

Defaults

tag – 2

Example

```
SEFOS(config-router)# area 10.0.0.1 range 10.0.0.0
255.0.0.0 summary advertise tag 10
```

Notes

The mask indicates the range of addresses being described by the particular route. For example, a summary-LSA for the destination 128.185.0.0 with a mask of 0xffff0000 actually is describing a single route to the collection of destinations 128.185.0.0 - 128.185.255.255.

This command is used only with Area Border Routers (ABRs). It is used to consolidate or summarize routes for an area. The result is that a single summary route is advertised to other areas by the ABR.

Related Commands

- `ip ospf authentication` - Specifies the authentication type for an interface
- `area area-id default-cost` - Specifies a cost for the default summary route sent into a stub or NSSA
- `area area-id nssa` - Configures an area as a NSSA and other parameters related to that area
- `area area-id stub`- Specifies an area as a stub area and other parameters related to that area
- `area - virtual-link` - Defines an OSPF virtual link and its related parameters
- `summary-address` - Creates aggregate addresses for OSPF

- `show ip ospf` - Summary address - Displays OSPF Summary-address redistribution Information

7.1.17 area - range - cost

Consolidates and summarizes routes at an area boundary. This command operates similarly to the command `area - range`.

area *area-id* **range** *network mask* **[{advertise | not-advertise}] [tag** *value***] [cost** *value***]**

Syntax Description

area-id – Area associated with the OSPF address range. This is specified as an IP address.

network – The IP address of the network indicated by the range.

mask – The subnet mask that pertains to the range. The mask indicates the range of addresses described by the particular route. For example, a summary-LSA for the destination 128.185.0.0 with a mask of 0xffff0000 is actually describing a single route to the collection of destinations 128.185.0.0 - 128.185.255.255.

advertise – When associated area-id is 0.0.0.0, aggregated Type-5 LSAs are generated. Otherwise if associated area-id is x.x.x.x (other than 0.0.0.0) aggregated Type-7 LSA is generated in NSSA x.x.x.x.

not-advertise – When associated area-id is 0.0.0.0, Type-5 LSA is not generated for the specified range, while aggregated Type-7 LSAs are generated in all attached NSSA. If associated area-id is x.x.x.x (other than 0.0.0.0), Type-7 LSAs are not generated in NSSA x.x.x.x for the specified range.

tag – Specifies whether the tags will be automatically generated or manually configured.

cost – Metric or cost for a summary route, which is used during OSPF SPF calculation to determine the shortest paths to the destination. This value ranges between 0 and 16777215.

Mode Router Configuration

Defaults **tag** – 2

Example

```
SEFOS(config-router)# area 10.0.0.1 range 10.0.0.0
255.0.0.0 advertise tag 10
```

Related Commands

- `ip ospf authentication` - Specifies the authentication type for an interface
- `area area-id default-cost` - Specifies a cost for the default summary route sent into a stub or NSSA

- `area area-id nssa` - Configures an area as a NSSA and other parameters related to that area
- `area area-id stub`- Specifies an area as a stub area and other parameters related to that area
- `area - virtual-link` - Defines an OSPF virtual link and its related parameters
- `summary-address` - Creates aggregate addresses for OSPF
- `show ip ospf` - Summary address - Displays OSPF Summary-address redistribution Information

7.1.18 summary-address

Creates aggregate addresses for OSPF. The `no` form of the command deletes the external summary address.

```
summary-address network mask area-id [{allowAll | denyAll |
advertise | not-advertise}] [Translation {enabled | disabled}]
```

```
no summary-address network mask area-id [not-advertise]
```

Syntax Description

network – The IP address of the Net indicated by the range.

mask – The subnet mask that pertains to the range.

area-id – Area associated with the OSPF address range. It is specified as an IP address.

allowAll – When set to allowAll and associated area-id is 0.0.0.0 aggregated Type-5 are generated for the specified range. In addition aggregated Type-7 are generated in all attached NSSA, for the specified range.

denyAll – When set to denyAll neither Type-5 nor Type-7 will be generated for the specified range.

advertise – When associated area-id is 0.0.0.0, aggregated Type-5 are generated. Otherwise if associated area-id is x.x.x.x (other than 0.0.0.0) aggregated Type-7 is generated in NSSA x.x.x.x.

not-advertise – When associated area-id is 0.0.0.0, Type-5 is not generated for the specified range, while aggregated Type-7 are generated in all attached NSSA. While associated area-id is x.x.x.x (other than 0.0.0.0), Type-7 are not generated in NSSA x.x.x.x for the specified range.

Translation – Indicates how an NSSA Border router is performing NSSA translation of Type-7 to into Type-5 LSAs. When set to enabled, P Bit is set in the generated Type-7 LSA. When set to disabled P Bit is cleared in the generated Type-7 LSA for the range.

Mode

Router Configuration

Defaults

summary-address – advertise

translation – disabled

Example

```
SEFOS(config-router)# summary-address 10.0.0.6 255.0.0.0
10.0.0.0 allowAll Translation enabled
```

Notes

- The router with the highest `router_id` becomes and remains the default router regardless of whether it has the highest priority or not. The router with the hightest priority becomes the default router only after the VLAN interface of the router is brought down and back up.
- When translation is set to enabled, the NSSA border router's `futOspfAreaNssaTranslatorRole` is set to always. When this object is set to disabled, a candidate NSSA border router does not perform translation.
- This commnd indicates whether Type-5/Type-7 will be aggregated or not generated for the specified range.
- `allowAll` and `denyAll` are not valid for *area-id* other than 0.0.0.0.
- Routes learned from other routing protocols can be summarized. The metric used to advertise the summary is the smallest metric of all the more specific routes.
- This command helps reduce the size of the routing table.

Related Commands

- `ip ospf authentication` - Specifies the authentication type for an interface

- `area area-id default-cost` - Specifies a cost for the default summary route sent into a stub or NSSA
- `area area-id nssa` - Configures an area as a NSSA and other parameters related to that area
- `area area-id stub`- Specifies an area as a stub area and other parameters related to that area
- `area - virtual-link` - Defines an OSPF virtual link and its related parameters
- `summary-address` - Creates aggregate addresses for OSPF
- `show ip ospf` - Summary address - Displays OSPF Summary-address redistribution Information

7.1.19 redistribute

Configures the protocol from which the routes have to be redistributed into OSPF. The `no` form of the command disables redistribution of routes from the given protocol into OSPF.

```
redistribute {static | connected | rip | bgp | all} [route-map
name_1-20]
```

```
no redistribute {static | connected | rip | bgp | all} [route-map
name_1-20]
```

Syntax Description

`static` – Redistributes routes, configured statically, to the OSPF routing protocol.

`connected` – Redistributes directly connected network routes, to the OSPF routing protocol.

`rip` – Redistributes routes, that are learned by the RIP process, to the OSPF routing protocol.

`bgp` – Redistributes routes, that are learned by the BGP process, to the OSPF routing protocol.

`all` – Redistributes all routes to the OSPF routing protocol.

`route-map` – Identifies the specified route-map in the list of route-maps. The length of the name ranges from 1 to 20.

Mode Router Configuration

Example

```
SEFOS(config-router)# redistribute static
```

Notes The `ASBR Router` command must be configured prior to the execution of this command.

Related Commands

- `default-information originate always` - Enables generation of a default external route into an OSPF routing domain
- `default-information originate` - Enables the generation of a default external route into an OSPF routing domain
- `redist-config` - Configures the information to be applied to routes learned from RTM

7.1.20 redist-config

Configures the information to be applied to routes learned from RTM. The no form of the command deletes the information applied to routes learned from RTM.

```
redist-config network mask [metric-value metric_1-16777215]
[metric-type {asExttype1 | asExttype2}]  [tag tag-value}
```

```
no redist-config network mask
```

Syntax Description

network – IP Address of the destination route.

mask – Mask of the destination route.

metric-value – The metric value applied to the route before it is advertised into the OSPF domain.

metric-type – The metric type applied to the route before it is advertised into the OSPF domain.

tag – The tag type describes whether tags will be automatically generated or will be manually configured.

Mode

Router Configuration

Defaults

metric-value – 10

metric-type – **asExttype2**

tag – manual

Example

```
SEFOS(config-router)# redist-config 10.0.0.0 255.0.0.0
metric-value 100 metric-type asExttype1 tag 10
```

Notes

tag *tag-value*: This is not used by OSPF protocol itself. It may be used to communicate information between AS boundary routers. The precise nature of this information is outside the scope of OSPF. If tags are manually configured, the `futospfRRDRouteTag` MIB has to be set with the Tag value needed.

Related Commands

- `redistribute` - Configures the protocol from which the routes have to be redistributed into OSPF

7.1.21 network

Defines the interfaces on which OSPF runs and the area identifier for those interfaces. The `no` form of the command disables OSPF routing for interfaces defined and to remove the area ID of that interface.

```
network network-number area area-id [unnum Vlan port-number]
```

```
no network network-number area area-id [unnum Vlan port-number]
```

Syntax Description

network-number – Network type.

area – Area associated with the OSPF address range. It is specified as an IP address.

unnum Vlan – VLAN identifier for which no IP address is configured.

Mode

Router Configuration

Example

```
SEFOS(config-router)# network 20.0.0.1 area 20.0.0.0
unnum Vlan 1
```

Notes

- When a more specific OSPF network range is removed, interfaces belonging to that network range will be retained and remain active if and only if a less specific network range exists.
- There is no limit to the number of network commands that can be used on the router.

Related Commands

- `router ospf` - Enables OSPF routing process
- `router ospf - process-id` - Enables the OSPF routing process
- `show ip ospf - database` - Displays OSPF Database summary for the LSA type
- `show ip ospf interface` - Displays OSPF interface information

7.1.22 network - wildcard-mask

Defines the interfaces on which OSPF runs, and the area identifier for those interfaces. The no form of the command disables OSPF routing for interfaces defined, and removes the area identifier of that interface. This command operates similarly to the command network.

```
network network number wildcard-mask area area-id [unnum Vlan
port-number]
```

```
no network network number wildcard-mask area area-id [unnum Vlan
port-number]
```

Syntax Description

network-number – IP address of the network.

wildcard-mask – IP-address-type mask that includes don't care bits.

area-id – Area associated with the OSPF address range. This is specified as an IP address.

unnum Vlan – VLAN identifier for which no IP address is configured.

Mode

Router Configuration

Example

```
SEFOS(config-router)# network 20.0.0.1 255.0.0.0 area
20.0.0.0 unnum Vlan 1
```

Notes

- When a more specific OSPF network range is removed, interfaces belonging to that network range will be retained and will remain active only if a less specific network range exists.
- There is no limit to the number of network commands that can be used on the router.

Related Commands

- router ospf - Enables OSPF routing process
- show ip ospf - database - Displays OSPF Database summary for the LSA type
- show ip ospf interface - Displays OSPF interface information

7.1.23 set nssa asbr-default-route translator

Enables or disables setting of P bit in the default Type-7 LSA generated by NSSA internal ASBR.

```
set nssa asbr-default-route translator {enable | disable}
```

Syntax Description	**enable** – When set to enabled, P-Bit is set in the generated Type-7 default LSA. **disable** – When set disabled, P-Bit is clear in the generated default LSA.
Mode	Router Configuration
Defaults	Disabled.
Example	`SEFOS(config-router)#` **`set nssa asbr-default-route translator enable`**
Notes	Specifies the P-Bit setting for the default Type-7 LSA generated by ASBR (which is not ABR).

Related Commands

- `asbr router` - Specifies this router as ASBR

7.1.24 passive-interface vlan

Suppresses routing updates on an interface. The `no` form of the command enables routing updates on an interface.

`passive-interface {vlan` *`1-4094`* **`|`** *`interface-type interface-id`***`}`**

`no passive-interface {vlan` *`1-4094`* **`|`** *`interface-type interface-id`***`}`**

Syntax Description	*`vlan-id`* – LSA retransmissions for adjacencies belonging to the VLAN interface. *`interface-type`* – Interface type. The keyword interface-type is not supported. *`interface-id`* – Interface identifier. The keyword interface-id is not supported.
Mode	Router Configuration
Example	`SEFOS(config-router)#` **`passive-interface vlan 1`**
Notes	OSPF routing information is neither sent nor received through the specified router interface. The specified interface address appears as a stub network in the OSPF domain.

Related Commands

- `passive-interface default` - Suppresses routing updates on all interfaces
- `show ip ospf interface` - Displays OSPF interface information

- `show ip ospf request-list` - Displays OSPF Link state request list information

7.1.25 passive-interface default

Suppresses routing updates on all interfaces. The no form of the command enables routing updates on all interfaces.

```
passive-interface default
```

```
no passive-interface default
```

Mode	Router Configuration
Example	`SEFOS(config-router)# passive-interface default`
Notes	All the OSPF interfaces created after the execution of this command will be passive. This is useful in Internet service provider (ISP) and large enterprise networks where many of the distribution routers have more than 200 interfaces.

Related Commands

- `passive-interface vlan` - Suppresses routing updates on an interface
- `show ip ospf interface` - Displays OSPF interface information
- `show ip ospf request-list` - Displays OSPF Link state request list information

7.1.26 timers spf

Sets OSPF SPF delay and hold timers. The `no` form of the command resets OSPF SPF delay and hold timers to the default value.

```
timers spf spf-delay_1-100 spf-holdtime_1-1000
```

```
no timers spf
```

Syntax Description

spf-delay_1-100 – Delay time (in seconds) in starting a SPF calculation after receiving a topology change. This value ranges between 1 and 100 seconds. A value of 0 means that there is no delay. That is, the SPF calculation is started immediately.

spf-holdtime_1-1000 – Minimum time (in seconds) between two consecutive SPF calculations. This value ranges between 1 and 1000 seconds.

Mode Router Configuration

Defaults

spf-delay_1-100 – 5 seconds.

spf-holdtime_1-1000 – 10 seconds.

Example

```
SEFOS(config-router)# timers spf 10 20
```

7.1.27 ip ospf demand-circuit

Configures OSPF to treat the interface as an OSPF demand circuit. The `no` form of the command removes the demand circuit designation from the interface.

```
ip ospf demand-circuit
```

```
no ip ospf demand-circuit
```

Mode

Interface Configuration

TApplicable only in VLAN Interface.

Example

```
SEFOS(config-if)# ip ospf demand-circuit
```

Notes

- It indicates whether demand OSPF procedures (hello suppression to FULL neighbors and setting the `DoNotAge` flag on prorogated LSAs) must be performed on this interface.
- On point-to-point interfaces, only one end of the demand circuit must be configured with this command. Periodic hello messages are suppressed and periodic refreshes of LSAs do not flood the demand circuit.

Related Commands

- `show ip ospf interface` - Displays OSPF interface information

7.1.28 ip ospf retransmit-interval

Specifies the time between LSA retransmissions for adjacencies belonging to the interface. The no form of the command uses the default time between LSA retransmissions for adjacencies belonging to the interface.

```
ip ospf retransmit-interval seconds_0-3600
```

```
no ip ospf retransmit-interval
```

Mode	Interface Configuration Applicable only in VLAN interface.
Defaults	5
Example	`SEFOS(config-if)# ip ospf retransmit-interval 300`
Notes	This value is also used while retransmitting database description and link-state request packets.

Related Commands

- `ip ospf hello-interval` - Specifies the interval between hello packets sent on the interface
- `ip ospf dead-interval` - Sets the interval at which hello packets must not be seen before neighbors declare the router down
- `ip ospf transmit-delay` - Sets the estimated time it takes to transmit a link state update packet on the interface
- `show ip ospf retransmission-list` - Displays OSPF Link state retransmission list information

7.1.29 ip ospf transmit-delay

Sets the estimated time it takes to transmit a link state update packet on the interface. The `no` form of the command sets the default estimated time it takes to transmit a link state update packet on the interface.

```
ip ospf transmit-delay seconds_0-3600
```

```
no ip ospf transmit-delay
```

Mode	Interface Configuration Applicable only in VLAN Interface.
Defaults	1
Example	`SEFOS(config-if)# ip ospf transmit-delay 50`
Notes	Link-state advertisements (LSAs) in the update packet must have their ages incremented by the amount specified in the seconds argument before transmission.

Related Commands

- `ip ospf hello-interval` - Specifies the interval between hello packets sent on the interface
- `ip ospf dead-interval` - Sets the interval at which hello packets must not be seen before neighbors declare the router down
- `ip ospf retransmit-interval` - Specifies the time between LSA retransmissions for adjacencies belonging to the interface

7.1.30 ip ospf priority

Sets the router priority.

```
ip ospf priority 0-255
```

```
no ip ospf priority
```

Mode	Interface Configuration This command is applicable only in VLAN interface.
Defaults	1
Example	`SEFOS(config-if)# ip ospf priority 25`
Notes	When two routers attached to a network attempt to become the designated router, the one with the higher router priority takes precedence. If there is a tie, the router with the higher router identifier takes precedence.

Related Commands

- `ip ospf network` - Configures the OSPF network type to a type other than the default for a given media.
- `neighbor` - Specifies a neighbor router and its priority.

7.1.31 ip ospf hello-interval

Specifies the interval between hello packets sent on the interface. The no form of the command sets default value for, interval between hello packets sent on the interface.

```
ip ospf hello-interval seconds_1-65535
```

```
no ip ospf hello-interval
```

Mode	Interface Configuration Applicable only in VLAN Interface.
Defaults	10
Example	`SEFOS(config-if)# ip ospf hello-interval 75`
Notes	This value must be the same for all routers attached to a common network.

Related Commands

- `ip ospf retransmit-interval` - Specifies the time between link-state advertisement (LSA) retransmissions for adjacencies belonging to the interface.
- `ip ospf dead-interval` - Sets the interval at which hello packets must not be seen before neighbors declare the router down.
- `ip ospf transmit-delay` - Sets the estimated time it takes to transmit a link state update packet on the interface.
- `show ip ospf interface` - Displays OSPF interface information.

7.1.32 ip ospf dead-interval

This command sets the interval at which hello packets must not be seen before neighbors declare the router down and the no form of the command sets default value for the interval at which hello packets must not be seen before neighbors declare the router down.

```
ip ospf dead-interval seconds_0-0x7fffffff
```

```
no ip ospf dead-interval
```

Mode	Interface Configuration Applicable only in VLAN interface.
Defaults	40
Example	`SEFOS(config-if)# ip ospf dead-interval 1000`
Notes	This value must be the same for all routers and access servers on a specific network.

Related Commands

- `ip ospf retransmit-interval` - Specifies the time between link-state advertisement (LSA) retransmissions for adjacencies belonging to the interface
- `ip ospf hello-interval` - Specifies the interval between hello packets sent on the interface
- `ip ospf transmit-delay`- Sets the estimated time it takes to transmit a link state update packet on the interface
- `show ip ospf interface` - Displays OSPF interface information.

7.1.33 ip ospf cost

Explicitly specifies the cost of sending a packet on an interface. The `no` form of the command resets the path cost to the default value.

ip ospf cost *cost_1-65535* **[tos** *tos-value_0-30***]**

no ip ospf cost [tos *tos-value_0-30***]**

Syntax Description	**cost** – Type 1 external metrics which is expressed in the same units as OSPF interface cost, that is in terms of the OSPF link state metric. **tos** – TOS of the route being configured. The only tos value you can enter is 0. because TOS is not supported.
Mode	Interface Configuration This command is applicable only in VLAN Interface.
Defaults	**cost** – 10
Example	`SEFOS(config-if)# ip ospf cost 10`
Notes	• In general, the path cost is calculated using the following formula: 108 / bandwidth . • Using this formula, the default path costs are calculated. Example: Ethernet-Default cost is 10.

