Sun Ethernet Fabric Operating System CLI Reference Manual, Vol. 4

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Contents

Using This Documentation

- **Overview** – Provides information on Oracle's SEFOS CLI commands
- **Audience** – Users and system administrators who configure SEFOS through the CLI
- **Required knowledge** – Basic knowledge of UNIX CLI command syntax

Product Documentation Library

Documentation and resources for this product and related products are available at http://www.oracle.com/goto/es2-72_es2-64/docs.

Acronyms

Refer to the *Sun Ethernet Fabric Operating System CLI Reference Manual, Vol. 1* for acronyms and abbreviations.

CLI Command Modes

Refer to the *Sun Ethernet Fabric Operating System CLI Reference Manual, Vol. 1* for CLI command modes.

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CHAPTER 22

IP

IP (Internet Protocol) is an identifier for a computer or device on a TCP/IP network. Networks using the TCP/IP protocol route messages based on the IP address of the destination. The format of an IP address is a 32-bit numeric address written as four numbers separated by periods. Each number can be 0 to 255. For example: 10.5.25.180.

Every computer that communicates over the Internet is assigned an IP address that uniquely identifies the device and distinguishes it from other computers on the Internet. Within an isolated network, IP addresses can be assigned at random as long as each one is unique. However, to connect a private network to the Internet, the registered IP addresses must be used (called Internet addresses) to avoid duplicates. The four numbers in an IP address are used in different ways to identify a particular network and a host on that network.

Four regional Internet registries -- ARIN, RIPE NCC, LACNIC and APNIC -- assign Internet addresses from the following three classes.

- Class A - supports 16 million hosts on each of 126 networks
- Class B - supports 65,000 hosts on each of 16,000 networks
- Class C - supports 254 hosts on each of 2 million networks

The number of unassigned Internet addresses is running out, so a new classless scheme called CIDR (Classless Inter-Domain Routing) is gradually replacing the system based on classes A, B, and C and is tied to adoption of IPv6.

ICMP (Internet Control Message Protocol) is an extension to the IP defined by RFC 792. ICMP supports packets containing error, control, and informational messages. For example, the ping command uses ICMP to test an Internet connection.

Oracle SEFOS provides the flexibility to use either the Oracle IPv4 Module or the Linux IP. The IP commands under this section are therefore classified into:

22.1 Commands Specific for Oracle IP

This section describes the commands that are specific for Oracle IP alone. These commands are based on the Oracle Proprietary MIB.

22.1.1 ip redirects

Command Objective	This command enables sending ICMP redirect messages. The redirect message is an ICMP message which informs a host to update its routing information to send packets on an alternate route when a packet enters an IP interface and exits the same interface. The redirect message is sent to inform the host of the presence of alternative route. The no form of this command disables sending ICMP redirect messages.
Syntax	**`ip redirects [vrf <vrf-name>]`** **`no ip redirects [vrf <vrf-name>]`**
Parameter Description	• **`vrf <vrf-name>`** - Sends the ICMP redirect messages for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32.
Mode	Global Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Default	Sending of ICMP Redirect messages is enabled.
Note:	VRF instance should be created before executing this command to configure ICMP redirect messages for the context.
Example	**`SEFOS(config)# ip redirects`**
Related Command(s)	• **`ip vrf`** - Creates VRF instance. • **`show ip information`** -– Displays IP configuration information.

22.1.2 ip unreachables

Command Objective	This command enables the router to send an ICMP unreachable message to the source if the router receives a packet that has an unrecognized protocol or no route to the destination address. ICMP provides a mechanism that enables a router or destination host to report an error in data traffic processing to the original source of the packet. This informs the source that the packet is dropped. The no form of this command disables sending ICMP unreachable messages.
Syntax	**ip unreachables [vrf <vrf-name>]** **no ip unreachables [vrf <vrf-name>]**
Parameter Description	• **vrf <vrf-name>** - Sends an ICMP unreachable message for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32.
Mode	Global Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Default	Sending of ICMP unreachable message is enabled.
Note:	VRF instance should be created before executing this command to configure the ICMP unreachable message for the context.
Example	**SEFOS(config)# ip unreachables**
Related Command(s)	• **ip vrf** - Creates VRF instance. • **show ip information** -– Displays IP configuration information.