Related Commands

- `area area-id default-cost` - Specifies a cost for the default summary route sent into a stub or NSSA
- `show ip ospf interface` - Displays OSPF interface information

7.1.34 ip ospf network

Configures the OSPF network type to a type other than the default for a given media. The `no` form of the command sets the OSPF network type to the default type.

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

```
no ip ospf network
```

Syntax Description	**broadcast** – Networks supporting many (more than two) attached routers, together with the capability to address a single physical message to all of the attached routers (broadcast). **non-broadcast** – Networks supporting many (more than two) routers, but having no broadcast capability. **point-to-multipoint** – Treats the non-broadcast network as a collection of point-to-point links. **point-to-point** – A network that joins a single pair of routers.
Mode	Interface Configuration This command is applicable only in VLAN Interface.
Defaults	**broadcast**
Example	`SEFOS(config-if)# ip ospf network broadcast`
Notes	Each pair of routers on a broadcast network is assumed to be able to communicate directly. An Ethernet is an example of a broadcast network. A 56Kb serial line is an example of a point-to-point network.

Related Commands

- `neighbor` - Specifies a neighbor router and its priority
- `ip ospf priority` - Sets the router priority
- `show ip ospf interface` - Displays OSPF interface information

7.1.35 ip ospf authentication-key

Specifies a password to be used by neighboring routers that are using the OSPF simple password authentication. The no form of the command removes a previously assigned OSPF password.

```
ip ospf authentication-key password_8
```

```
no ip ospf authentication-key
```

Mode Interface Configuration
Applicable only in VLAN interface.

Example
```
SEFOS(config-if)# ip ospf authentication-key asdf123
```

Notes
- The password string can contain from 1 to 8 uppercase and lowercase alphanumeric characters.
- A separate password can be assigned to each network on a per-interface basis. All neighboring routers on the same network must have the same password to be able to exchange OSPF information.

Related Commands

- ip ospf authentication - Specifies the authentication type for an interface
- summary-address - Creates aggregate addresses for OSPF
- show ip ospf - Displays general information about OSPF routing process

7.1.36 ip ospf authentication

Specifies the authentication type for an interface. The no form of the command removes the authentication type for an interface and set it to NULL authentication.

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

```
no ip ospf authentication
```

Syntax Description **message-digest** – Message Digest authentication.
null – NULL authentication.

Mode Interface Configuration
Applicable only in VLAN Interface.

Defaults **null**

Example `SEFOS(config-if)# ip ospf authentication`

Notes
- Before using the ip ospf authentication command, a password for the interface must be configured using the ip ospf authentication-key command.
- If the authentication type is 'message digest' then key will be selected from the md-5 table.

Related Commands

- `area area-id stub` - Specifies an area as a stub area and other parameters related to that area
- `area area-id default-cost` - Specifies a cost for the default summary route sent into a stub or NSSA
- `area - virtual-link` - Defines an OSPF virtual link and its related parameters
- `area - range` / `area - range - cost` - Consolidates and summarizes routes at an area boundary
- `ip ospf authentication-key` - Specifies a password to be used by neighboring routers that are using the OSPF simple password authentication
- `ip ospf message-digest-key` - Enables OSPF MD5 authentication

7.1.37 ip ospf message-digest-key

Enables OSPF MD5 authentication. The `no` form of the command removes an old MD5 key.

ip ospf message-digest-key *key-id_0-255* **md5** *md5-key_16*

no ip ospf message-digest-key key-id_0-255

Syntax Description

key-id_0-255 – Identifies the secret key, which is used to create the message digest appended to the OSPF packet.

md5 – Secret key, which is used to create the message digest appended to the OSPF packet.

Mode Interface Configuration
This command is applicable only in VLAN Interface.

Example
```
SEFOS(config-if)# ip ospf message-digest-key 5 md5
abcd123
```

Notes
- Message Digest authentication is a cryptographic authentication. A key (password) and key-id are configured on each router. The router uses an algorithm based on the OSPF packet, the key, and the key-id to generate a "message digest" that gets appended to the packet.
- Usually, one key per interface is used to generate authentication information when sending packets and to authenticate incoming packets. The same key identifier on the neighbor router must have the same key value.

Related Commands
- `ip ospf authentication` - Specifies the authentication type for an interface
- `summary-address` - Creates aggregate addresses for OSPF
- `show ip ospf` - Displays general information about OSPF routing process

7.1.38 debug ip ospf

Sets the OSPF debug level. The `no` form of the command removes an old MD5 key.

```
debug ip ospf {pkt {hp | ddp | lrq | lsu | lsa} | module
{adj-formation | ism | nsm | config | interface}}
```

```
no debug ip ospf {pkt {hp | ddp | lrq | lsu | lsa} | module
{adj-formation | ism | nsm | config | interface} | all}
```

Syntax Description
pkt – Packet high level dump debug messages.
hp – Hello packet debug messages.
ddp – DDP packet debug messages.
lrq – Link state Request Packet debug messages.
lsu – Link state Update Packet debug messages.
lsa – Link state Acknowledge Packet debug messages.
module – RTM module debug messages.
adj-formation – Adjacency formation debug messages.
ism – Interface state machine debug messages.
nsm – Neighbor state machine debug messages.
config – Configuration debug messages.
interface – Interface.

Mode	Privileged EXEC
Example	`SEFOS# debug ip ospf pkt hp`
Notes	The information displayed by the `show ip ospf retransmission-list command` is useful in debugging OSPF routing operations.

Related Commands

- `show ip ospf` - Displays general information about OSPF routing process

7.1.39 show ip ospf interface

Displays OSPF interface information.

```
show ip ospf interface [vlan 1-4094]
```

Syntax Description	**vlan** – LSA retransmissions for adjacencies belonging to the VLAN interface.
Mode	Privileged EXEC

Example

```
Single Instance:
SEFOS# show ip ospf interface
vlan4 is up line protocol is up
  Internet Address 10.1.4.1, Mask 255.255.255.0, Area 0.0.0.5
  AS 1, Router ID 10.1.100.1, Network Type BROADCAST, Cost 1
  Transmit Delay is 1 sec, State 4, Priority 1
  Designated RouterId 10.1.100.1, Interface address 10.1.4.1
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
  Hello due in 6 sec
  Neighbor Count is 0, Adjacent neighbor count is 0
Connected to VRF  default
vlan100 is up line protocol is up
  Internet Address 10.1.100.1, Mask 255.0.0.0, Area 33.0.0.12
  AS 1, Router ID 10.0.0.1, Network Type BROADCAST, Cost 1
  Transmit Delay is 1 sec, State 5, Priority 1
  Designated RouterId 10.1.100.2, Interface address 10.1.100.2
  Backup Designated RouterId 10.1.100.1, Interface address 10.1.100.1
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
  Hello due in 6 sec
  Neighbor Count is 1, Adjacent neighbor count is 1
  Adjacent with the neighbor 10.1.100.2
Connected to VRF  default
```

Related Commands

- `network` / `network - wildcard-mask` - Defines the interfaces on which OSPF runs and to define the area ID for those interfaces
- `passive-interface vlan` - Suppresses routing updates on an interface
- `passive-interface default` - Suppresses routing updates on all interfaces
- `ip ospf demand-circuit` - Configures OSPF to treat the interface as an OSPF demand circuit
- `ip ospf hello-interval` - Specifies the interval between hello packets sent on the interface
- `ip ospf dead-interval` - Sets the interval at which hello packets must not be seen before neighbors declare the router down
- `ip ospf cost` - Specifies the cost of sending a packet on an interface

7.1.40 show ip ospf neighbor

Displays OSPF neighbor information list.

```
show ip ospf neighbor [vlan 1-4094] [neighbor-id] [detail]
```

Syntax Description

vlan – LSA retransmissions for adjacencies belonging to the VLAN interface.
neighbor-id – Neighbor router identifier.
detail – OSPF neighbor information in detail.

Mode

Privileged EXEC

Example

```
Single Instance:
SEFOS# show ip ospf neighbor
Vrf default

Neighbor-ID   Pri   State        DeadTime   Address       Interface
-----------    ---   --------    -------    -------       ----------
10.1.100.2    1     FULL/DR     33           10.1.100.2   vlan100
```

Related Commands

- neighbor - Specifies a neighbor router and its priority

7.1.41 show ip ospf request-list

Displays OSPF Link state request list information.

```
show ip ospf request-list [neighbor-id] [vlan 1-4094]
```

```
show ip ospf [vrf name] request-list [neighbor-id] [vlan 1-4094]
```

Syntax Description

neighbor-id – Neighbor router ID.

vlan – LSA retransmissions for adjacencies belonging to the VLAN interface.

Mode

Privileged EXEC

Example

```
Single Instance:
SEFOS# show ip ospf request-list

OSPF Router with ID (10.1.100.1) (Vrf default)
Neighbor 10.1.100.2, interface - address 10.1.100.2
Type LS-ID    ADV-RTR       SeqNo         Age     Checksum
---- ----     -------       -----         ---     --------
```

Related Commands

- `passive-interface vlan` - Suppresses routing updates on an interface
- `passive-interface default` - Suppresses routing updates on all interfaces

7.1.42 show ip ospf retransmission-list

Displays OSPF Link state retransmission list information.

show ip ospf retransmission-list [*neighbor-id***] [vlan** *1-4094***]**

show ip ospf [vrf *name***] retransmission-list [***neighbor-id***] [vlan [vlan** *1-4094***]**

Syntax Description

neighbor-id – Neighbor router identifier.

vlan – LSA retransmissions for adjacencies belonging to the VLAN interface.

Mode

Privileged EXEC

Example

```
Single Instance:
SEFOS# show ip ospf retransmission-list
OSPF Router with ID (10.1.100.1) (Vrf default)
```

Notes

This value is also used while retransmitting database description and link-state request packets.

Related Commands

- `ip ospf retransmit-interval` - Specifies the time between LSA retransmissions for adjacencies belonging to the interface

7.1.43 show ip ospf virtual-links

Displays OSPF virtual link information.

```
show ip ospf virtual-links
```

Mode Privileged EXEC

Example

```
Single Instance:

SEFOS# show ip ospf virtual-links

Vrf default

Virtual Link to router 10.1.100.2, Interface State is
POINT_TO_POINT
  Transit Area 0.0.0.1
  Transmit Delay is 1 sec, Neighbor State FULL
  Timer intervals configured, Hello 10, Dead 40,
Retransmit 5
```

Related Commands

- area - virtual-link - Defines an OSPF virtual link and its related parameters

7.1.44 show ip ospf border-routers

Displays OSPF border and boundary router information.

```
show ip ospf border-routers
```

Mode Privileged EXEC

Example

```
Single Instance:
SEFOS# show ip ospf border-routers

Vrf default

OSPF Process Border Router Information

Destination   TOS   Type NextHop      Cost   Rt.Type    Area
-----------   ---   ---- -------      ----   -------    ----
10.1.100.2    0     ABR  10.1.100.2   1      intraArea 0.0.0.1
```

Related Commands

- abr-type - Sets the alternative ABR type

7.1.45 show ip ospf - summary address

Displays OSPF summary-address redistribution information.

```
show ip ospf {area-range | summary-address}
```

Syntax **area-range** – Area associated with the OSPF address range. It is specified as an IP address.
summary-address – Aggregate addresses for OSPF.

Mode Privileged EXEC

Example

```
Single Instance:
SEFOS# show ip ospf area-range
Display of Summary addresses for Type3 and Translated Type5
Summary Address
-----------------------------------------------
Network   Mask         LSAType Area         Effect           Tag
-------   -------       ----                 ------           ---
10.0.0.0  255.0.0.0 Summary 33.0.0.12 Advertise 1074636208
SEFOS# show ip ospf summary-address
Display of Summary addresses for Type5 and Type7 from redistributed routes
OSPF External Summary Address Configuration Information
-----------------------------------------------------
Network     Mask     Area            Effect    TranslationSt
-------     ----     ----             ------    ------------
10.0.0.1   255.0.0.0   33.0.0.12   advertiseMatching   enabled
```

Related Commands

- area - range / area - range - cost - Consolidates and summarizes routes at an area boundary
- summary-address - Creates aggregate addresses for OSPF

7.1.46 show ip ospf

Displays general information about the OSPF routing process.

```
show ip ospf
```

Mode Privileged EXEC

Example

```
Single Instance:
SEFOS# show ip ospf
OSPF Router with ID(10.1.100.1) (Vrf default)
 Supports only single TOC(TOS0) route
 ABR Type supported is Standard ABR
 It is an Area Border Router
 Number of Areas in this router is 3
 Area is 0.0.0.5
 Number of interfaces in this area is 1
 SPF algorithm executed 35 times
 Area is 0.0.0.1
 Number of interfaces in this area is 1
 SPF algorithm executed 44 times
 Area is 0.0.0.0
 Number of interfaces in this area is 1
 SPF algorithm executed 20 times
```

Related Commands

- `area - stability interval` - Configures the Stability interval for NSSA
- `area - virtual-link` - Defines an OSPF virtual link and its related parameters
- `ip ospf authentication-key` - Specifies a password to be used by neighboring routers that are using the OSPF simple password authentication.
- `debug ip ospf` - Sets the OSPF debug level

7.1.47 show ip ospf route

Displays routes learned by OSPF process.

```
show ip ospf route
```

Mode Privileged EXEC

Example

```
Single Instance:
SEFOS# show ip ospf route
 Vrf default
OSPF Routing Table
Dest/Mask             TOS NextHop/Interface   Cost Rt.Type    Area
---------             --- -------/---------   ---- -------    ----
10.1.4.0/255.255.255.0     0   0.0.0.0/vlan4         1     IntraArea
0.0.0.5
10.1.11.0/255.255.255.0    0   10.1.100.2/vlan1002 2     InterArea
0.0.0.0
10.1.100.0/255.255.255.0   0   0.0.0.0/vlan100       1     IntraArea
0.0.0.1
```

Related Commands

- `router ospf` - Enables OSPF routing process
- `router ospf - process-id` - Enables the OSPF routing process
- `router-id` - Sets the router-id for the OSPF process

7.1.48 show ip ospf - database summary

Displays OSPF LSA Database summary.

show ip ospf *area-id* **database [{database-summary | self-originate | adv-router** *ip-address***}]**

Syntax Description

area-id – Area associated with the OSPF address range. It is specified as an IP address.

database – Displays how many of each type of LSA for each area there are in the database.

database-summary – Displays how many of each type of LSA for each area there are in the database, and the total number of LSA types.

self-originate – Displays only self-originated LSAs (from the local router).

adv-router – Displays all the specified router link-state advertisements (LSAs). If no IP address is included, the information is about the local router itself.

Mode

Privileged EXEC

Example

```
Single Instance:
SEFOS# show ip ospf database
OSPF Router with ID (10.1.100.1) (Vrf default)
         Router Link States (Area 0.0.0.0)
         ---------------------------------
Link ID     ADV Router   Age     Seq#         Checksum   Link Count
-------     ----------   ---     ----         --------   ----------
10.1.100.2 10.1.100.2   32769   0x80000026 0x7aa4     2
10.1.100.1 10.1.100.1   1626    0x80000036 0x1e1a     1
         Summary Link States (Area 0.0.0.0)
         ---------------------------------

Link ID     ADV Router   Age     Seq#         Checksum
-------     ----------   ---     ----         --------
10.1.100.0 10.1.100.1   566     0x80000031 0x2dfe
10.1.4.0    10.1.100.1   566     0x80000030 0x533a
10.1.100.0 10.1.100.2   33600   0x80000001 0x87d3
         Router Link States (Area 0.0.0.1)
         ---------------------------------
Link ID     ADV Router   Age     Seq#         Checksum   Link Count
-------     ----------   ---     ----         --------   ----------
10.1.100.2 10.1.100.2   135     0x8000000b 0x5609     1
10.1.100.1 10.1.100.1   1626    0x8000003d 0xf33c     1
         Network Link States (Area 0.0.0.1)
         ---------------------------------

Link ID     ADV Router   Age     Seq#         Checksum
-------     ----------   ---     ----         --------
10.1.100.1 10.1.100.1   673     0x80000009 0xff6e
         Summary Link States (Area 0.0.0.1)
         ---------------------------------
Link ID     ADV Router   Age     Seq#         Checksum
-------     ----------   ---     ----         --------
10.1.4.0    10.1.100.1   755     0x80000030 0x533a
10.1.11.0   10.1.100.2   882     0x80000008 0x505d
         Router Link States (Area 0.0.0.5)
         ---------------------------------
Link ID     ADV Router   Age     Seq#         Checksum   Link Count
-------     ----------   ---     ----         --------   ----------
```

```
10.1.100.1 10.1.100.1   755     0x80000038 0xf118     1
          Summary Link States (Area 0.0.0.5)
          ----------------------------------
Link ID     ADV Router   Age     Seq#           Checksum
-------     ----------   ---     ----            --------
10.1.100.0 10.1.100.1   755     0x80000009      0x7dd6
10.1.11.0   10.1.100.1   1621    0x80000008      0x604d
```

7.1.49 show ip ospf - database

Displays OSPF Database summary for the LSA type.

show ip ospf [*area-id***] database {asbr-summary | external | network | nssa-external | opaque-area | opaque-as | opaque-link | router | summary } [***link-state-id***] [{adv-router** *ip-address* **| self-originate}]**

Syntax Description

area-id – Area associated with the OSPF address range. It is specified as an IP address.

database – Displays how many of each type of LSA for each area there are in the database.

asbr-summary – Displays information only about the ASBR summary LSAs.

external – Displays information only about the external LSAs.

network – Displays information only about the network LSAs.

nssa-external – Displays information about the NSSA external LSAs.

opaque-area – Displays information about the Type-10 LSAs.

opaque-as – Displays information about the Type-11 LSAs.

opaque-link – Displays information about the Type-9 LSAs.

router – Displays information only about the router LSAs.

summary – Displays information only about the summary LSAs.

link-state-id – Portion of the Internet environment that is being described by the advertisement. The value entered depends on the type of the LSA. The value must be entered in the form of an IP address.

adv-router – Displays all the specified router link-state advertisements (LSAs). If no IP address is included, the information is about the local router itself.

self-originate – Displays only self-originated LSAs (from the local router).

Mode

Privileged EXEC

Example

```
Single Instance:
SEFOS# show ip ospf database summary

OSPF Router with ID (10.0.100.1) (Vrf default)

SEFOS# show ip ospf database network

OSPF Router with ID (10.0.100.1) (Vrf default)
```

Related Commands

- `network` / `network - wildcard-mask` - Defines the interfaces on which OSPF runs and to define the area ID for those interfaces
- `router ospf` - Enables OSPF routing process
- `router ospf - process-id` - Enables the OSPF routing process

CHAPTER 8

OSPFv3

OSPFv3 is the modified form of OSPF to support version 6 of IP. The fundamental mechanisms of OSPF remain unchanged, such as: flooding, DR election, area support, SPF calculations, and so on. However, some changes have been necessary due to either changes in protocol semantics from IPv4 to IPv6, or simply to handle the increased address size of IPv6.

8.1 OSPFv3 Commands

The list of CLI commands for the configuration of OSPFv3 are as follows:

- `ipv6 router ospf`
- `router-id - IPv4-address`
- `area - stub | nssa`
- `area - stability-interval`
- `area - translation-role`
- `timers spf`
- `abr-type`
- `area - default-metric value`
- `area - default-metric type`
- `area - virtual-link`
- `ASBR Router`
- `area - range`
- `area - range - cost`
- `area - summary-prefix`
- `redistribute`

- passive-interface
- host - metric | area-id
- no area
- no area - range
- nssaAsbrDfRtTrans
- redist-config
- as-external lsdb-limit
- exit-overflow-interval
- demand-extensions
- reference-bandwidth
- auto-cost reference-bandwidth
- ipv6 ospf area
- ipv6 ospf demand-circuit
- ipv6 ospf retransmit-interval
- ipv6 ospf transmit-delay
- ipv6 ospf priority
- no ipv6 ospf priority
- ipv6 ospf hello-interval
- ipv6 ospf dead-interval
- ipv6 ospf poll-interval
- ipv6 ospf metric
- ipv6 ospf network
- ipv6 ospf neighbor
- ipv6 ospf passive-interface
- ipv6 ospf neighbor probing
- ipv6 ospf neighbor-probe retransmit-limit
- ipv6 ospf neighbor-probe interval
- debug ipv6 ospf - pkt
- debug ipv6 ospf
- debug ipv6 ospf - packet | events
- show ipv6 ospf interface
- show ipv6 ospf neighbor
- show ipv6 ospf - request/retrans-list
- show ipv6 ospf virtual-links
- show ipv6 ospf border-routers

- show ipv6 ospf - area-range / summary-prefix
- show ipv6 ospf - General Information
- show ipv6 ospf - LSA Database
- show ipv6 ospf route
- show ipv6 ospf areas
- show ipv6 ospf host
- show ipv6 ospf redist-config

8.1.1 ipv6 router ospf

Enables the OSPFv3 routing protocol. The no form of the command disables the OSPFv3 routing protocol.

```
ipv6 router ospf
```

```
no ipv6 router ospf
```

Mode	Global Configuration
Defaults	Disabled.
Example	SEFOS(config)# **ipv6 router ospf**
Notes	The no form of the command disables all the interfaces and triggers flushing of self-originated LSAs and deletes the router's link state database.

8.1.2 router-id - IPv4-address

Sets a fixed router identifier.

```
router-id IPv4-address
```

Syntax Description	*IPv4-address* – A 32-bit integer that uniquely identifies the router in the autonomous system.
Mode	Router Configuration
Defaults	*IPv4-address* – **0.0.0.0**
Example	SEFOS(config-router)# **router-id 11.0.0.1**

Related Commands

- `show ipv6 ospf` - General Information – Displays general information about the OSPFv3 routing process

8.1.3 area - stub | nssa

Defines an area as a stub area or an NSSA.

```
area area-id {{stub | nssa} [no-summary]}
```

Syntax Description

area-id – A 32-bit integer.

stub – Stub area.

nssa – NSSA.

no-summary – Allows an area to be a stubby or not-so-stubby but does not allow it to have summary routes injected into it.

Mode

Router Configuration

Example

```
SEFOS(config-router)# area 1.1.1.1 stub no-summary
```

Notes

- In stub area, the generation of summary LSA is optional.
- If `no-summary` option is specified in the command, then the router neither originates nor propagates summary LSAs into the stubby area or NSSA. It relies entirely on its default route.
- If the no-summary option is not specified, the router summarizes and propagates summary LSAs.
- The `no-summary` option can be specified only in the area border Routers and by default, it is set to send summary.

Related Commands

- `show ipv6 ospf areas` – Displays the area table

8.1.4 area - stability-interval

Configures the stability interval (in seconds) for the NSSA. The `no` form of the command sets the default value of the stability interval for the NSSA.

```
area area-id stability-interval seconds_1-65535
```

```
no area area-id stability-interval
```

Syntax Description	*area-id* – A 32 bit integer. **stability-interval** – The number of seconds after which an elected translator determines that its services are no longer required, and that it must continue to perform its translation duties.
Mode	Router Configuration
Defaults	**stability-interval** – 40
Example	`SEFOS(config-router)#` **area 0.0.0.1 stability-interval 50**

Related Commands

- `show ipv6 ospf areas` – Displays the area table

8.1.5 area - translation-role

Configures the translation role for NSSA. The `no` form of the command configures the default translation role for the NSSA.

area *area-id* **translation-role {always | candidate}**

no area *area-id* **translation-role**

Syntax Description	*area-id* – A 32-bit integer. **translation-role** – An NSSA border router's ability to perform NSSA Translation of Type-7 LSAs to Type-5 LSAs.
Mode	Router Configuration
Defaults	**translation-role** – **candidate**
Example	`SEFOS(config-router)#` **area 0.0.0.1 translation-role always**
Notes	When the translator role is set to always, the Type-7 LSAs are always translated into Type-5 LSAs. When translator role is set to candidate, an NSSA border router participates in the translator election process.

Related Commands

- `show ipv6 ospf areas` – Displays the area table

8.1.6 timers spf

Configures the delay time and the hold time between two consecutive SPF calculations. The no form of the command sets the default values for *spf-delay* and *spf-holdtime*.

Note – Delay time is the time interval when OSPFv3 receives a topology change and when it starts a Shortest Path First (SPF) calculation.

```
timers spf spf-delay spf-holdtime
```

```
no timers spf
```

Syntax Description

spf-delay – The interval by which SPF calculation is delayed after a topology change reception.

spf-holdtime – The delay between two consecutive SPF calculations.

Mode

Router Configuration

Defaults

spf-delay – 5

spf-holdtime – 10

Example

```
SEFOS(config-router)# timers spf 10 20
```

Related Commands

- show ipv6 ospf - General Information – Displays general information about the OSPFv3 routing process

8.1.7 abr-type

Sets the ABR (Area Border Router) type.

```
abr-type {standard | cisco | ibm}
```

```
no abr-type
```

Syntax Description

standard – Standard ABR type.

cisco – CISCO ABR type.

ibm – IBM ABR type.

Mode	Router Configuration
Defaults	**standard**
Example	`SEFOS(config-router)# abr-type cisco`

Related Commands

- `show ipv6 ospf` - General Information – Displays general information about the OSPFv3 routing process

8.1.8 area - default-metric value

Sets the default metric value for an area of type NSS/stub only.

```
area area-id default-metric metric
```

Syntax Description	*area-id* – A 32-bit integer. **default-metric** – Cost for the default summary route in a stub/NSS area.
Mode	Router Configuration
Defaults	**default-metric** – 1
Example	`SEFOS(config-router)# area 1.1.1.1 default-metric 20`
Notes	Default metric can be defined only for a valid area.

Related Commands

- `area - stub | nssa` – Defines an area as a stub area or an NSSA

8.1.9 area - default-metric type

Sets the default metric-type for an area type of NSS or stub only.

```
area area-id default-metric type metric-type_1-3
```

Syntax Description	*area-id* – A 32 bit integer. **default-metric type** – Type of metric.
Mode	Router Configuration

Defaults	**default-metric type** – 1
Example	SEFOS(config-router)# **area 1.1.1.1 default-metric type 2**
Notes	Default metric can be defined only for a valid area.

Related Commands

- show ipv6 ospf - General Information – Displays general information about the OSPFv3 routing process

8.1.10 area - virtual-link

Sets the virtual link between areas.

In OSPFv3, all areas must be connected to a backbone area. If there is a break in backbone continuity, or the backbone is purposefully partitioned, a virtual link can be established. The two endpoints of a virtual link are ABRs. The virtual link must be configured in both routers. The configuration information in each router consists of the other virtual endpoint (the other ABR) and the non-backbone area that the two routers have in common (called the transit area).

If 20.0.0.3 is the Router ID of the Neighbor and 100 is the Interface Index assigned to the OSPFv3 virtual interface, then this interface index is advertised in Hello packet sent over the virtual link and in the router's router-LSAs.

area *area-id* **virtual-link** *router-id if-index* **[hello-interval** *seconds***] [retransmit-interval** *seconds***] [transmit-delay** *seconds***] [dead-interval** *seconds***]**

Syntax Description

area-id – A 32-bit integer.

router-id – The Router ID of the virtual neighbor.

if-index – Interface Index assigned to the OSPFv3 virtual interface.

hello-interval – The interval between hello packets on the OSPFv3 virtual link interface. This value ranges between 1 and 65535 seconds.

retransmit-interval – The time between link-state advertisement (LSA) retransmissions for adjacencies belonging to the OSPFv3 virtual link interface. This value ranges between 1 and 1800 seconds.

transmit-delay – The estimated time it takes to transmit a link state update packet over this interface. This value ranges between 1 and 1800 seconds.

dead-interval – The interval at which hello packets must not be seen before its neighbors declare the router down. This value ranges between 1 and 65535 seconds.

Mode

Router Configuration

Defaults

hello-interval – 10

retransmit-interval – 20

transmit-delay – 1

dead-interval – 60

Example

```
SEFOS(config-router)# area 1.1.1.1 virtual-link
20.0.0.3 1 hello-interval 50 retransmit-interval 6
transmit-delay 6 dead-interval 100
```

Notes

- Virtual links cannot be configured through stub areas.
- `hello-interval` and `dead-interval` values must be the same for all routers on a specific network.

Related Commands

- `show ipv6 ospf interface` – Displays the OSPFv3-related interface information
- `show ipv6 ospf virtual-links` – Displays the parameters and the current state of OSPFv3 virtual links

8.1.11 ASBR Router

Configures the router as an ASBR. The `no` form of the command disables the ASBR status of the router.

```
ASBR Router
```

```
no ASBR Router
```

Mode	Router Configuration
Example	`SEFOS(config-router)# ASBR Router`
Notes	Only when ASBR status is configured to enable, routes from other protocols are redistributed into OSPFv3 domain.

Related Commands

- `show ipv6 ospf` - General Information – Displays general information about the OSPFv3 routing process

8.1.12 area - range

Creates the internal aggregation address range. The internal address range is of two types:

- Type-3 aggregation
- Type 7 translation aggregation

```
area area-id range IPv6-prefix prefix-length [{advertise |
not-advertise}] {summary | Type7} [tag tag-value]
```

Syntax Description	*area-id* – A 32-bit integer. **range** – Internal aggregation address range. *ipv6-prefix* – The IPv6 address prefix of the range. *prefix-length* – The prefix length of the address range. **advertise** – Flushes out all the routes (LSAs) falling in the range and generates aggregated LSA for the range. **not-advertise** – Suppresses routes that match the prefix/prefix-length pair. **summary** – Summary LSA. **Type7** – Type-7 LSA. **tag** – Sets the tag value for the aggregated route.
Mode	Router Configuration

Defaults **tag** – 0

Example
```
SEFOS(config-router)# area 0.0.0.0 range
3ffe:5000:481d::5 80 advertise Type7 tag 20
```

Notes
- When parameter summary is specified, the configured range is used for aggregating Type-3 LSA.
- When parameter Type7 is specified, the configured range is used for aggregating Type-7 LSAs.
- The optional parameter tag is used to set the tag value for the aggregated route. This is not used by the OSPFv3 protocol alone. It can be used to communicate information between AS boundary routers.

Related Commands

- `show ipv6 ospf - area-range / summary-prefix` – Displays either the list of all area address ranges information or all external summary address configuration information

8.1.13 area - range - cost

Summarizes routes at an area boundary. This command operates similar to the command `area - range`.

```
area area-id range IPv6-prefix | prefix-length [{advertise |
not-advertise}] [tag value] [cost cost]
```

Syntax Description

area-id – Area identifier. This is a 32-bit integer.

ipv6-prefix – The IPv6 address prefix of the range.

prefix-length – The prefix length of the address range.

advertise – Flushes out all the routes (LSAs) falling in the range and generates aggregated LSA for the range.

not-advertise – Suppresses routes that match the prefix/prefix-length pair.

tag – Sets the tag value for the aggregated route. The tag value is used to communicate information between AS boundary routers.

cost – Metric or cost for a summary route, which is used during OSPF SPF calculation to determine the shortest paths to the destination. This value ranges between 0 and 16777215.

Mode Router Configuration

Defaults **tag** – 0

Example
```
SEFOS(config-router)# area 0.0.0.0 range
3ffe:5000:481d::5 / 80 advertise tag 20
```

Notes The optional parameter tag is used to set the tag value for the aggregated route. This is not used by the OSPFv3 protocol alone. It can be used to communicate information between AS boundary routers.

Related Commands

- `show ipv6 ospf - area-range / summary-prefix` – Displays either the list of all area address ranges information or all external summary address configuration information

8.1.14 area - summary-prefix

Enables route aggregation or filtering while importing routes in the OSPFv3 domain. The command configures Type-5 and Type-7 address range specifying whether Type-5 or Type-7 LSAs are generated or not for the configured range for the particular area.

```
area area-id summary-prefix IPv6-prefix prefix-length [{allowAll
| denyAll | advertise | not-advertise}] [Translation {enabled |
disabled}]
```

Syntax Description

area-id – A 32-bit integer.

summary-prefix – Summary prefix.

ipv6-prefix – The IPv6 address prefix of the range.

prefix-length – The prefix length of the address range.

allowAll – When set to allowAll and the associated area-id is 0.0.0.0, aggregated Type-5 LSAs are generated for the specified range. In addition, aggregated Type-7 LSAs are generated in all the attached NSSAs for the specified range.

denyAll – When set to denyAll, neither Type-5 LSA nor Type-7 LSAs are generated for the specified range.

advertise – When the associated area-id is 0.0.0.0, aggregated Type-5 LSAs are generated. Otherwise, if the associated *area-id* is x.x.x.x (other than 0.0.0.0), aggregated Type-7 LSA is generated in NSSA area x.x.x.x.

not-advertise – When the associated area-id is 0.0.0.0, Type-5 LSA is not generated for the specified range, while all the NSSA LSAs within this range are flushed out and aggregated Type-7 LSA is generated in all attached NSSAs. If associated *area-id* is x.x.x.x (other than 0.0.0.0), Type-7 LSA is not generated in NSSA x.x.x.x for the specified range.

Translation – When set to enabled, the P-Bit is set in the generated Type-7 LSA. When set to disabled, the P-Bit is cleared in the generated Type-7 LSA for the range.

Mode

Router Configuration

Defaults

Translation – **enabled**

advertise

Example

```
SEFOS(config-router)# area  0.0.0.0  summary-prefix
3ffe:5000::481d::5 80  allowall Translation enabled
```

Notes

The value allowAll/denyall is not valid for *area-id* other than 0.0.0.0.

Related Commands

- show ipv6 ospf - area-range / summary-prefix – Displays either the list of all area address ranges information or all external summary address configuration information

8.1.15 redistribute

Configures the protocol from which the routes have to be redistributed into OSPFv3. The no form of the command disables the redistribution of routes from the given protocol into OSPFv3.

```
redistribute {static | connected | ripng | bgp}
```

```
no redistribute {static | connected | ripng | bgp}
```

Syntax Description

static – Advertises routes, configured statically in the OSPFv3 routing process.

connected – Advertises directly connected networks routes in the OSPFv3 routing process.

ripng – Advertises routes that are learnt by the RIP process in the OSPFv3 routing process.

bgp – Advertises routes that are learnt by the BGP process in the OSPFv3 routing process.

Mode

Router Configuration

Example

```
SEFOS(config-router)# redistribute static
```

Notes

To configure Redistribution of routes from other protocols, the following steps must be performed.

1. Configure the router as ASBR.
2. Configure redistribution of routes from particular protocol.

The above order must be maintained and ASBR setting must be done before enabling redistribution.

Related Commands

- ASBR Router – Configures the router as an ASBR
- show ipv6 ospf - General Information – Displays general information about the OSPFv3 routing process

8.1.16 passive-interface

Sets the global default passive interface status. All the interfaces created after executing this command become passive interfaces. The no form of the command resets the global default passive interface status. All the interfaces created after executing this command become non-passive interfaces.

```
passive-interface
```

```
no passive-interface
```

Mode	Router Configuration
Defaults	Disabled.
Example	`SEFOS(config-router)# passive-interface`

Related Commands

- `show ipv6 ospf` - General Information – Displays general information about the OSPFv3 routing process

8.1.17 host - metric | area-id

Configures a host entry with metric or *area-id*.

```
host IPv6-address {metric cost} [area-id {area-id}]
```

```
no host IPv6-address
```

Syntax Description	*IPv6-address* – IPV6 address prefix. **metric** – Metric to be advertised. *area-id* – A 32-bit integer.
Mode	Router Configuration
Example	`SEFOS(config-router)# host 3ffe:481d::5 metric 10 area-id 0.0.0.1`

Related Commands

- `show ipv6 ospf host` – Displays the host table information

8.1.18 no area

Deletes an area and does any one of the following based on the optional parameter.

- Coverts stub or nss area to normal area
- Deletes virtual link
- Deletes stub cost

- Deletes `area-range` or `summary-prefix` values

```
no area area-id [{stub | nssa | virtual-link router-id |
default-metric | {range {summary | Type7} | summary-prefix}
IPv6-prefix prefix-length}]
```

Syntax Description

area-id – A 32-bit integer

stub – Stub area.

nssa – Not so stubby area.

virtual-link – The Router ID of the virtual neighbor.

default-metric – Cost for the default summary route in a stub/NSS area.

range – Type-3 or Type-7 or external LSA range.

IPv6-prefix – The IPv6 address prefix of the range.

prefix-length – The prefix length of the address range.

Mode Router Configuration

Example

```
SEFOS(config-router)# no area 1.1.1.1
SEFOS(config-router)# no area  1.1.1.1 stub
SEFOS(config-router)# no area 1.1.1.1 default-metric
SEFOS(config-router)# no area 1.1.1.1 virtual-link
20.0.0.3
SEFOS(config-router)# no area 1.1.1.1 range summary
3ffe:3010:481d::5  80
```

Notes Before deleting an area, it is necessary to delete all the interfaces attached to that area.

Related Commands

- `show ipv6 ospf areas` – Displays the Area Table
- `show ipv6 ospf - area-range / summary-prefix` – Displays either the list of all area address ranges information or all external summary address configuration information
- `no ipv6 ospf area` – Disables OSPFv3 routing protocol on the interface

8.1.19 no area - range

Deletes an area-range. This command operates similar to that of the command `no area`.

```
no area area-id range IPV6-prefix | prefix-length [{advertise |
not-advertise}] [cost cost]
```

Syntax Description

area-id – Area identifier. This is a 32-bit integer.

IPv6-prefix – The IPv6 address prefix of the range.

prefix-length – The prefix length of the address range.

advertise – Flushes out all the routes (LSAs) falling in the range and generates aggregated LSA for the range.

not-advertise – Suppresses routes that match the prefix/prefix-length pair.

cost – Metric or cost for a summary route, which is used during OSPF SPF calculation to determine the shortest paths to the destination. This value ranges between 0 and 16777215.

Mode Router Configuration

Example

```
SEFOS(config-router)# no area 1.1.1.1 range
3ffe:3010:481d::5 / 80
```

Notes All the interfaces attached to an area must be deleted before deleting an area.

Related Commands

- `show ipv6 ospf areas` – Displays the Area Table
- `show ipv6 ospf - area-range / summary-prefix` – Displays either the list of all area address ranges information or all external summary address configuration information
- `no ipv6 ospf area` – Disables OSPFv3 routing protocol on the interface

8.1.20 nssaAsbrDfRtTrans

This command enables setting of P bit in the default Type-7 LSA generated by an NSSA internal ASBR. The no form of the command disables setting of P bit in the default Type-7 LSA generated by an NSSA internal ASBR.

```
nssaAsbrDfRtTrans
```

```
no nssaAsbrDfRtTrans
```

Mode Router Configuration

Defaults Disabled

Example

```
SEFOS(config-router)# nssaAsbrDfRtTrans
```

Related Commands

- `show ipv6 ospf` - General Information – Displays general information about the OSPFv3 routing process

8.1.21 redist-config

Configures the information to be applied to routes learnt from RTM. The `no` form of the command deletes the information applied to routes learnt from RTM.

```
redist-config IPv6-prefix prefix-length [metric-value metric]
[metric-type {asExttype1 | asExttype2}] [tag tag-value]
```

```
no redist-config IPv6-prefix prefix-length
```

Syntax Description

IPv6-prefix – The IPv6 address prefix.

prefix-length – The prefix length of the address.

metric-value – The metric value applied to the route before it is advertised into the OSPFv3 Domain.

metric-type – The metric type applied to the route before it is advertised into the OSPFv3 Domain.

tag – The tag type describes whether tags will be automatically generated or will be manually configured.