22.1.3 ip mask-reply

Command Objective	This command enables sending ICMP mask reply messages. The IP mask reply is an ICMP message sent by the router to the host informing the subnet mask of the network. This reply is in correspondence to a request sent by the host seeking the subnet mask of the network. The no form of this command disables sending ICMP mask reply messages.
Syntax	**ip mask-reply [vrf <vrf-name>]** **no ip mask-reply [vrf <vrf-name>]**
Parameter Description	• **vrf<vrf-name>** - Sends ICMP mask reply messages for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32.
Mode	Global Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Default	Sending of ICMP mask reply messages is enabled.
Note:	VRF instance should be created before executing this command to configure the ICMP mask reply messages for the context.
Example	**SEFOS(config)# ip mask-reply**
Related Command(s)	• **ip vrf** - Creates VRF instance. • **show ip information** -– Displays IP configuration information.

22.1.4 ip echo-reply

Command Objective	This command enables sending ICMP echo reply messages. The IP echo reply is a message sent by a device, in response to a request sent by another device. This message is used to check if device is able to communicate (send and receive data) with the destination device. The no form of this command disables sending ICMP echo reply messages.
Syntax	**ip echo-reply [vrf <vrf-name>]** **no ip echo-reply [vrf <vrf-name>]**
Parameter Description	• **vrf<vrf-name>** - Sends an ICMP echo reply messages for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32.
Mode	Global Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Default	Sending of ICMP echo reply messages is enabled.
Note:	VRF instance should be created before executing this command to configure the ICMP echo reply messages for the context.
Example	**SEFOS(config)# ip echo-reply**
Related Command(s)	• **ip vrf** - Creates VRF instance. • **show ip information** -– Displays IP configuration information.

22.1.5 maximum-paths

Command Objective	This command sets the maximum number of paths that can be connected to a host. It provides multiple forwarding paths for data traffic and enables load balancing. It improves the overall network fault tolerance, as failure in one instance does not affect the other instances. The no form of this command sets the maximum number of paths to its default value.
Note:	This command is currently not supported on Broadcom chipsets.
Syntax	**maximum-paths [vrf <vrf-name>] <value (1-16)>** **no maximum-paths [vrf <vrf-name>]**
Parameter Description	• **vrf<vrf-name>** - Sets the maximum number of paths for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32.
Mode	Global Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Default	Maximum number of multipaths is set as 2.
Note:	VRF instance should be created before executing this command to configure the maximum number of multipaths for the context.
Example	**SEFOS(config)# maximum-paths 15**
Related Command(s)	• **ip vrf** - Creates VRF instance. • **show ip information** -– Displays IP configuration information.

22.1.6 ip rarp client request

Command Objective	This command sets the number of RARP client request retries or interval between requests. The **ip rarp client request** is sent from a newly set up machine in a network. The RARP client program requests the RARP server in the router to send its IP address. The network administrator creates a table in the LAN's gateway router. The router maps the MAC address of the client to an IP address that is sent to the client for future use. If the server didn't respond with an IP address, the client retries the request for the configured number of times and the interval between each retry can also be set. The no form of this command sets the RARP client request retries or interval between retries to the default values. RARP requests are most commonly sent by diskless clients and JumpStart clients during boot. The client uses the RARP protocol to broadcast the Ethernet address and asks for the corresponding IP address.
Syntax	**ip rarp client request {interval <timeout (30-3000)> | retries <retries (2-10)>}** **no ip rarp client request { interval|retries }**
Parameter Description	• **interval <timeout (30-3000)>** - Configures the interval (in seconds) after which an unanswered RARP request is transmitted. This value ranges from 30 to 3000. • **retries <retries (2-10)>** - Sets the maximum number of retransmissions of RARP request packet after which request must not be sent. This value ranges from 2 to 10.
Mode	Global Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Default	• interval 100 • retries 4
Example	**SEFOS(config)# ip rarp client request interval 30**
Related Command(s)	• **show ip rarp** - Displays RARP configuration information.