Mode Router Configuration

Example

```
SEFOS(config-router)# redist-config  3ffe:5000:481d::5
80 metric-value 30 metric-type  asExttype1 tag 12
```

Related Commands

- `show ipv6 ospf redist-config` – Displays the configuration information to be applied to the routes learnt from the RTM

8.1.22 as-external lsdb-limit

Sets the maximum number of non-default AS-external-LSA entries that can be stored in the link-state database. If the value is -1, then there is no limit.

```
as-external lsdb-limit lsdb-limit_-1-0x7fffffff
```

Mode	Router Configuration
Defaults	**lsdb-limit** – -1
Example	`SEFOS(config-router)#` **as-external lsdb-limit 10**
Notes	• When the number of non-default AS-external-LSAs in a router's link-state database reaches the configured limit, the router enters Overflow- State. The router never holds more than the configured non-default AS-external-LSAs in its database. • The LSDB limit MUST be set identically in all routers attached to the OSPFv3 backbone and/or any regular OSPFv3 area. (i.e. OSPFv3 stub areas and NSSAs are excluded).

Related Commands

- `show ipv6 ospf` - General Information – Displays general information about the OSPFv3 routing process
- `exit-overflow-interval` – Sets the number of seconds after which a router will attempt to leave the overflow state

8.1.23 exit-overflow-interval

Sets the number of seconds after which a router will attempt to leave the overflow state.

exit-overflow-interval *interval*

Mode	Router Configuration
Defaults	**interval** – 0
Example	`SEFOS(config-router)#` **exit-overflow-interval 10**

Related Commands

- `show ipv6 ospf` - General Information – Displays general information about the OSPFv3 routing process

8.1.24 demand-extensions

Enables routing support for demand routing. The `no` form of the command disables routing support for demand routing.

demand-extensions

```
no demand-extensions
```

Mode	Router Configuration
Defaults	Enabled.
Example	`SEFOS(config-router)# demand-extensions`

Related Commands

- `show ipv6 ospf` - General Information – Displays general information about the OSPFv3 routing process

8.1.25 reference-bandwidth

Sets the reference bandwidth in kilobits per second for calculating the default interface metrics.

```
reference-bandwidth ref-bw
```

Mode	Router Configuration
Defaults	*ref-bw* – 100,000 KBPS
Example	`SEFOS(config-router)# reference-bandwidth 1000000`

Related Commands

- `show ipv6 ospf` - General Information – Displays general information about the OSPFv3 routing process

8.1.26 auto-cost reference-bandwidth

Sets the reference bandwidth in kilobits per second for calculating the default interface metrics. The `no` form of the command sets the reference bandwidth to the default value. This command operates similar to that of the command `reference-bandwidth`.

```
auto-cost reference-bandwidth ref-bw
```

```
no auto-cost reference-bandwidth
```

Syntax Description	*ref-bw* – Reference bandwidth (in kilobits per second) for calculating the default interface metrics.
Mode	Router Configuration
Defaults	*ref-bw* – 100,000 kbps.
Example	`SEFOS(config-router)# auto-cost reference-bandwidth 1000000`

Related Commands

- `show ipv6 ospf` - General Information – Displays general information about the OSPFv3 routing process

8.1.27 ipv6 ospf area

Enables OSPFv3 for IPv6 on an interface. The `no` form of the command disables OSPFv3 routing protocol on the interface.

```
ipv6 ospf area IPv4-address
```

```
no ipv6 ospf
```

Syntax Description	*IPv4-address* – A 32-bit integer.
Mode	Router Configuration
Defaults	Disabled.
Example	`SEFOS(config-if)# ipv6 ospf area  0.0.0.0`
Notes	The `no` form of the command disables an interface and triggers flushing of self-originated link scope LSAs, and deletes the link scope LSAs associated with this interface from the link state database. If there is a single interface in the associated area, then this command deletes its area scope LSAs from the link state database.

Related Commands

- `no area - range` – Deletes an area
- `show ipv6 ospf` - General Information – Displays general information about the OSPFv3 routing process
- `show ipv6 ospf interface` – Displays the OSPFv3-related interface information

8.1.28 ipv6 ospf demand-circuit

Configures OSPFv3 to treat the interface as an OSPFv3 demand circuit. The command indicates whether demand OSPFv3 procedures (hello suppression to FULL neighbors and setting the DoNotAge flag on propagated LSAs) must be performed on the configured interface. The no form of the command disables the demand circuit on an interface.

```
ipv6 ospf demand-circuit
```

```
no ipv6 ospf demand-circuit
```

Mode	Interface Configuration Applicable only in VLAN Interface.
Defaults	Disabled.
Example	`SEFOS(config-if)# ipv6 ospf demand-circuit`
Notes	The routing support for demand routing must have been enabled (using the demand-extensions command) prior to the execution of this command.

Related Commands

- demand-extensions – Enables routing support for demand routing
- show ipv6 ospf interface – Displays the OSPFv3-related interface information

8.1.29 ipv6 ospf retransmit-interval

Sets the time between LSA retransmissions for adjacencies belonging to interface. The no form of the command sets the default retransmit interval for an interface.

```
ipv6 ospf retransmit-interval interval
```

```
no ipv6 ospf retransmit-interval
```

Syntax Description	Interface Configuration Applicable only in VLAN Interface.
Mode	Router Configuration

Defaults	**interval** – 5
Example	SEFOS(config-if)# **ipv6 ospf retransmit-interval 10**
Notes	The retransmit time interval is the number of seconds between the link-state advertisement retransmissions for adjacencies belonging to an interface. The retransmit-interval value is also used while retransmitting database description and link-state request packets.

Related Commands

- show ipv6 ospf interface – Displays the OSPFv3-related interface information

8.1.30 ipv6 ospf transmit-delay

Sets the estimated time taken to transmit LS update packet over a particular interface. The no form of the command sets the default transmit delay for an interface.

```
ipv6 ospf transmit-delay 1-1800
```

```
no ipv6 ospf transmit-delay
```

Mode	Interface Configuration Applicable only in VLAN Interface.
Defaults	**delay** – 1
Example	SEFOS(config-if)# **ipv6 ospf transmit-delay 10**

Related Commands

- show ipv6 ospf interface – Displays the OSPFv3-related interface information

8.1.31 ipv6 ospf priority

Sets the router priority, which helps to determine the designated router for this network. The no form of the command sets the default router priority for an interface.

```
ipv6 ospf priority 1-255
```

```
no ipv6 ospf priority
```

Mode	Interface Configuration Applicable only in VLAN Interface.
Defaults	**priority** – 1
Example	`SEFOS(config-if)#` **`ipv6 ospf priority 7`**
Notes	A priority value of 0 signifies that the router is not eligible to become the designated router on a particular network.

Related Commands

- `show ipv6 ospf interface` – Displays the OSPFv3-related interface information

8.1.32 no ipv6 ospf priority

Sets the default router priority for an interface. This command operates similar to that of the command `ipv6 ospf priority`.

```
no ipv6 ospf priority priority-value
```

Syntax Description	*priority-value* – Priority value of the router. A priority value of 0 signifies that the router is not eligible to become the designated router on a particular network.
Mode	Interface Configuration Applicable only in VLAN Interface.
Defaults	**priority** – 1
Example	`SEFOS(config-if)#` **`no ipv6 ospf priority 7`**

Related Commands

- `show ipv6 ospf interface` – Displays the OSPFv3-related interface information

8.1.33 ipv6 ospf hello-interval

Specifies the time interval between the OSPFv3 hello packets on a particular interface (the length of time, in seconds, between the Hello packets that the router sends on the interface). The no form of the command sets the default hello interval for an interface.

```
ipv6 ospf hello-interval seconds_1-65535
```

```
no ipv6 ospf hello-interval
```

Mode	Interface Configuration Applicable only in VLAN Interface.
Defaults	**interval** – 10
Example	SEFOS(config-if)# **ipv6 ospf hello-interval 20**
Notes	The hello interval value must be same for all routers attached to a common link.

Related Commands

- show ipv6 ospf interface – Displays the OSPFv3-related interface information

8.1.34 ipv6 ospf dead-interval

Configures the router dead interval. The command is configured in seconds and indicates the time period for which the router waits for hello packet from the neighbor before declaring this neighbor down. The no form of the command sets the interface dead interval to default value.

```
ipv6 ospf dead-interval seconds_1-65535
```

```
no ipv6 ospf dead-interval
```

Mode	Interface Configuration Applicable only in VLAN Interface.
Defaults	**interval** – 40
Example	SEFOS(config-if)# **ipv6 ospf dead-interval 50**
Notes	This value must be a multiple of the hello interval and must be same for all routers attached to a common link.

Related Commands

- `show ipv6 ospf interface` – Displays the OSPFv3-related interface information

8.1.35 ipv6 ospf poll-interval

Configures the larger time interval, in seconds, between the hello packets sent to an inactive non-broadcast multi-access neighbor. The `no` form of the command sets the default poll interval for an interface.

```
ipv6 ospf poll-interval seconds_1-65535
```

```
no ipv6 ospf poll-interval
```

Mode	Interface Configuration Applicable only in VLAN Interface.
Defaults	**interval** – 120
Example	`SEFOS(config-if)#` **`ipv6 ospf poll-interval 30`**

Related Commands

- `show ipv6 ospf interface` – Displays the OSPFv3-related interface information

8.1.36 ipv6 ospf metric

Explicitly specifies the metric value for sending a packet on an interface. The `no` form of the command sets the default value for the interface metric.

```
ipv6 ospf metric 1-65535
```

```
no ipv6 ospf metric
```

Mode	Interface Configuration This command is applicable only in VLAN Interface.
Defaults	**metric** – 10
Example	`SEFOS(config-if)#` **`ipv6 ospf metric 20`**

Related Commands

- `show ipv6 ospf interface` – Displays the OSPFv3-related interface information

8.1.37 ipv6 ospf network

Sets the network type for an interface. The `no` form of the command sets the default value for the network type.

```
ipv6 ospf network {broadcast | non-broadcast |
point-to-multipoint | point-to-point}
```

```
no ipv6 ospf network
```

Syntax Description

broadcast – Networks supporting many (more than two) attached routers, together with the capability to address a single physical message to all of the attached routers (broadcast).

non-broadcast – Networks supporting many (more than two) routers, but having no broadcast capability.

point-to-multipoint – Treats the non-broadcast network as a collection of point-to-point links.

point-to-point – A network that joins a single pair of routers.

Mode

Interface Configuration

Applicable only in VLAN Interface.

Defaults

broadcast

Example

```
SEFOS(config-if)# ipv6 ospf network non-broadcast
```

Notes

- If the Interface Network type is NBMA or Point-to-Multipoint, neighbor must be configured.
- When there are few configured neighbors on the interface, then both network type change command and the no form of the command do not succeed.

Related Commands

- `show ipv6 ospf neighbor` – Configures a neighbor on non-broadcast networks and sets the priority value for the neighbor if specified
- `show ipv6 ospf interface` – Displays the OSPFv3-related interface information

8.1.38 ipv6 ospf neighbor

Configures a neighbor on non-broadcast networks and sets the priority value for the neighbor if specified. The no form of the command deletes a configured neighbor or sets the default priority value (if the priority option is specified).

```
ipv6 ospf neighbor IPv6-address [priority 1-255]
```

```
no ipv6 ospf neighbor IPv6-address [priority 1-255]
```

Syntax Description

IPv6-address – IPv6 Address prefix.

priority – A number that specifies the router priority.

Mode

Interface Configuration

Applicable only in VLAN Interface.

Defaults

priority – 1

Example

```
SEFOS(config-if)# ipv6 ospf neighbor
fe80::220:35ff:fe43:6020 priority 2
```

Notes

- In the OSPFv3 protocol packets, the IPv6 address indicates the source address of the neighbor. The link local address of the neighbor must be used for this field.
- Neighbors can be configured only in NBMA networks and point-to-multipoint networks.

Related Commands

- show ipv6 ospf interface – Displays the OSPFv3-related interface information
- show ipv6 ospf neighbor – Displays OSPFv3 neighbors information

8.1.39 ipv6 ospf passive-interface

Configures an OSPFv3 interface to be passive. The execution of the command results in suppressing OSPFv3 protocol packets traffic on this interface. The no form of the command configures an OSPFv3 interface to be non-passive.

```
ipv6 ospf passive-interface
```

```
no ipv6 ospf passive-interface
```

Mode	Interface Configuration Applicable only in VLAN Interface.
Defaults	Disabled
Example	`SEFOS(config-if)# ipv6 ospf passive-interface`

Related Commands

- `show ipv6 ospf interface` – Displays the OSPFv3 related interface information

8.1.40 ipv6 ospf neighbor probing

Enables neighbor probing on demand-circuit enabled interface. The **no** form of the command disables neighbor probing on demand-circuit enabled interface.

```
ipv6 ospf neighbor probing
```

```
no ipv6 ospf neighbor probing
```

Mode	Interface Configuration Applicable only in VLAN Interface.
Defaults	Disabled.
Example	`SEFOS(config-if)# ipv6 ospf neighbor probing`

Related Commands

- `show ipv6 ospf interface` – Displays the OSPFv3-related interface information

8.1.41 ipv6 ospf neighbor-probe retransmit-limit

Sets the number of consecutive LSA retransmissions before the neighbor is deemed inactive. The `no` form of the command sets the default neighbor probe retransmission limit.

```
ipv6 ospf neighbor-probe retransmit-limit retrans-limit
```

```
no ipv6 ospf neighbor-probe retransmit-limit
```

Mode	Interface Configuration Applicable only in VLAN Interface.
Defaults	*retrans-limit* – 10
Example	SEFOS(config-if)# **ipv6 ospf neighbor-probe retransmit-limit 30**

Related Commands

- show ipv6 ospf interface – Displays the OSPFv3-related interface information

8.1.42 ipv6 ospf neighbor-probe interval

Sets the number of seconds, that indicates how often neighbor will be probed. The no form of the command sets the default neighbor probe interval.

```
ipv6 ospf neighbor-probe interval interval
```

```
no ipv6 ospf neighbor-probe interval
```

Mode	Interface Configuration Applicable only in VLAN Interface.
Defaults	**interval** – 120
Example	SEFOS(config-if)# **ipv6 ospf neighbor-probe interval 200**

Related Commands

- show ipv6 ospf interface – Displays the OSPFv3-related interface information

8.1.43 debug ipv6 ospf - pkt

Sets the trace levels.

```
debug ipv6 ospf [pkt ([{high | low | hex}] [hp] [ddp] [lrq] [lsu]
[lsa])] [level ([fn_entry] [fn_exit] [critical] [mem_alloc_succ]
[mem_alloc_fail])] [module ([ppp] [rtm] [nssa] [rt_aggrg]
[adj_formation] [lsdb]  [ism] [nsm] [rt_calc] [interface]
[config])]
```

```
no debug ipv6 ospf [ pkt  ([{high | low | hex}] [hp] [ddp] [lrq]
[lsu] [lsa])] [level ([fn_entry] [fn_exit] [critical]
[mem_alloc_succ]  [mem_alloc_fail])] [module ([ppp] [rtm] [nssa]
[rt_aggrg] [adj_formation] [lsdb] [ism] [nsm] [rt_calc]
[interface] [config])]
```

Syntax Description

pkt – Packet high level dump debug messages.
high – Packet high level dump trace.
low – Packet low level dump trace.
hex – Packet hex dump trace.
hp – Hello packet trace.
ddp – DDP packet trace.
lrq – Link state request packet trace.
lsu – Link state update packet trace.
lsa – Link state acknowledge packet trace.
level – Trace level debug messages.
fn_entry – Function entry trace.
fn_exit – Function exit trace.
critical – Critical trace.
mem_alloc_succ – Memory allocation success trace.
mem_alloc_fail – Memory allocation failure trace.
module – OSPFv3 module debug messages.
ppp – Protocol packet processing trace.
rtm – RTM module trace.
nssa – NSSA trace.

Mode Privileged EXEC

Defaults Debugging is disabled.

Example

```
SEFOS# debug ipv6 ospf pkt  high  hp  level  fn_entry
module ppp
```

Related Commands

- `show ipv6 ospf` - General Information – Displays general information about the OSPFv3 routing process

8.1.44 debug ipv6 ospf

Sets the IPv6 OSPF trace levels. The no form of the command resets the IPv6 OSPF trace levels. This command operates similar to the command debug ipv6 ospf - pkt.

```
debug ipv6 ospf {adj | ipsec | database-timer | flood | hello |
lsa-gen | retransmission | lsdb | spf statistic}
```

```
no debug ipv6 ospf {adj | ipsec | database-timer | flood | hello
| lsa-gen | retransmission | lsdb}
```

Syntax Description

adj – Adjacency information.

ipsec – The interaction between OSPF and IPSec in IPv6 networks, including creation and removal of policy definitions.

database-timer – Database-timer information.

flood – Flooding information.

hello – Hello packet information.

lsa-gen – Link-state advertisement (LSA) generation information for all LSA types.

retransmission – Retransmission information.

lsdb – Link state database information.

spf statistic – Shortest path first statistics information.

Mode Privileged EXEC

Defaults Debugging is disabled.

Example

```
SEFOS# debug ipv6 ospf adj
```

Related Commands

- show ipv6 ospf - General Information – Displays general information about the OSPFv3 routing process

8.1.45 debug ipv6 ospf - packet | events

Sets the IPv6 OSPF event trace. The no form of the command resets the IPv6 OSPF event trace. This command operates similar to that of the command debug ipv6 ospf - pkt.

```
debug ipv6 ospf {packet | events}
```

```
no debug ipv6 ospf {packets | events}
```

Syntax Description	**packet** – Received OSPFv3 packet information. **events** – OSPFv3-related events information.
Mode	Privileged EXEC
Defaults	Debugging is disabled.
Example	SEFOS# **debug ipv6 ospf adj**

Related Commands

- show ipv6 ospf - General Information – Displays general information about the OSPFv3 routing process

8.1.46 show ipv6 ospf interface

Displays the OSPFv3-related interface information.

```
show ipv6 ospf interface [vlan 1-4094]
```

Syntax Description **vlan** – VLAN identifier.

Mode User/Privileged EXEC

Example

```
SEFOS# show ipv6 ospf interface vlan 1

OSPFv3  Interface  Information

Interface Name: vlan2     Interface Id: 1 Area Id:
0.0.0.0

Local Address: fe80::211:22ff:fe33:4412 Router Id:
11.0.0.2
Network Type: BROADCAST      Cost: 10      State: WAITING

Designated Router Id: 0.0.0.0 local address: (null)

Backup Designated Router Id: 0.0.0.0 local address:
(null)

Transmit Delay: 1 sec     Priority: 1      IfOptions: 0x0

Timer intervals configured:
Hello: 10, Dead: 40, Retransmit: 5, Poll: 120
Demand Circuit: Disable Neighbor Probing: Disable

Nbr Probe Retrans Limit: 10 Nbr Probe Interval: 120

Hello due in 4 sec
Neighbor Count is: 1
Adjacent with the neighbor  11.0.0.1
```

Related Commands

- `area - virtual-link` – Sets the Virtual Link between Areas
- `ipv6 ospf area` – Enables OSPFv3 for IPv6 on an interface
- ipv6 ospf demand-circuit – Configures OSPFv3 to treat the interface as an OSPFV3 demand circuit
- `ipv6 ospf retransmit-interval` – Sets the time between LSA retransmissions for adjacencies belonging to an interface
- `ipv6 ospf transmit-delay` – Sets the estimated time taken to transmit LS update packet over a particular interface
- `ipv6 ospf priority` – Sets the router priority, which helps to determine the Designated Router for this network

- `no ipv6 ospf priority` – Sets the default router priority for an interface
- `ipv6 ospf hello-interval` – Specifies the time interval between the OSPFv3 hello packets on a particular interface
- `ipv6 ospf dead-interval` – Configures the router dead interval
- `ipv6 ospf poll-interval`- Configures the larger time interval, in seconds, between the Hello packets sent to an inactive non-broadcast multi-access neighbor
- `ipv6 ospf metric`- Specifies the metric value for sending a packet on an interface
- `ipv6 ospf network` – Sets the network type for an interface
- `ipv6 ospf neighbor` – Configures a neighbor on non-broadcast networks and sets the priority value for the neighbor if specified
- `ipv6 ospf passive-interface` – Configures an OSPFv3 interface to be Passive
- `ipv6 ospf neighbor probing` – Enables neighbor probing on demand-circuit enabled interface
- `ipv6 ospf neighbor-probe retransmit-limit` – Sets the number of consecutive LSA retransmissions before the neighbor is deemed inactive
- `ipv6 ospf neighbor-probe interval` – Sets the number of seconds, that indicates how often neighbor will be probed

8.1.47 show ipv6 ospf neighbor

Displays OSPFv3 neighbor information.

show ipv6 ospf neighbor [*neighbor-router-id***]**

Mode User or Privileged EXEC

Example

```
SEFOS# show ipv6 ospf neighbor

ID PriStateDead Address
Time
11.0.0.41FULL/PTOP    31      fe80::211:22ff:fe33:4434
11.0.0.510FULL/BACKUP 35       fe80::260:83ff:fe38:8aa2
```

Related Commands

- `ipv6 ospf neighbor` – Configures a neighbor on non-broadcast networks and sets the priority value for the neighbor if specified

8.1.48 show ipv6 ospf - request/retrans-list

Displays the list of all LSAs in request-list or in retransmission-list.

show ipv6 ospf {request-list | retrans-list} [*neighbor-router-id*]

Syntax Description

request-list – The list of link state advertisements for which the neighbor has more up-to-date instances.

retrans-list – The list of link state advertisements that have been sent but not acknowledged.

neighbor-router-id – Neighbor router identifier.

Mode User/Privileged EXEC

Example

```
SEFOS# show ipv6 ospf retrans-list

NeighborId 20.0.0.3, Nbr Address
fe80::220:35ff:fe43:6020
Type         LsId        AdvRtr     SeqNo        Age
Checksum
0x2001     0.0.0.2   11.0.0.2    0x80000011     0
0xcddf

SEFOS# show ipv6 ospf request-list

Neighbor 20.0.0.3, Address fe80::220:35ff:fe43:6020
Type     LSID        ADVRTR       SeqNo            Age
Checksum
8193     0.0.0.1   11.0.0.3     0x80000002        6
0x1211
```

8.1.49 show ipv6 ospf virtual-links

Displays the parameters and the current state of OSPFv3 virtual links.

show ipv6 ospf virtual-links

Mode User or Privileged EXEC

Example

```
SEFOS# show ipv6 ospf virtual-links

Interface State: PointToPoint, Neighbor State: FULL
Transit Area: 2.2.2.2,  Virtual Neighbor: 11.0.0.7
Intervals Configured for the Virtual Interface:
Hello: 10, Dead: 60, Transit: 1, Retransmit : 20
```

Related Commands

- `area - virtual-link` – Sets the virtual link between Areas

8.1.50 show ipv6 ospf border-routers

Displays the internal OSPFv3 routing table entries to an ABR or ASBR.

```
show ipv6 ospf border-routers
```

Mode User or Privileged EXEC

Example

```
SEFOS# show ipv6 ospf border-routers

OSPFv3 Process Border Router Information

Destination   Type   NextHop                 Cost   Rt Area   Type Id
11.0.0.2       ABR   fe80::211:22ff:fe33:4412   10 intraArea 0.0.0.0
11.0.0.2       ABR   fe80::211:22ff:fe33:4422   10 intraArea 0.0.0.1
11.0.0.2      ASBR   fe80::211:22ff:fe33:4412   10 intraArea 0.0.0.0
11.0.0.2      ASBR   fe80::211:22ff:fe33:4422   10 intraArea 0.0.0.0
```

Related Commands

- `abr-type` – Sets the ABR type
- `ASBR Router` – Configures the router as an ASBR

8.1.51 show ipv6 ospf - area-range / summary-prefix

Displays either the list of all area address ranges information or all external summary address configuration information.

```
show ipv6 ospf {area-range | summary-prefix}
```

Syntax **area-range** – Area associated with the OSPFv3 address range.
summary-prefix – Aggregate addresses for OSPFv3.

Mode User or Privileged EXEC

Example

```
SEFOS# show ipv6 ospf area-range

OSPFv3  Summary Address Configuration Information
Network          Pfx     LSA        Area       Effect           Tag
                Length   Type
3ffe::100:0:0:0   80    Summary    0.0.0.0    advertise         0
3ffe::110:0:0:0   80    Summary    0.0.0.0    doNotAdvertise    0
3ffe::120:0:0:0   80    Summary    0.0.0.1    advertise         0
3ffe::130:0:0:0   80    Type7      0.0.0.1    advertise         0

SEFOS# show ipv6 ospf summary-prefix

OSPFv3 External Summary Address Configuration Information

Prefix           Pfx    Area-id     Effect     TranslationState
                Length
3ffe::200:0:0:0   80    0.0.0.0    advertise        enabled
3ffe::210:0:0:0   80    0.0.0.0    advertise        disabled
3ffe::220:0:0:0   80    0.0.0.0    doNotAdvertise   enabled
3ffe::230:0:0:0   80    0.0.0.0    allowAll         enabled
3ffe::240:0:0:0   80    0.0.0.0    denyAll          enabled
```

Related Commands

- `area - range` – Creates the internal aggregation address range
- `area - range - cost` – Summarizes routes at an area boundary
- `area - summary-prefix` – Enables route aggregation or filtering while importing routes in the OSPFv3 domain
- `no area` / `no area - range` – Deletes an area

8.1.52 `show ipv6 ospf` - General Information

Displays general information about OSPFv3 routing process.

```
show ipv6 ospf
```

Mode User or Privileged EXEC

Example

```
SEFOS# show ipv6 ospf

Router Id: 11.0.0.1                    ABR Type:   Standard ABR
 SPF schedule delay: 5 secs      Hold time between two SPFs: 10 secs
 Exit Overflow Interval: 0          Ref BW: 100000000      Ext Lsdb
Limit: -1
 Trace Value: 0x00000800       As Scope Lsa: 0       Checksum Sum: 0x0
 Demand Circuit: Enable            Passive Interface: Disable
 Nssa Asbr Default Route Translation: Disable
 Autonomous System Boundary Router
 Number of Areas in this router  2
                            Area      0.0.0.0
         Number of interfaces in this area is  1
         Number of Area Scope Lsa: 4       Checksum Sum: 0x1210e
         Number of Indication Lsa: 0         SPF algorithm
         executed:  6 times
                            Area      0.0.0.1
         Number of interfaces in this area is  1
         Number of Area Scope Lsa: 3       Checksum Sum: 0x18d41
         Number of Indication Lsa: 0         SPF algorithm
         executed:  2 times
```

Related Commands

- `router-id - IPv4-address` – Sets a fixed router identifier
- `timers spf` – Configures the delay time and the hold time between two consecutive SPF calculations
- `abr-type` – Sets the ABR type
- `ASBR Router` – Configures the router as an ASBR
- passive-interface – Sets the global default passive interface status
- `nssaAsbrDfRtTrans` – Enables setting of P bit in the default Type-7 LSA generated by an NSSA internal ASBR
- `as-external lsdb-limit` – Sets the maximum number of non-default AS-external-LSAs entries that can be stored in the link-state database

- `exit-overflow-interval` – Sets the number of seconds after which a router will attempt to leave the Overflow State
- `demand-extensions` – Enables routing support for demand routing
- `reference-bandwidth` / `auto-cost reference-bandwidth` – Sets the reference bandwidth in kilobits per second for calculating the default interface metrics
- `ipv6 ospf area` – Enables OSPFv3 for IPv6 on an interface
- `debug ipv6 ospf - pkt` – Sets the trace levels
- `debug ipv6 ospf` – Sets the IPv6 OSPF trace levels
- `debug ipv6 ospf - packet | events` – Sets the IPv6 OSPF event trace

8.1.53 `show ipv6 ospf` - LSA Database

Displays the LSA information.

```
show ipv6 ospf [area area-id] database [{router | network |
as-external | inter-prefix | inter-router | intra-prefix | link |
nssa}] [{detail | HEX}]
```

Syntax Description

area – A 32-bit integer.
database – Displays the number of each type of LSA for each area in the database.
router – Router LSAs.
network – Network LSAs.
as-external – AS-external LSAs.
inter-prefix – Inter-prefix LSAs.
inter-router – Inter-router LSAs.
intra-prefix – Intra-prefix LSAs.
link – Link State LSAs.
nssa – NSSA LSAs.
detail – Displays the LSAs information in detail.
HEX – Displays the LSAs information in hexadecimal format.

Mode User/Privileged EXEC

Example

```
SEFOS# show ipv6 ospf database

Area-id    RtrId      LsaType   Age   Seq#            Checksum
0.0.0.0   11.0.0.1   0x0008    300    0x80000002    0x323f
0.0.0.0   11.0.0.2   0x0008    300    0x80000001    0xa426
0.0.0.0   11.0.0.1   0x2001     1     0x80000003    0x3b9a
```

```
0.0.0.0   11.0.0.2   0x2001     0     0x80000006    0x2fa2
0.0.0.0   11.0.0.2   0x2002     0     0x80000001    0x6081
0.0.0.0   11.0.0.2   0x2009     0     0x80000002    0x504c
```

```
SEFOS# show ipv6 ospf database detail
```

```
Age: 0    Seconds              LS Type: Router Lsa
Link State Id: 0.0.0.0       Adv Rtr Id: 12.0.0.2
Sequence: 0x80000001         Checksum: 0x7c85     Length: 24
Router is an AS Boundary Router
Number of Links: 0            Options: 0x33

Age: 0    Seconds              LS Type: Intra Area Prefix Lsa
Link State Id: 0.0.0.0       Adv Rtr Id: 12.0.0.2
Sequence: 0x80000001         Checksum: 0x4966     Length: 52
#Prefixes: 1                  Referenced LS Type: Router Lsa
Ref Link State Id: 0.0.0.0    Ref Adv Router: 12.0.0.2
Prefix Length (Bytes): 16     Prefix Options: 0x00
Metric: 0xa
Prefix: 3ffe:481d::5
```

```
SEFOS# show ipv6 ospf database hex
```

```
00 00 00 08 00 00 00 02 0b 00 00 01 80 00 00 02 e9 d0 00 2c 01 00 00
33 fe 80 00
 00 00 00 00 00 02 11 22 ff fe 33 44 21 00 00 00 00
00 07 00 08 00 00 00 02 0b 00 00 02 80 00 00 02 f9 be 00 2c 01 00 00
33 fe 80 00
 00 00 00 00 00 02 11 22 ff fe 33 44 22 00 00 00 00

00 00 20 01 00 00 00 00 0b 00 00 01 80 00 00 01 fe e2 00 28 00 00 00
33 01 00 00
 02 00 00 00 02 00 00 00 02 0b 00 00 02
00 06 20 01 00 00 00 00 0b 00 00 02 80 00 00 03 e7 f4 00 28 03 00 00
33 01 00 00
02 00 00 00 02 00 00 00 02 0b 00 00 01
```

8.1.54 show ipv6 ospf route

Displays routes learned by the OSPFv3 process.

```
show ipv6 ospf route
```

Mode User or Privileged EXEC

Example

```
SEFOS# show ipv6 ospf route

OSPFV3 Process Routing Table
Dest/Prefix-Length    NextHop/IfIndex       Cost   Rt.Type       Area
3333::/96             fec0::4444:0:2/vlan4  10     type2Ext      0.0.0.0
fec0::3003:0:0/96      ::            /vlan5   1     intraArea     0.0.0.4
fec0::4444:0:0/96      ::            /vlan4   1     intraArea     0.0.0.3
```

Related Commands

- `ipv6 router ospf` – Enables the OSPFv3 routing protocol
- `router-id - IPv4-address` – Sets a fixed router ID

8.1.55 show ipv6 ospf areas

Displays the area table.

```
show ipv6 ospf areas
```

Mode Useror Privileged EXEC

Example

```
SEFOS# show ipv6 ospf areas

OSPFV3   AREA   CONFIGURATION   INFORMATION

AreaId: 0.0.0.0               Area Type: NORMAL AREA
Spf Calculation: 3 (times)   Area Bdr Rtr Count: 1
As Bdr Rtr Count: 0           Area Summary: Send Summary

Area-id: 0.0.0.1              Area Type: NSS AREA
Spf Calculation: 0 (times)   Area Bdr Rtr Count: 1
As Bdr Rtr Count: 0           Area Summary: Send Summary
Stub Metric: 0x1 Stub Metric Type: 1
Translator Role: Candidate Translator State: Disabled
Nssa Stability Interval: 40
```

Related Commands

- `area - stub | nssa` – Defines an area as a stub area or an NSSA
- `area - stability-interval` – Configures the stability interval (in seconds) for the NSSA
- `area - translation-role` – Configures the translation role for NSSA

- `no area` / `no area - range` – Deletes an area

8.1.56 show ipv6 ospf host

Displays the host table information.

```
show ipv6 ospf host
```

Mode User/Privileged EXEC

Example

```
SEFOS# show ipv6 ospf host

OSPFv3   HOST   CONFIGURATION Information
Address                 Area-id            StubMetric
3ffe::80:0:1            0.0.0.0            30
```

Related Commands

- `host - metric | area-id` – Configures a host entry with metric and *area-id*

8.1.57 show ipv6 ospf redist-config

Displays the configuration information to be applied to the routes learnt from the RTM.

```
show ipv6 ospf redist-config
```

Mode User/Privileged EXEC

Example

```
SEFOS# show ipv6 ospf redist-config

Address   Prefix   PfxLength    MetricType Metric   TagType   TagValue
3ffe::    64       asExt         Type2      10       manual    10
```

Related Commands

- `redist-config` – Configures the information to be applied to routes learnt from RTM

CHAPTER 9

PIM

PIM is a multicast routing architecture that allows the addition of IP multicast routing on existing IP networks. Multicast IP routing protocols are used to distribute data to multiple recipients. Using multicast, a source can send a single copy of data to a single multicast address, which is then distributed to an entire group of recipients. A multicast group identifies a set of recipients that are interested in a particular data stream, and is represented by an IP address from a well-defined range. Data sent to this IP address is forwarded to all members of the multicast group.

PIM is a unicast routing protocol independent and can be operated in two modes: dense and sparse (currently, only sparse mode is supported) It is designed to provide scalable inter-domain multicast routing across the Internet. PIM provides multicast routing and forwarding capability to the switch. It maintains the integrity of the hardware based multicast forwarding table with respect to the forwarding table existing in the software. It is independent of the underlying unicast routing protocol and uses the information from the unicast routing protocol.

9.1 PIM Commands

The list of CLI commands for the configuration of PIM is as follows:

- `set ip pim` / `ip multicast`
- `ip pim version`
- `set ip pim threshold`
- `set ip pim spt-switchperiod`
- `set ip pim rp-threshold`
- `set ip pim rp-switchperiod`
- `set ip pim regstop-ratelimit-period`

- set ip pim pmbr
- ip pim component
- set ip pim static-rp
- rp-candidate rp-address
- rp-candidate holdtime
- ip pim query-interval
- ip pim message-interval
- ip pim bsr-candidate - value
- ip pim bsr-candidate - vlan
- ip pim componentId
- ip pim dr-priority
- ip pim override-interval
- ip pim lan-delay
- set ip pim lan-prune-delay
- set ip pim graft-retry interval
- no ip pim interface
- debug ip pim
- show ip pim interface
- show ip pim neighbor
- show ip pim rp-candidate
- show ip pim rp-set
- show ip pim bsr
- show ip pim rp-static
- show ip pim component
- show ip pim thresholds
- show ip pim mroute

9.1.1 set ip pim

Enables or disables PIM globally.

```
set ip pim {enable | disable}
```

Syntax Description	**enable** – Enables PIM. **disable** – Disables PIM.
Mode	Global Configuration
Defaults	Disabled.
Example	`SEFOS(config)# set ip pim enable`
Notes	• PIM mode will be set as sparse, when PIM is enabled globally. • IGMP proxy service must be disabled in the system, before enabling the PIM globally.

Related Commands

- `no ip igmp proxy-service` - Disables IGMP Proxy service in the system
- `show ip pim interface` - Displays the routers PIM interfaces

9.1.2 ip multicast

Enables PIM globally. This command operates similar to the command `set ip pim`.

```
ip multicast
```

Mode	Global Configuration
Defaults	Disabled.
Example	`SEFOS(config)# ip multicast`
Notes	• PIM mode will be set as sparse, when PIM is enabled globally. • IGMP proxy service must be disabled in the system, before enabling the PIM globally.

Related Commands

- `no ip igmp proxy-service` - Disables IGMP Proxy service in the system
- `show ip pim interface` - Displays the routers PIM interfaces

9.1.3 ip pim version

Sets the PIM version.

```
ip pim version {1 | 2}
```

Syntax Description	**1 | 2** – PIM version is configured either as v1 or v2. Only PIM version 2 is currently supported.
Mode	Global Configuration
Example	`SEFOS(config)# ip pim version 2`

9.1.4 set ip pim threshold

Specifies the SPT group or source threshold when exceeded, switching to shortest path tree is initiated. To switch to SPT, the threshold must be configured.

```
set ip pim threshold {spt-grp | spt-src}
number-of-packets_0-2147483647
```

Syntax Description	**spt-grp** – The threshold of data rate for any group when exceeded, source specific counters are initiated for that particular group. It is based on number of bits per second. **spt-src** – The switching to Shortest Path Tree is initiated, when the threshold of data rate for any source is exceeded. It is based on number of bits per second. *number-of-packets_0-2147483647* – Number of packets.
Mode	Global Configuration
Defaults	0
Example	`SEFOS(config)# set ip pim threshold spt-grp 50`

Related Commands

- `show ip pim thresholds` - Displays threshold configured for SPT, RP thresholds, rate limit values for SM

9.1.5 set ip pim spt-switchperiod

Specifies the time period (in seconds) during which the data rate is to be monitored for switching to shortest path tree.

```
set ip pim spt-switchperiod seconds_0-2147483647
```

Mode	Global Configuration
Defaults	0
Example	`SEFOS(config)# set ip pim spt-switchperiod 60`
Notes	• The same period is used for monitoring the data rate for both source and group. To switch to SPT, this period must be configured. • The SPT (Shortest Path Tree) is used for multicast transmission of packets with the shortest path from sender to recipients

Related Commands

- `show ip pim thresholds` - Displays threshold configured for SPT, RP thresholds, rate limit values for both SM and DM

9.1.6 set ip pim rp-threshold

Specifies the threshold at which the Rendezvous Point (RP) initiates switching to source specific shortest path tree.

set ip pim rp-threshold *number-of-reg-packets_0-2147483647*

Mode	Global Configuration
Defaults	0
Example	`SEFOS(config)# set ip pim rp-threshold 50`
Notes	To switch to SPT, this threshold must be configured and this switching is based on the number of registered packets received.