22.1.7 ip aggregate-route

Command Objective	This command sets the maximum number of aggregate routes. Aggregate Route-based IP switching is achieved by creating a virtual circuit along the network by selecting the forwarding paths used by routers that use OSPF and BGP(Border Gateway Protocol).The data is sent through these virtual circuits to the destination. The routing process is skipped along this circuit. The data is tagged with a label that is read by the switches and forwarded to the destination. This value ranges from 5 to 4095. The no form of this command sets the maximum number of aggregate routes to its default value.
Syntax	**`ip aggregate-route <value (5-4095)>`** **`no ip aggregate-route`**
Mode	Global Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Default	10
Example	**`SEFOS(config)# ip aggregate-route 500`**
Related Command(s)	• **`show ip information`** -– Displays IP configuration information.

22.1.8 traffic-share

Command Objective	This command enables traffic sharing (load sharing of IP packets). Traffic sharing is the process by which the protocols select the route for traffic flow with regard to path cost calculation and load distribution. EIGRP (Enhanced Interior Gateway Routing Protocol) provides intelligent traffic sharing. Traffic sharing is controlled by selecting the mode of distribution. The **traffic-share balanced** distributes the traffic proportionately to the ratio of the metrics of different routes. The **traffic-share min** distributes the traffic in the route which has minimal cost path even if different paths are available. The no form of this command disables traffic sharing.
Note:	This command is currently not supported on Broadcom chipsets.
Syntax	**traffic-share [vrf <vrf-name>]** **no traffic-share [vrf <vrf-name>]**
Parameter Description	• **vrf<vrf-name>** - Enables traffic sharing for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32.
Mode	Global Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Default	Load Sharing is disabled
Note:	VRF instance should be created before executing this command to configure the traffic sharing for the context.
Example	**SEFOS(config)# traffic-share**
Related Command(s)	• **ip vrf** - Creates VRF instance. • **show ip information** -– Displays IP configuration information.

22.1.9 ip path mtu discover

Command Objective	This command initiates path MTU (Maximum Transmission Unit) discovery. The no form of this command sets path MTU discovery to its default value. When IP path MTU discover is set to be disabled, PMTU-D is not done even if the application requests to do so.
Syntax	**ip [vrf <vrf-name>] path mtu discover** **no ip [vrf <vrf-name>] path mtu discover**
Parameter Description	• **vrf<vrf-name>** - Initiates path MTU discovery for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32.
Mode	Global Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Default	Path MTU discovery is disabled
Note:	VRF instance should be created before executing this command to configure the path MTU discovery for the context.
Example	**SEFOS(config)# ip path mtu discover**
Related Command(s)	• **ip path mtu** - Sets the MTU for usage in PMTU discovery. • **ip vrf** - Creates VRF instance. • **show ip information** -– Displays IP configuration information.

22.1.10 ip path mtu

Command Objective	This command sets the Maximum Transmission Unit (MTU) for usage in PMTU discovery. The transmission of packets from source to destination has many networks to pass through. Each network has its own Maximum Transmission Unit. The smallest MTU of all the links is the path MTU. This PMTU can be manually configured by the administrator. The no form of this command removes MTU for usage in PMTU discovery.
Syntax	**ip path mtu [vrf <vrf-name>] <dest ip> <tos(0-255)> <mtu(68-65535)>** **no ip path mtu [vrf <vrf-name>] <dest ip> <tos>**
Parameter Description	• **vrf<vrf-name>** - Sets the MTU for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32. • **dest ip** - Sets the destination IP Address. This is done to define the path between source and destination. • **tos** - Sets the Type of Service of the configured route. This value ranges from 0 to 255 • **mtu** - Sets the Maximum Transmission Unit for the path from source to the destination. This value ranges from 68 to 65535.
Mode	Global Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Note:	• This command executes only if, ▪ Path MTU discovery is enabled. • VRF instance is created to configure the MTU for the context.
Example	**SEFOS(config)# ip path mtu 10.0.0.1 0 1800**
Related Command(s)	• **ip vrf** - Creates VRF instance. • **ip path mtu discovery** - Enables path MTU (Maximum Transmission Unit) discovery. • **show ip pmtu** - Displays the configured PMTU entries.