Related Commands

- `show ip pim thresholds` - Displays threshold configured for SPT, RP thresholds, rate limit values for both SM and DM

9.1.7 set ip pim rp-switchperiod

Specifies the time period (in seconds) during which RP monitors register packets for switching to the source specific shortest path tree.

set ip pim rp-switchperiod *seconds_0-2147483647*

Mode	Global Configuration
Defaults	0
Example	`SEFOS(config)# set ip pim rp- switchperiod 100`
Notes	• To switch to SPT, this time period must be configured. • RP-tree is a pattern that multicast packets are sent to a PIM-SM router by unicast and then forwarded to actual recipients from RP.

Related Commands

- `show ip pim thresholds` - Displays threshold configured for SPT, RP thresholds, rate limit values for SM

9.1.8 set ip pim regstop-ratelimit-period

Specifies the time period during which RP monitors the number of register packets after sending the register stop message.

```
set ip pim regstop-ratelimit-period seconds_0-2147483647
```

Mode	Global Configuration
Defaults	5
Example	`SEFOS(config)# set ip pim regstop-ratelimit-period 100`
Notes	Register stop message is used to avoid encapsulation of multicast data packets from the first hop router to the RP.

Related Commands

- `show ip pim thresholds` - Displays threshold configured for SPT, RP thresholds, rate limit values for SM

9.1.9 set ip pim pmbr

Enables or disables the PMBR (PIM Multicast Border Router) status.

```
set ip pim pmbr {enable | disable}
```

Syntax Description	**enable** – Enables the PMBR status. **disable** – Disables the PMBR status.
Mode	Global Configuration
Defaults	Disabled.
Example	`SEFOS(config)# set ip pim pmbr enable`
Notes	• A PMBR integrates two different PIM domains (either PIM -SM or PIM -DM). • A PMBR connects a PIM domain to other multicast routing domain(s).

Related Commands

- `show ip pim thresholds` - Displays threshold configured for SPT, RP thresholds, rate limit values for SM

9.1.10 ip pim component

Configures the PIM component in the router. The `no` form of the command destroys the PIM component.

```
ip pim component component-id_1-255
```

```
no ip pim component component-id_1-255
```

Mode	Global Configuration
Defaults	0
Example	`SEFOS(config)# ip pim component 1`
Notes	• The PIM Component 1 cannot be deleted as it is the default component. • The PIM Component corresponds to each instance of a PIM domain and classifies it as sparse or dense mode. Currently, only sparse mode is supported.

Related Commands

- `show ip pim component` - Displays the component information.

9.1.11 set ip pim static-rp

Enables or disables the Static RP configuration Status. This command specifies whether to use the configured static- RP.

```
set ip pim static-rp {enable | disable}
```

Syntax Description
enable – Enables the static RP configuration status.
disable – Disables the static RP configuration status.

Mode Global Configuration

Defaults Disabled

Example
```
SEFOS(config)# set ip pim static-rp enable
```

Related Commands

- `show ip pim rp-set` - Displays the RP-set information
- `show ip pim rp-static` - Displays the RP-static information

9.1.12 rp-candidate rp-address

Sets the address of the interface, which is advertised as a candidate-RP. The `no` form of the command disables the address of the interface, which will be advertised as a candidate-RP.

```
rp-candidate rp-address group-address group-mask ip-address
```

```
no rp-candidate rp-address group-address group-mask ip-address
```

Syntax Description
group-address – The IP multicast group address for which this entry contains multicast routing information.
group-mask – The IP multicast group address mask that gives the group prefix for which this entry contains information about the RP.
ip-address – IP address.

Mode Global Configuration

Example
```
SEFOS(pim-comp)# rp-candidate rp-address 224.1.0.0
255.255.0.0 20.0.0.2
```

Notes A candidate-RP is a router configured to send periodic candidate-RP-advertisement messages to the BSR and to process join or prune or register messages for the advertised group prefix, when it is elected as a RP.

Related Commands

- `show ip pim rp-set` - Displays the RP-set information
- `show ip pim rp-candidate` - Displays the RP-candidate information

9.1.13 rp-candidate holdtime

Sets the hold time of the component when it is a candidate RP in the local domain. The `no` form of the command sets the default hold time (0) of the component.

```
rp-candidate holdtime 0-255
```

```
no rp-candidate holdtime
```

Mode	PIM Component
Defaults	0
Example	`SEFOS(pim-comp)# rp-candidate holdtime 25`
Notes	• If its value is set to 0, it indicates that the local system is not a candidate RP. • Hold time is the amount of time the candidate RP advertisement is valid. This field allows advertisements to be aged out.

Related Commands

- `show ip pim rp-candidate` - Displays the RP candidate information

9.1.14 rp-static rp-address

Sets the address of the interface, which is advertised as a static-RP. The `no` form of the command disables the address of the interface, which is advertised as a static-RP.

```
rp-static rp-address group-address group-mask ip-address
```

```
no rp-static rp-address group-address group-mask
```

Syntax Description	*group-address* – Indicates the PIM Sparse multicast group address using the listed RP. *group-mask* – The IP multicast group address mask that gives the group prefix for which this entry contains information about the RP. *ip-address* – IP address.
Mode	Global Configuration
Example	`SEFOS(pim-comp)# rp-candidate rp-address 224.1.0.0 255.255.0.0 20.0.0.2`
Notes	A candidate-RP is a router configured to send periodic candidate-RP-advertisement messages to the BSR and to process join or prune or register messages for the advertised group prefix, when it is elected as a RP.

Related Commands

- `show ip pim rp-static` - Displays the RP-static information

9.1.15 ip pim query-interval

Sets the frequency at which PIM hello messages are transmitted on this interface. The `no` form of the command sets the default hello timer interval for this interface. This command is applicable only in VLAN Interface mode.

```
ip pim query-interval seconds_0-65535
```

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

Mode	Interface Configuration
Defaults	30
Example	`SEFOS (config-if)# ip pim query-interval 60`
Notes	The query message informs the presence of a PIM router on the interface to the neighboring PIM routers.

Related Commands

- `show ip pim interface` - Displays the router's PIM interfaces

9.1.16 ip pim message-interval

Sets the frequency at which PIM join or prune messages are transmitted on this PIM interface. The no form of the command sets the default value for PIM join/prune message. This command is applicable only in VLAN Interface mode.

```
ip pim message-interval interval_0-65535
```

```
no ip pim message-interval
```

Mode	Interface Configuration
Defaults	60
Example	`SEFOS(config-if)# ip pim message-interval 120`
Notes	The same join or prune message interval must be used on all the PIM routers in the PIM domain. If all the routers do not use the same timer interval, the performance of PIM Sparse can be adversely affected.

Related Commands

- `show ip pim interface` - Displays the routers PIM interfaces

9.1.17 ip pim bsr-candidate - *value*

Sets the preference value for the local interface as a candidate bootstrap router. The no form of the command sets the default preference value for the local interface as a candidate bootstrap router. This command is applicable only in VLAN Interface mode.

```
ip pim bsr-candidate 0-255
```

```
no ip pim bsr-candidate
```

Mode	Interface Configuration Applicable only in the VLAN Interface.
Defaults	0
Example	`SEFOS(config-if)# ip pim bsr-candidate 1`
Notes	A BSR is a dynamically elected router within a PIM domain.

Related Commands

- `show ip pim bsr` - Displays the BSR information

9.1.18 ip pim bsr-candidate - vlan

Sets the local interface as a candidate BSR. This command operates similar to the command `ip pim bsr-candidate - value`. This command is applicable only in VLAN Interface mode.

ip pim bsr-candidate *vlan-id_1-4094* **[priority** *value***]**

Syntax Description	*vlan-id_1-4094* – VLAN interface number from which BSR address is derived to make BSR as a candidate. This value ranges between 1 and 4094. **priority** – Priority of the candidate BSR. This value ranges between 0 and 255.
Mode	Global Configuration
Defaults	**priority** – 0
Example	`SEFOS(config)#` **ip pim bsr-candidate 1 priority 100**
Notes	The router with highest priority is considered as the BSR. If the priority values are same, then the router with largest IP address is considered as the BSR.

Related Commands

- `show ip pim bsr` - Displays the BSR information

9.1.19 ip pim componentId

Adds the interface to the component.

ip pim componentId *1-255*

Mode	Global Configuration
Defaults	1
Example	`SEFOS(config-if)#` **ip pim componentId 1**
Notes	This command adds the current VLAN into the specified PIM component.

Related Commands

- `ip pim component` - Configures the PIM component in the router
- `show ip pim component` - Displays the component information

9.1.20 ip pim dr-priority

Sets the designated router priority value configured for the router interface. The `no` form of the command sets the default designated router priority value (0) for the router interface. This command is applicable only in VLAN Interface mode.

ip pim dr-priority *1-65535*

no ip pim dr-priority

Mode	Interface Configuration
Defaults	1
Example	`SEFOS(config-if)#` **ip pim dr-priority 100**
Notes	The DR sets up multicast route entries and sends corresponding join or prune and register messages on behalf of directly-connected receivers and sources, respectively.

Related Commands

- `show ip pim interface` - Displays the routers PIM interfaces

9.1.21 ip pim override-interval

Sets the override interval configured for router interface and the `no` form of the command sets the default override interval (0) for router interface. This command is applicable only in VLAN Interface mode.

ip pim override-interval *0-65535*

no ip pim override-interval

Mode	Interface Configuration

Defaults	0
Example	`SEFOS(config-if)# ip pim override-interval 100`
Notes	Override interval is the random amount of time delayed for sending override messages to avoid synchronization of override messages when multiple downstream routers share a multi-access link.

Related Commands

- `show ip pim interface` - Displays the routers PIM interfaces

9.1.22 ip pim lan-delay

Sets the `LanDelay` configured for the router interface. The `no` form of the command sets the default `LanDelay` (0) for the router per interface. This command is applicable only in VLAN Interface mode.

```
ip pim lan-delay 0-65535
```

```
no ip pim lan-delay
```

Mode	Interface Configuration
Defaults	0
Example	`SEFOS(config-if)# ip pim lan-delay 120`
Notes	The LAN delay inserted by a router in the LAN prune delay option expresses the expected message propagation delay on the interface. It is used by upstream routers to find out the delayed time interval for a Join override message before pruning an interface.

Related Commands

- `show ip pim interface` - Displays the routers PIM interfaces

9.1.23 set ip pim lan-prune-delay

Sets the `LanPruneDelay` bit configured for the router interface to advertise the LAN delay. This command is applicable only in VLAN Interface mode.

```
set ip pim lan-prune-delay {enable | disable}
```

Syntax Description	**enable** – Enables LAN-prune-delay. **disable** – Disables LAN-prune-delay.
Mode	Interface Configuration
Defaults	Disabled.
Example	`SEFOS(config-if)# set ip pim lan-prune-delay enable`
Notes	The command specifies whether to use LAN prune delay or not.

Related Commands

- `show ip pim interface` - Displays the routers PIM interfaces

9.1.24 set ip pim graft-retry interval

Sets the time before which graft is retransmitted upon no receipt of graft ACK. The no form of the command sets the graft retry interval to the default value. This command is applicable only in VLAN Interface mode.

```
set ip pim graft-retry interval 1-10
```

```
no ip pim graft-retry interval
```

Mode	Interface Configuration
Defaults	3 seconds.
Example	`SEFOS(config-if)# set ip pim graft-retry interval 4`

Related Commands

- `show ip pim interface` - Displays the routers PIM interfaces

9.1.25 no ip pim interface

Deletes an interface at PIM level. This command is applicable only in VLAN Interface mode.

```
no ip pim interface
```

Mode	Interface Configuration
Example	`SEFOS(config-if)# no ip pim interface`
Notes	This command is used to destroy the interface at PIM.

Related Commands

- `show ip pim interface` - Displays the routers PIM interfaces

9.1.26 debug ip pim

Enables PIM trace and the `no` form of the command disables PIM trace.

```
debug ip pim {[nbr] [grp] [jp] [ast] [bsr] [io] [pmbr] [mrt] [mdh]
[mgmt] [srm] | [all]}
```

```
no debug ip pim {[nbr] [grp] [jp] [ast] [bsr] [io] [pmbr] [mrt]
[mdh] [mgmt] [srm] | [all]}
```

Syntax Description	**nbr** – Neighbor discovery traces. **grp** – Group membership traces. **jp** – Join or prune traces. **ast** – Assert state traces. **bsr** – Bootstrap/RP traces. **io** – Input/output traces. **pmbr** – Interoperability traces. **mrt** – Multicast route table update traces. **mdh** – Multicast data handling traces. **mgmt** – Configuration traces. **srm** – State refresh messages. **all** – All traces.
Mode	Privileged EXEC
Example	`SEFOS# debug ip pim all`
Notes	A four-byte integer value is specified for enabling the level of debugging. Each bit in the four-byte integer variable represents a level of debugging. The combinations of levels are also allowed. You must enter the corresponding integer value for the bit set.

Related Commands

- `show ip pim interface` - Displays the routers PIM interfaces

9.1.27 show ip pim interface

Displays the router's PIM interfaces.

show ip pim interface [{Vlan *vlan-id* | *interface-type interface-id* | **detail}]**

Syntax Description

vlan – VLAN identifier.
detail – Detailed information of the interface.
interface-type – Interface type.
interface-id – Interface identifier.

Mode

Privileged EXEC

Example

```
SEFOS# show ip pim interface
Address IfName/IfId Ver/Mode Nbr   Qry     DR-Address DR-Prio
                                  Count Interval
10.0.0.1   vlan1/160 2/Sparse    0    45     10.0.0.1      5
20.0.0.1   vlan2/33  2/Sparse    0    30     20.0.0.1      1
30.0.0.1   vlan3/34  2/Sparse    0    60     30.0.0.1      1

SEFOS# show ip pim interface vlan 1

Address IfName/IfId Ver/Mode Nbr Qry      DR-Address DR-Prio
                                  Count Interval
10.0.0.1   vlan1/160  2/Sparse  0  45       10.0.0.1       5

SEFOS# show ip pim interface detail

vlan1 33 is up
  Internet Address is 12.0.0.1
  Muticast Switching : Enabled
  PIM : Enabled
  PIMv6 : Disabled
    PIM version : 2, mode: Sparce
    PIM DR : 12.0.0.1
    PIM DR Priority : 1
    PIM Neighbour Count : 0
    PIM Hello/Query Interval : 90
    PIM Message Interval : 60
    PIM Override Interval : 0
    PIM Lan Delay : 0
    PIM Lan-Prune-Delay : Disabled
    PIM Graft Retry Interval : 3
```

```
PIM State Refresh : Uncapable
PIM Component Id : 1
PIM domain border : disabled
PIM State Refresh Processing : enabled
PIM Refresh Origination : Disabled
```

Notes It shows the list of interface addresses, the mode of the interface, designated router on that interface, hello interval, join/prune Interval of the interface.

Related Commands

- `set ip pim` - Enables or disables PIM
- `ip multicast` - Enables PIM globally
- `ip pim query-interval` - Sets the frequency at which PIM hello messages are transmitted on this interface
- `ip pim message-interval` - Sets the frequency at which PIM Join/Prune messages are transmitted on this PIM interface
- `ip pim bsr-candidate - value` - Sets the preference value for the local interface as a candidate bootstrap router
- `ip pim dr-priority` - Sets the designated router priority value configured for the router interface
- `ip pim override-interval` - Sets the override interval configured for router interface
- `ip pim lan-delay` - Sets the LanDelay configured for the router interface
- `set ip pim lan-prune-delay` - Sets the LanPruneDelay bit configured for the router interface to advertise the LAN delay
- `no ip pim interface` - Deletes an interface at PIM level
- `debug ip pim` - Enables PIM trace

9.1.28 show ip pim neighbor

Displays the router's PIM neighbors' information.

```
show ip pim neighbor [{Vlan vlan-id | interface-type
interface-id}]
```

Syntax **`Vlan`** – VLAN identifier.
`interface-type` – Interface type.
`interface-id` – Interface identifier.

Mode Privileged EXEC

Example

```
SEFOS# show ip pim neighbor vlan 1

Neighbour IfName/Idx Uptime/Expiry Ver DRPri CompId Override LanDelay
Address                                      /Mode           Interval
-------- --------   -------------   --- ----- ------ -------  --------
12.0.0.2 vlan1/33   00:00:45/275    v2  1       1    0          0
```

Notes

It shows the neighbor address, the interface used to reach the PIM neighbor, the up time (the time since this neighbor became the neighbor of the local router), expiry time (the minimum time remaining before this PIM neighbor will be aged out), LAN delay and override interval.

Related Commands

- `ip pim query-interval` - Sets the frequency at which PIM hello messages are transmitted on this interface
- `ip pim message-interval` - Sets the frequency at which PIM join or prune messages are transmitted on this PIM interface
- `ip pim bsr-candidate - value` - Sets the preference value for the local interface as a candidate bootstrap router

9.1.29 show ip pim rp-candidate

Displays the candidate RP information.

show ip pim rp-candidate [ComponentId *1-255*]

Syntax Description

ComponentId – Component ID.

Mode

Privileged EXEC

Example

```
SEFOS# show ip pim rp-candidate 2
CompId   GroupAddress Group Mask   RPAddress/Priority
    2      224.1.0.0     255.255.0.0      20.0.0.1/192
```

Notes

It shows the group addresses, the group mask and the RP address that indicates the IP address of the rendezvous point (RP) for the listed PIM sparse group.

Related Commands

- `rp-candidate rp-address` - Enables the address of the interface, which is advertised as a candidate-RP
- `rp-candidate holdtime` - Sets the holdtime of the component when it is a candidate RP in the local domain

- `rp-static rp-address` - Sets the address of the interface, which is advertised as a static-RP

9.1.30 show ip pim rp-set

Displays the RP-set information.

```
show ip pim rp-set [rp-address]
```

Syntax Description — **rp-address** – Indicates the IP address of the rendezvous point for the listed PIM sparse group.

Mode — Privileged EXEC

Example

```
SEFOS# show ip pim rp-set
PIM Group-to-RP mappings
---------------------------
Group Address: 224.1.0.0  Group Mask: 255.255.0.0
   RP: 20.0.0.1
   Component-Id: 2
      Hold Time: 120, Expiry Time: 00:01:43
```

Notes — It shows details of the Group Prefix, RP address, hold time and expiry time.

Related Commands

- `rp-candidate rp-address` - Enables the address of the interface, which is advertised as a candidate-RP
- `set ip pim static-rp` - Enables or disables the static RP configuration status

9.1.31 show ip pim bsr

Displays the BSR information.

```
show ip pim bsr [Component-Id 1-255]
```

Mode Privileged EXEC

Example

```
SEFOS# show ip pim bsr 1
PIMv2 Bootstrap Configuration For Component 1
---------------------------------------------
This system is the Bootstrap Router (BSR)
  BSR Address: 10.0.0.1
  BSR Priority: 6, Hash Mask Length: 30
```

Related Commands

- `ip pim bsr-candidate - value` - Sets the preference value for the local interface as a candidate bootstrap router
- `ip pim bsr-candidate - vlan` - Sets the local interface as a candidate bootstrap router

9.1.32 show ip pim rp-static

Displays the static RP information.

show ip pim rp-static [ComponentId *1-255*]

Mode Privileged EXEC

Example

```
SEFOS# show ip pim rp-static 2
Static-RP Enabled
 CompId   GroupAddress   Group Mask         RPAddress
   2       225.1.0.0      255.255.0.0         20.0.0.1
```

Related Commands

- `set ip pim static-rp` - Enables or disables the static RP configuration status

9.1.33 show ip pim component

Displays the component information.

show ip pim component [ComponentId *1-255*]

Mode Privileged EXEC

Example

```
SEFOS# show ip pim component 1
PIM Component Information
-------------------------
Component-Id: 1
   PIM Mode: sparse,    PIM Version: 2
   Elected BSR: 10.0.0.1
   Candidate RP Holdtime: 0
```

Related Commands

- `ip pim component` - Configures the PIM component in the router
- `ip pim componentId` - Adds the interface to the component

9.1.34 show ip pim thresholds

Displays threshold configured for SPT, RP thresholds, and rate limit values for SM (sparse mode).

```
show ip pim thresholds
```

Mode Privileged EXEC

Example

```
SEFOS# show ip pim thresholds
PIM SPT Threshold Information
   Group Threshold: 0
   Source Threshold: 0
   Switching Period: 0
PIM SPT-RP Threshold Information
   Register Threshold: 0
   RP Switching Period: 0
   Register Stop rate limit: 5
```

Related Commands

- `set ip pim threshold` - Specifies the SPT group or source threshold when exceeded, switching to shortest path tree is initiated
- `set ip pim spt-switchperiod` - Specifies the period (in seconds) over which the data rate is to be monitored for switching to shortest path tree
- `set ip pim rp-threshold` - Specifies the threshold at which the RP initiates switching to source specific shortest path tree

- `set ip pim rp-switchperiod` - Specifies the period (in seconds) over which RP monitors register packets for switching to the source specific shortest path tree
- `set ip pim regstop-ratelimit-period` - Specifies the period over which RP monitors number of register packets after sending the register stop message
- `set ip pim pmbr` - Enables or disables the PMBR status
- `ip pim dr-priority` - Sets the designated router priority value configured for the router interface

9.1.35 show ip pim mroute

Displays the PIM multicast information.

```
show ip pim mroute [{comp-id_1-255 | group-address |
source-address} summary]
```

Syntax Description

comp-id_1-255 – Component identifier.

group-address – Indicates the PIM multicast group address using the listed RP.

source-address – The network address that identifies the sources for which this entry contains multicast routing information.

summary – Summary of PIM mroute information.

Mode

Privileged EXEC

Example

```
SEFOS# show ip pim mroute
IP Multicast Routing Table
--------------------------
Route Flags S: SPT Bit W: Wild Card Bit R: RPT Bit
IIF State P: Pruned F: Forwarding A: Graft Ack Pending
Timers: Uptime/Expires
Interface State: Interface, State/Mode

PIM Multicast Routing Table For Component 1
(12.0.0.10,227.1.1.1) ,00:00:03/05:43:11
  Incoming Interface : vlan1 ,RPF nbr : NULL ,Route
Flags : ---
 IIF State : P ,SRM Generation  : Enabled
 Source Active Timer Value 210
 Source Active Remaining Time : 05:43:11
 State Refresh Remaining Time : 00:00:00
 Prune Limit Remaing Time : 00:00:00
Outgoing Interface List : NULL
```

```
SEFOS# show ip pim mroute 1 summary
IP Multicast Routing Table
---------------------------
Route Flags S: SPT Bit W: Wild Card Bit R: RPT Bit
Timers : Uptime/Expires
Interface State : Interface, State/Mode

PIM Multicast Routing Table For Component 1
(*, 224,1,0.0) , 00:04:35/--- , RP : 12.0.0.1
Incoming Interface : vlan1, RPF nbr : NULL, Route Flags
: WR
Outgoing InterfaceList:
 vlan2, Forwarding/Sparse, 00:04:35/---

(12.0.0.30,224.1.0.0) , 00:00:04/00:03:26
Incoming Interface : vlan1, RPF nbr : NULL, Route Flages
: S
Outgoing InterfaceList :
vlan2, Forwarding/Sparse , 00:00:04/---
```

Notes It shows details of the (S ,G) ,(*,G) and (*,*,RP) entries.

Related Commands

- `ip pim bsr-candidate - value` - Sets the preference value for the local interface as a candidate bootstrap router

CHAPTER 10

RIPng

RIPng functions the same and offers the same benefits as RIP in IPv4. RIP enhancements for IPv6, detailed in RFC 2080, include support for IPv6 addresses and prefixes, and the use of all-RIP-routers multicast group address as the destination address for RIP update messages. This module describes how to configure Routing Information Protocol for IPv6. RIPng process maintains a local routing table, referred to as a RIB. The RIPng RIB contains a set of RIPng routes learned from all its neighboring networking devices.

10.1 RIPng Commands

The list of CLI commands for the configuration of RIPng is as follows:

- `ipv6 router rip`
- `ipv6 router rip - name`
- `ipv6 split-horizon`
- `ipv6 rip enable`
- `ipv6 rip name enable`
- `ipv6 rip default-information - originate | only`
- `ipv6 rip metric-offset`
- `redistribute`
- `distribute prefix`
- `debug ipv6 rip`
- `show ipv6 rip`
- `show ipv6 rip stats`
- `show ipv6 rip filter`

10.1.1 ipv6 router rip

Enables RIPng and enters into the router configuration mode and the no form of the command disables RIPng on all the interfaces.

```
ipv6 router rip
```

```
no ipv6 router rip
```

Mode	Global Configuration
Example	SEFOS(config)# **ipv6 router rip**
Notes	Before configuring the router to run RIPng, the ipv6 unicast-routing must be enabled globally, and IPv6 must be enabled on the interface in which RIPng is to be processed.

Related Commands

- ipv6 rip enable - Enables IPv6 RIP processing on an interface that has not been configured with an explicit IPv6 address

10.1.2 ipv6 router rip - name

Enables RIPng and enters into the router configuration mode. The no form of the command disables RIPng on all the interfaces. This command operates similar to that of the command ipv6 router rip.

```
ipv6 router rip name
```

```
no ipv6 router rip name
```

Syntax Description	*name* – Specific RIPng routing process. This feature is ignored during the command execution.
Mode	Global Configuration
Example	SEFOS(config)# **ipv6 router rip router1**
Notes	Before configuring the router to run RIPng, the ipv6 unicast-routing must be enabled globally, and IPv6 must be enabled on the interface in which RIPng is to be processed.

10.1.3 ipv6 split-horizon

Enables the `split-horizon` updates and the `no` form of the command disables the `split-horizon` updates.

```
ipv6 split-horizon
```

```
no ipv6 split-horizon
```

Mode	Interface Configuration
Example	`SEFOS(config-if)#` **`ipv6 split-horizon`**
Notes	The value `split-horizon` denotes that split-horizon algorithm must be applied in the response packets that are going out.

Related Commands

- `show ipv6 rip` - Displays IPv6 local RIB and routing protocol information

10.1.4 ipv6 rip enable

Enables RIP routing and the `no` form of the command disables the RIP routing.

```
ipv6 rip
```

```
no ipv6 rip
```

Mode	Interface Configuration Applicable only in the VLAN interface mode.
Example	`SEFOS(config-if)#` **`ipv6 rip enable`**

Related Commands

- `show ipv6 rip` - Displays IPv6 Local RIB and routing protocol information

10.1.5 ipv6 rip name enable

Enables the specified RIPng routing process on an interface. The no form of the command disables the specified routing process on an interface. This command operates similar to that of the command ipv6 rip enable.

```
ipv6 rip name enable
```

```
no ipv6 rip name enable
```

Syntax Description — *name* – Specific RIPng routing process. This feature is ignored during the command execution.

Mode — Interface Configuration
Applicable in the VLAN Interface mode only.

Example

```
SEFOS(config-if)# ipv6 rip name enable
SEFOS(config-if)# no ipv6 rip name enable
```

Related Commands

- show ipv6 rip - Displays IPv6 local RIB and routing protocol information

10.1.6 ipv6 rip default-information - originate | only

Originates the IPv6 default route into the specified RIP routing process updates, sent from the specified interface. This command operates similar to that of the command ipv6 rip default-information originate.

Note – The routing process ignores all default routes received on any interface, after originating the IPv6 default route out of any interface to avoid routing loops.

```
ipv6 rip process-name default-information {originate | only }
[metric value]
```

Syntax Description	*process-name* – Specific RIPng routing process. This feature is ignored during the command execution. **originate** – Default route is originated in addition to all other routes in the updates sent from the interface. **only** – Default route is originated while suppressing all other routes in the updates sent from the interface. **metric** – Metric to be used for redistributed routes.
Mode	Interface Configuration Applicable only in the VLAN interface mode.
Example	`SEFOS(config-if)# ipv6 rip process1 default-information originate`

Related Commands

- `show ipv6 rip` - Displays IPv6 local RIB and routing protocol information

10.1.7 ipv6 rip metric-offset

Adjusts default metric increment.

```
ipv6 rip metric-offset 1-15
```

Mode	Interface Configuration
Example	`SEFOS(config-if)# ipv6 rip metric-offset 6`
Notes	• The `ipv6 rip metric-offset` command is used in conjunction with the `redistribute router configuration` command to cause the current routing protocol to use the same metric value for all redistributed routes. • The maximum metric that RIP can advertise is 16, and a metric of 16 denotes a route that is unreachable.

Related Commands

- `show ipv6 rip` - Displays IPv6 local RIB and routing protocol information

10.1.8 redistribute

Enables redistribution of IPv6 prefix from another protocol into RIPng. The no form of the command disables redistribution of IPv6 prefix from another protocol into RIPng.

```
redistribute {static | connected | ospf} metric 0-16
```

```
no redistribute {static | connected | ospf}
```

Syntax Description

static – Statically configured routes to advertise in the RIPng process.
connected – Connected routes to advertise in the RIPng process.
ospf – OSPF routes to advertise in the RIPng process.
metric – Routing metric associated with the route.

Mode Router Configuration

Example

```
SEFOS(config-router)# redistribute static metric 6
```

Related Commands

- show ipv6 rip - Displays IPv6 local RIB and routing protocol information

10.1.9 distribute prefix

Enables filter network in routing updates sent or received and the no form of the command disables Filter network in routing updates sent or received.

```
distribute prefix ipv6_addr {in | out}
```

```
no distribute prefix ipv6_addr {in | out}
```

Syntax Description

ipv6-addr – IPv6 Address
in – Filter network in routing updates received
out – Filter network in routing updates sent out

Mode Router Configuration

Example
```
SEFOS(config-router)# distribute prefix
fe80::208:2ff:fe02:408 in
```

Notes
- Filtering is controlled by distribute lists. Input distribute lists control route reception and input filtering is applied to advertisements received from neighbors. Only those routes that pass input filtering are inserted in the RIP local routing table and become candidates for insertion into the IPv6 routing table.
- Output distribute lists control route advertisement. Output filtering is applied to route advertisements sent to neighbors. Only those routes passing output filtering will be advertised.

Related Commands

- `show ipv6 rip` - Displays IPv6 local RIB and routing protocol information
- `show ipv6 rip filter` - Displays peer and Advfilter table

10.1.10 debug ipv6 rip

Enables RIPng routing protocol debugging and the `no` form of the command disables RIPng routing protocol debugging.

```
debug ipv6 rip {all | data | control}
```

```
no debug ipv6 rip
```

Syntax Description
all – All resources.
data – Data path messages.
control – Control Plane messages.

Mode Privileged EXEC

Defaults Disabled.

Example
```
SEFOS# debug ipv6 rip all
```

Related Commands

- `show ipv6 rip` - Displays IPv6 local RIB and routing protocol information

10.1.11 show ipv6 rip

Displays IPv6 local RIB and routing protocol information.

```
show ipv6 rip [database]
```

Syntax Description **database** – IPv6 RIP protocol database

Mode Privileged EXEC

Example

```
SEFOS# show ipv6 rip database
RIP local RIB
4444::/64,  metric 10, local
       vlan1/::, expires in 180 secs
5555::/64,  metric 10, local
       vlan2/::, expires in 180 secs
6666::/64,  metric 7, static
       tunnel0/::, expires in 180 secs
```

Related Commands

- `ipv6 router rip` - Enables the router configuration mode
- `ipv6 split-horizon` - Enables the split-horizon updates
- `ipv6 rip enable` / `ipv6 rip name enable` - Enables RIP routing
- `ipv6 rip default-information - originate | only` - Originates the IPv6 default route into the specified RIP routing process updates sent from the specified interface.
- `ipv6 rip metric-offset` - Adjusts default metric increment
- `redistribute` - Redistributes IPv6 prefix from another protocol into RIPng
- `distribute prefix` - Enables filter network in routing updates sent or received
- `debug ipv6 rip` - Enables IPv6 RIP routing protocol debugging

10.1.12 show ipv6 rip stats

Displays all the interface statistics.

```
show ipv6 rip stats
```

Mode Privileged EXEC

Example

```
SEFOS# show ipv6 rip stats
          Interface Index      vlan1
          *****************     ***
Rcvd   :
Messages          0     Requests       0    Responses
0
UnknownCommds     0     OtherVer       0    Discards
0
Sent   :
Messages          1     Requests       1    Responses
0
Trigger Updates   0
```

10.1.13 show ipv6 rip filter

Displays peer and `advfilter` table.

```
show ipv6 rip filter
```

Mode Privileged EXEC

Example

```
SEFOS# show ipv6 rip filter

Filter Address                          FilterType
**************                          **********
fe80::200:ff:febb:e01                          IN
fe80::200:ff:fecc:102                          IN
3333::1111                                    OUT
```

Related Commands

- `distribute prefix` - Enables Filter network in routing updates sent or received

CHAPTER 11

RRD6

RRD6 allows different routing protocols to exchange IPv6 routing information.

11.1 RRD6 Commands

The list of CLI commands for the configuration of RRD6 is as follows:

- export ospfv3
- redistribute-policy
- default redistribute-policy
- throt
- show redistribute-policy ipv6
- show redistribute information ipv6

11.1.1 export ospfv3

Enables redistribution of OSPF area or external routes to the protocol. The no form of the command disables redistribution of OSPF area or external routes to the protocol.

```
export ospfv3 {area-route | external-route} {rip}
```

```
no export ospfv3 {area-route | external-route} {rip}
```

Syntax Description	**area-route** – OSPFv3 inter-area and intra-area address/mask pairs to be exported into the routing protocol. **external-route** – OSPFv3 Type 1 and Type 2 External address/mask pairs to be exported into the routing protocol. **rip** – Routing information protocol.
Mode	Global Configuration
Example	`SEFOS(config)# export ospfv3 area-route rip`

Related Commands

- `show redistribute information ipv6` - Displays the RTM6 RRD status for registered protocols

11.1.2 redistribute-policy

Adds the IPv6 permit or deny redistribution policy. The `no` form of the command removes the IPv6 permit or deny redistribution policy.

```
redistribute-policy {ipv6} {permit|deny} DestIp DestRange {static
| local | rip | ospf} {rip | ospf | all}
```

```
no redistribute-policy {ipv6} DestIp DestRange
```

Syntax Description	**ipv6** – IPv6 protocol. **permit** – Sets the default rule for all prefixes to `permit`. **deny** – Sets the default rule for all prefixes to `deny`. **DestIp** – Destination IP address. **DestRange** – Destination range. **static** – Static routes. **local** – Local routes. **rip** – Routing Information protocol. **ospf** – Open Shortest Path First protocol. **all** – All.
Mode	Global Configuration

Defaults	**permit all**
Example	SEFOS(config)# **redistribute-policy ipv6 permit 4444::1111 64.static ospf**
Notes	• The addresses learnt within the specified range through the specified routing protocol will be redistributed to other routing protocols. • No routes will be exchanged between RTM and the re-distributing protocols.

Related Commands

- show redistribute information ipv6 - Displays route redistribution filters

11.1.3 default redistribute-policy

Sets the default behavior of the RRD6 control table.

```
default redistribute-policy {ipv6} {permit | deny}
```

Syntax Description	**ipv6** – IPv6 protocol. **permit** – Sets the default rule for all prefixes to permit. **deny** – Sets the default rule for all prefixes to deny.
Mode	Global Configuration
Example	SEFOS(config)# **default redistribute-policy ipv6 permit**

Related Commands

- show redistribute information ipv6 - Displays route redistribution filters

11.1.4 throt

Configures the maximum number of routes processed for every iteration.

```
throt value
```

Mode	Global Configuration
Defaults	1000
Example	SEFOS(config)# **throt 100**

11.1.5 show redistribute-policy ipv6

Displays the route redistribution filters

```
show redistribute-policy ipv6
```

Mode Privileged EXEC

Example

```
SEFOS# show redistribute-policy ipv6
Destination    Range    SrcProto     DestProto      Flag
-----------    -----    --------     -----------    ----
3434::1111     64         static      rip           Deny
::              128       all        others        Allow
```

Related Commands

- `redistribute-policy` - Adds the IPv6 permit or deny redistribution policy
- `default redistribute-policy` - Sets the default behavior of the RRD6 control table

11.1.6 show redistribute information ipv6

Displays the RTM6 RRD status for registered protocols.

```
show redistribute information ipv6
```

Mode Privileged EXEC

Example

```
SEFOS# show redistribute information ipv6
Current State is enabled
ProtoName     OspfAreaRoutes     OspfExtRoutes
---------     --------------     -------------
local           Disable             Disable
static          Disable             Disable
rip              Enable              Enable
```

Related Commands

- `export ospfv3` - Enables redistribution of OSPF area/External routes to the protocol

CHAPTER 12

VRRP

Note – This chapter applies to the Sun Network 10GbE Switch 72p product only. VRRP is not supported on the Sun Blade 6000 Ethernet Switched NEM 24p 10GbE, so do not use any of the procedures in this chapter for that product.

VRRP is an election protocol that dynamically assigns responsibility for one or more virtual router to the VRRP routers on a LAN, allowing several routers on a multi-access link to utilize the same virtual IP address. A VRRP router is configured to run the VRRP protocol in conjunction with one or more other routers attached to a LAN. In a VRRP setup, one router is elected as the master router with the other routers acting as backups for the case of failure of the master router. VRRP is designed to eliminate the router as a single point of failure when static routes are used.

12.1 VRRP Commands

The list of CLI commands for the configuration of VRRP is as follows:

- `router VRRP`
- `interface`
- `vrrp - ipv4 address`
- `vrrp - ip address`
- `vrrp group shutdown`
- `vrrp - priority`
- `vrrp - preempt`
- `vrrp - text-authentication`
- `vrrp - authentication text`

- vrrp - interval
- vrrp - timers advertise
- vrrp - accept-mode
- show vrrp interface - vrid
- show vrrp interface

12.1.1 router VRRP

- Enables VRRP in the router and is used to enter the VRRP configuration mode. The no form of the command disables VRRP in the router.

```
router vrrp
```

```
no router vrrp
```

Mode Global Configuration

Defaults VRRP is disabled.

Example
```
SEFOS(config)# router vrrp
```

Notes Enabling the VRRP router will transition the state of the virtual router from initialize to backup or master (Initialize indicates that the virtual router is waiting for a startup event. backup indicates that the virtual router is monitoring the availability of the master router. master indicates that the virtual router is forwarding the packets for IP addresses that are associated with this router.) Disabling the VRRP router will transition the state from backup or master to initialize. State transitions may not be immediate but may depend on other factors such as the interface state.

Related Commands

- show vrrp interface - vrid - Displays the VRRP status information
- vrrp group shutdown - Shuts down all VRRP groups

12.1.2 interface

Selects an interface to configure. The no form of the command deletes the virtual router entries on the given interface.

```
interface {vlan 1-4094 | interface-type interface-id}
```

```
no interface {vlan 1-4094 | interface-type interface-id}
```

Mode	VRRP Router Configuration
Example	`SEFOS(config-vrrp)# interface vlan 3`
Notes	• VRRP must be enabled prior to the execution of this command. • This interface must have an ip address prior to the execution of this command.

Related Commands

- `router VRRP` - Enables VRRP in the router
- `show vrrp interface - vrid` - Displays the VRRP status information
- `show vrrp interface` - Displays the VRRP status information

12.1.3 vrrp - ipv4 address

Sets an associated IP address for the virtual router. The `no` form of the command deletes the associated IP address for the virtual router.

```
vrrp vr-id_1-255 ipv4 ucast-addr [secondary]
```

```
no vrrp vr-id_1-255 ipv4 ucast-addr [secondary]
```

Syntax Description	*vr-id_1-255* – Virtual router identifier. VRID is a number which along with an interface index uniquely identifies a virtual router instance on a given VRRP router. This value ranges between 1 and 255. *ucast-addr* – Associated IP address to be added. **secondary** – Indicates that this is a secondary IP address.
Mode	VRRP Interface Configuration
Example	`SEFOS(config-vrrp-if)# vrrp 3 ipv4 10.0.0.1`
Notes	• Once this command is executed, the VRRP Module starts the transition from `initial` state to either `backup` state or `master` state as per the election process on the specific interface. • This command should precede any other interface command for this VR identifier.

Related Commands

- `router VRRP` - Enables VRRP in the router

- vrrp - preempt - Enables the pre-emption of state change from either Backup to Master or vice versa based on the election process
- vrrp - text-authentication / vrrp - authentication text - Sets the authentication type for the virtual router to simple password
- vrrp - interval / vrrp - timers advertise - Sets the advertisement timer for a virtual router
- show vrrp interface - vrid - Displays the VRRP status information
- show vrrp interface - Displays the VRRP status information

12.1.4 vrrp - ip address

Sets an associated IP address for the virtual router. The no form of the command deletes the associated IP address for the virtual router. This command operates similar to that of the command vrrp - ipv4 address.

```
vrrp vr-id_1-255 ip ucast-addr [secondary]
```

Syntax Description

vr-id_1-255 – Virtual router identifier. VRID is a number which along with an interface index uniquely identifies a virtual router instance on a given VRRP router. This value ranges between 1 and 255.

ucast-addr – Associated IP address to be added.

secondary – Indicates that this is a secondary IP address.

Mode

VRRP Interface Configuration

Example

```
SEFOS(config-vrrp-if)# vrrp 3 ip 10.0.0.1
```

Notes

- Once this command is executed, the VRRP Module starts the transition from initial state to either backup state or master state as per the election process on the specific interface.
- This command should precede any other interface command for this VR identifier.

Related Commands

- router VRRP - Enables VRRP in the router
- vrrp - preempt - Enables the pre-emption of state change from either Backup to Master or vice versa based on the election process
- vrrp - text-authentication / vrrp - authentication text - Sets the authentication type for the virtual router to simple password
- vrrp - interval / vrrp - timers advertise - Sets the advertisement timer for a virtual router
- show vrrp interface - vrid - Displays the VRRP status information

- show vrrp interface - Displays the VRRP status information

12.1.5 vrrp group shutdown

Shuts down all VRRP groups. This command operates similar to the no form of the command vrrp - ipv4 address, except that all the associated IP addresses of the virtual router will be deleted.

```
vrrp group shutdown
```

Mode VRRP Interface Configuration

Example `SEFOS(config-vrrp-if)# vrrp group shutdown`

Related Commands

- router VRRP - Enables VRRP in the router
- show vrrp interface - vrid - Displays the VRRP status information
- show vrrp interface - Displays the VRRP status information

12.1.6 vrrp - priority

Sets the priority for the virtual router. The no form of the command sets the priority for the virtual router to the default value.

```
vrrp vr-id_1-255 priority 1-254
```

```
no vrrp vr-id_1-255 priority
```

Syntax Description *vr-id_1-255* – Virtual router identifier.
priority – Priority used for the virtual router master election process.

Mode VRRP Interface Configuration

Defaults	**priority** – 100
Example	`SEFOS(config-vrrp-if)# vrrp 3 priority 7`
Notes	• Higher values imply higher priority. • A priority of 255 is used for the router that owns the associated IP address (es). • The command vrrp <vrid(1-255)> ipv4 <ip address> must be entered for the current interface (with the proper vrid) before the execution of this command.

Related Commands

- `router VRRP` - Enables VRRP in the router
- `show vrrp interface - vrid` - Displays the VRRP status information

12.1.7 vrrp - preempt

Enables the pre-emption of state change from either Backup to Master or vice versa based on the election process. The no form of the command disables the preempt mode.

```
vrrp vr-id_1-255 preempt [delay minimum 0-30]
```

```
no vrrp vr-id_1-255 preempt
```

Syntax Description	*vr-id_1-255* – Virtual router identifier. **delay minimum** – Number of seconds that the router will delay before issuing an advertisement claiming master ownership. This value ranges between 0 and 30.
Mode	VRRP Interface Configuration
Defaults	Pre-emption is enabled. **delay minimum** – 0
Example	`SEFOS(config-vrrp-if)# vrrp 3 preempt`
Notes	The command `vrrp - ipv4 address` must be entered for the current interface (with the proper vr-id) before the execution of this command.

Related Commands

- `router VRRP` - Enables VRRP in the router
- `vrrp - ipv4 address` / `vrrp - ip address` - Sets the IP address for the virtual router

- show vrrp interface - vrid - Displays the VRRP status information
- show vrrp interface - Displays the VRRP status information

12.1.8 vrrp - text-authentication

Sets the authentication type for the virtual router to simple password. The no form of the command sets the authentication type for the virtual router to none.

```
vrrp vr-id_1-255 text-authentication password
```

```
no vrrp vr-id_1-255 text-authentication
```

Syntax Description

vr-id_1-255 – Virtual router identifier.

password – Authentication password used to validate the incoming VRRP packets.

Mode

VRRP Interface Configuration

Example

```
SEFOS(config-vrrp-if)# vrrp 3 text-authentication
abcdefgh
```

Notes

- The authentication password is an alphanumeric string with up to 8 characters.
- The command vrrp - ipv4 address must be entered for the current interface (with the proper vrid) before the execution of this command.

Related Commands

- router VRRP - Enables VRRP in the router
- vrrp - ipv4 address / vrrp - ip address - Sets the IP address for the virtual router
- show vrrp interface - Displays the VRRP status information

12.1.9 vrrp - authentication text

Sets the authentication type for the virtual router to simple password. This command operates similar to the command vrrp - text-authentication.

```
vrrp vr-id_1-255 authentication text password
```

Syntax Description	*vr-id_1-255* – Virtual router identifier. This value ranges between 1 and 255. *password* – Authentication password used to validate the incoming VRRP packets.
Mode	VRRP Interface Configuration
Example	`SEFOS(config-vrrp-if)# vrrp 3 authentication text abcdefgh`
Notes	• The authentication password is an alphanumeric string of up to 8 characters. • The command `vrrp - ipv4 address` must be entered for the current interface (with the proper vr-id) before the execution of this command.

Related Commands

- `router VRRP` - Enables VRRP in the router
- `vrrp - ipv4 address` / `vrrp - ip address` - Sets the IP address for the virtual router
- `show vrrp interface` - Displays the VRRP status information

12.1.10 vrrp - interval

Sets the advertisement timer for a virtual router. The `no` form of the command sets the advertisement timer for a virtual router to the default value.

```
vrrp vr-id_1-255 timer interval-seconds_1-255
```

```
no vrrp vr-id_1-255 timer
```

Syntax Description	*vr-id_1-255* – Virtual router identifier. This value ranges between 1 and 255. **timer** – The time interval, in seconds, between successive advertisement messages. This value ranges between 1 and 255.
Mode	VRRP Interface Configuration
Defaults	1 second
Example	`SEFOS(config-vrrp-if)# vrrp 4 timer 6`
Notes	• Only the master router sends advertisements. • On expiry of the advertise timer, the Master sends advertisement packets to the backup • The command`vrrp - ipv4 address` must be entered for the current interface (with the proper vrid) before the execution of this command.

Related Commands

- router VRRP - Enables VRRP in the router
- vrrp - ipv4 address / vrrp - ip address - Sets the IP address for the virtual router
- show vrrp interface - Displays the VRRP status information

12.1.11 vrrp - timers advertise

Sets the advertisement timer for a virtual router. This command operates similar to that of the command vrrp - interval.

vrrp *vr-id_1-255* **timers advertise [msec]** *interval-seconds_1-255*

Syntax Description	*vr-id_1-255* – Virtual identifier. This value ranges between 1 and 255. **msec** – Unit of advertisement time is changed from seconds to milliseconds. **interval** – The time interval, in seconds, between successive advertisement messages. This value ranges between 1 and 255.
Mode	VRRP Interface Configuration
Defaults	1 second
Example	`SEFOS(config-vrrp-if)# vrrp 3 timers advertise 100`
Notes	• Only the master router sends advertisements • On expiry of the advertise timer, the master sends advertisement packets to the backup. • The command vrrp - ipv4 address must be entered for the current interface (with the proper vr-id) before the execution of this command.

Related Commands

- router VRRP - Enables VRRP in the router
- vrrp - ipv4 address / vrrp - ip address - Sets the IP address for the virtual router
- show vrrp interface - Displays the VRRP status information

12.1.12 vrrp - accept-mode

Enables VRRP accept mode. The no form of the command disables the VRRP accept mode.

```
vrrp vr-id_1-255 accept-mode enable
```

```
no vrrp vr-id_1-255 accept-mode enable
```

Syntax Description	*vr-id_1-255* – V irtual router identifier. This value ranges between 1 and 255. **accept-mode** – Identifies the mode to be enables.
Mode	VRRP Interface Configuration
Default	Accept mode disabled.
Example	`SEFOS(config-vrrp-if)# vrrp 1 accept-mode enable`

Related Commands

- router VRRP - Enables VRRP in the router.
- vrrp - ipv4 address / vrrp - ip address - Sets the IP address for the virtual router.
- show vrrp interface - Displays the VRRP status information.

12.1.13 show vrrp interface - vrid

Displays the VRRP status information.

```
show vrrp [interface {vlan 1-4094 | interface-type interface-id}
vr-id_1-255] [{brief | detail | statistics}]
```

Syntax Description

interface vlan – VRRP information on the given VLAN ID and VRID.
brief – Information about VRRP in brief.
detail – Information about VRRP in detail.
statistics – VRRP statistics.
vr-id_1-255 – Virtual Router ID.
interface-type – Interface type.
interface-id – Interface identifier.

Mode

Privileged EXEC

Example

```
SEFOS# show vrrp interface vlan 2 detail
vlan2   - vrID 1
---------------
   State is Master
   Virtual IP address is 12.0.0.2
   Virtual MAC address is 00:00:5e:00:01:01
   Master router is 12.0.0.2
 Associated IpAddresses :
 ----------------------

12.0.0.2
   Advertise time is 1 secs
   Current priority is 100
   Configured priority is 100, may preempt
vlan2   - vrID 2
---------------
   State is Master
   Virtual IP address is 12.0.0.1

Virtual MAC address is 00:00:5e:00:01:02
   Master router is 12.0.0.1
 Associated IpAddresses :
 ----------------------
   12.0.0.1

Advertise time is 1 secs
   Current priority is 255
   Configured priority is 255, may preempt

SEFOS# show vrrp interface vlan 2 brief
P indicates configured to preempt
Interface    vrID Priority   P   State    Master    VRouter
                                           Addr      Addr
---------    ---- --------   -   -----    -------   -------
vlan2        1    100        P  Master   local     12.0.0.2
vlan2        2    255        P  Master   local     12.0.0.1
```

```
SEFOS# show vrrp interface vlan 2 statistics
vlan2   - vrID 1
---------------
Transitions to Master            : 2
Advertisements Received          : 0
Advertise Internal Errors        : 0
Authentication Failures          : 0
TTL Errors                         : 0
Zero Priority Packets Received : 1
Zero Priority Packets Sent       : 0

Invalid Type Packets Received   : 0
Address List Errors               : 0
Invalid Authentication Type     : 0
Authentication Type Mismatch    : 0
Packet Length Errors              : 0
vlan2   - vrID 2
---------------
Transitions to Master            : 1

Advertisements Received          : 0
Advertise Internal Errors        : 0
Authentication Failures          : 0
TTL Errors                         : 0
Zero Priority Packets Received : 0
Zero Priority Packets Sent       : 0
Invalid Type Packets Received   : 0
Address List Errors               : 0

Invalid Authentication Type     : 0
Authentication Type Mismatch    : 0
Packet Length Errors              : 0

SEFOS# show vrrp interface vlan 2
P indicates configured to preempt
Interface    vrID Priority   P   State    Master    VRouter
                                          Addr      Addr
---------    ---- --------   -   -----    -------   -------
vlan2        1    100        P  Master   local     12.0.0.2
vlan2        2    255        P  Master   local     12.0.0.1
```

Notes

This command can be executed with the VLAN identifier (1-4094) as the mandatory parameter.

Related Commands

- `router VRRP` - Enables VRRP in the router
- `interface` - Selects an interface to be configured
- `vrrp - ipv4 address` / `vrrp - ip address` - Sets the IP address for the virtual router
- `vrrp - ipv4 address` / `vrrp - ip address` - Sets the IP address for the virtual router
- `vrrp group shutdown` - Shuts down all VRRP groups.
- `vrrp - preempt` - Enables the pre-emption of state change from either Backup to Master or vice versa based on the election process
- `vrrp - text-authentication` / `vrrp - authentication text` - Sets the authentication type for the virtual router to simple password.
- `vrrp - interval` / `vrrp - timers advertise` - Sets the advertisement timer for a virtual router

12.1.14 show vrrp interface

Displays the VRRP status information.

```
show vrrp interface [{vlan 1-4094 | interface-type interface-id }]
[{brief | detail | statistics}]
```

Syntax Description

interface vlan – VRRP information on the given VLAN identifier.
brief – Information about VRRP in brief.
detail – Information about VRRP in detail.
statistics – VRRP statistics.
interface-type – Interface type.
interface-id – Interface identifier.

Mode

Privileged EXEC

Example

```
SEFOS# show vrrp interface
P indicates configured to preempt
Interface    vrID Priority P   State   Master Addr   VRouter Addr
---------    ---- -------- -   -----   -----------   ------------
 vlan2         1      100     P   Master     local         21.0.0.1
```

Related Commands

- `router VRRP` - Enables VRRP in the router
- `interface` - Selects an interface to configure

- `vrrp - ipv4 address` / `vrrp - ip address` - Sets the IP address for the virtual router
- `vrrp group shutdown` - Shuts down all VRRP groups.
- `vrrp - preempt` - Enables the pre-emption of state change from either Backup to Master or vice versa based on the election process
- `vrrp - ipv4 address` / `vrrp - ip address` - Sets the IP address for the virtual router

CHAPTER 13

EVB

SEFOS EVB is the Oracle implementation of IEEE standard Edge Virtual Bridging. This document describes the basic configuration examples of EVB.

13.1 EVB Commands

The list of CLI commands for the configuration of EVB is as follows:

- `shutdown evb`
- `set evb {enable | disable}`
- `show evb`
- `show evb interface`
- `show vdp profiles interface`
- `show running-config evb`

13.1.1 `shutdown evb`

Shutdowns EVB on the system and the no form if the command starts EVB on the system

```
shutdown evb
```

```
no shutdown evb
```

Mode	Global Configuration
Default	`no shutdown evb`

Example **SEFOS(config)# shutdown evb**

Related Commands

- `show evb` - Displays EVB global information

13.1.2 set evb {enable | disable}

Enables or disables EVB on a particular interface

```
set evb enable
```

```
set evb disable
```

Syntax Description	Enable - Enables EVB on the port Disable - Disable EVB on the port
Mode	Interface Configuration Mode

Example	`SEFOS(config)# interface extreme-ethernet 0/24`
	`SEFOS(config-if)# set vdp enable`
	`SEFOS(config-if)# set vdp disable`

Notes	LLDP module must be started and enabled and lldp evb tlv must be selected before EVB is enabled

Related Commands

- `no shutdown lldp` - Starts LLDP on the system
- `set lldp enable` - Enables LLDP on a paticular interface
- `lldp tlv-selcct dot1evbtlv` - Configures EVB TLV (type, length, value) types to be transmitted on a port
- `show evb interface [` *interface-type interface-id* `]` - Displays the interface EVB parameter

13.1.3 show evb

Displays EVB Global Configuration.

Mode Privileged EXEC

Example

```
SEFOS# show evb
EVB Global Information
----------------------
System Control                  : Start
```

Related Commands

- `shutdown evb` - Shutdowns the EVB

13.1.4 show evb interface

Displays configuration and status of EVB on an interface.

show evb interface [*interface-type interface-id***]**

Syntax Description	*interface-type*	-	Interface type
	interface-id	-	Interface identifier
Mode	Privileged EXEC		

Example

```
SEFOS# show evb interface extreme-ethernet 0/24
Port                          : Ex0/24
Show Type                     : Admin State
EVB Capable State             : on
```

Related Commands

- `set evb {enable | disable}` - Enables/Disables the EVB on an interface

13.1.5 show vdp profiles interface

Displays the vdp profile information on an interface.

show vdp profiles interface [*interface-type interface-id***]**

Syntax Description	Interface-type	-	Interface type
	Interface-id	-	Interface identifier
Mode	Privileged EXEC		

Example

```
SEFOS# show vdp profiles int ex 0/24
Name        VSIID                 State       VSIType
maxbw(%)    mtu
----        -----                 -----       -------
--------    ---
vnic4       02:08:20:3d:0d:68     ASSOC       133/0
25           1500
vnic3       02:08:20:fd:3f:de     ASSOC       130/0
10           1500
vnic2       02:08:20:92:2f:9c     ASSOC       138/0
50           1500
vnic1       02:08:20:c8:91:03     ASSOC       129/0
5            1500
```

Related Commands

- `set evb {enable | disable}` - Enables/Disables the EVB on an interface
- `show evb interface [` *interface-type interface-id* `]` - Displays the interface EVB parameter

13.1.6 show running-config evb

Display the current running EVB configuration.

```
show running-config evb
```

Mode Privileged EXEC

Example

```
SEFOS# show running-config evb

Building configuration...


interface  extreme-ethernet 0/1
!
interface  extreme-ethernet 0/2
!
interface  extreme-ethernet 0/3
!
interface  extreme-ethernet 0/4
!
interface  extreme-ethernet 0/5
!
interface  extreme-ethernet 0/6
!
interface  extreme-ethernet 0/7
!
interface  extreme-ethernet 0/8
!
interface  extreme-ethernet 0/9
!
interface  extreme-ethernet 0/10
!
interface  extreme-ethernet 0/11
!
interface  extreme-ethernet 0/12
!
interface  extreme-ethernet 0/13
!
interface  extreme-ethernet 0/14
!
interface  extreme-ethernet 0/15
!
interface  extreme-ethernet 0/16
!
interface  extreme-ethernet 0/17
!
```

```
interface  extreme-ethernet 0/18
!
interface  extreme-ethernet 0/19
!
interface  extreme-ethernet 0/20
!
interface  extreme-ethernet 0/21
!
interface  extreme-ethernet 0/22
!
interface  extreme-ethernet 0/23
!
interface  extreme-ethernet 0/24
set vdp enable
!

end
```

Notes This is an extension of `show running-config` command

Related Commands

- `set evb {enable | disable}` - Enables/Disables the EVB on an interface