22.1.11 ip rarp client

Command Objective	This command enables RARP (Reverse Address Resolution Protocol) client. The RARP resolves an IP address from a given hardware address. The client that requests for the IP is the RARP client. The IP address of the default interface is obtained through RARP, when the IP address configuration mode is dynamic. After RARP Max retries, IP is obtained through DHCP. The no form of this command disables RARP client.
Syntax	**`ip rarp client`** **`no ip rarp client`**
Mode	Interface Configuration Mode (Router)
Package	Workgroup, Enterprise, Metro_E, and Metro
Default	Enabled
Note:	The RARP server must be disabled when the RARP client is enabled.
Example	**`SEFOS(config-if)# ip rarp client`**
Related Command(s)	• **`show interfaces`** - Displays the interface status and configuration for all interfaces available in the switch. • **`show ip rarp`** - Displays RARP configuration information.

22.1.12 ip directed-broadcast

Command Objective	This command enables forwarding of directed broadcasts. The IP directed broadcast is an IP packet whose destination is a valid IP subnet address, but the source is from a node outside the destination subnet. The routers from outside the subnet forward the IP directed broadcast, like any other IP packet. When the directed packets reach a router in the destination subnet, the packet is exploded as a broadcast in the subnet. The header information on the broadcast packet is rewritten for the broadcast address in the subnet. The packet is sent as link-layer broadcast. The no form of this command disables forwarding of directed broadcasts.
Syntax	**`ip directed-broadcast`** **`no ip directed-broadcast`**
Mode	Interface Configuration Mode (VLAN / Router)
Package	Workgroup, Enterprise, Metro_E, and Metro
Default	Disabled
Example	**`SEFOS(config-if)# ip directed-broadcast`**
Related Command(s)	• **`show interfaces`** - Displays the interface status and configuration for all interfaces available in the switch.

22.1.13 show ip rarp

Command Objective	This command displays RARP configuration information such as maximum number of RARP request retransmission retries and RARP request retransmission timeout. It also displays the number of responses discarded.
Syntax	**show ip rarp**
Mode	Privileged EXEC Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Example	**SEFOS# show ip rarp** RARP Configurations: -------------------- Maximum number of RARP request retransmission retries is 4 RARP request retransmission timeout is 100 seconds RARP Statistics: ---------------- 0 responses discarded
Related Command(s)	• **ip rarp client request** - Sets the number of RARP client request retries. • **ip rarp client** - Enables RARP client.

22.1.14 show ip pmtu

Command Objective	This command displays the configured PMTU entries. The details include destination IP address, Type of Service, and Path MTU.
Syntax	**show ip pmtu [vrf <vrf-name>]**
Parameter Description	• **vrf <vrf-name>** - Sends an ICMP unreachable message for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32.
Mode	Privileged EXEC Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Default	vrf - default
Example	**SEFOS# show ip pmtu** Ip Path MTU Table ---------- Vrf Name Destination TOS PMTU -------- ----------- --- ---- Default 15.0.0.20 2 1500 vr1 14.0.0.25 255 900 **SEFOS# show ip pmtu vrf default** Ip Path MTU Table ---------- Vrf Name Destination TOS PMTU -------- ----------- --- ---- Default 15.0.0.20 2 1500
Related Command(s)	• **ip path mtu** - Sets the MTU for usage in PMTU discovery.

22.2 Commands Common for Oracle and Linux IP

This section describes the commands that are common for Oracle IP and Linux IP. These commands are based on the standard MIB.

22.2.1 ping

Command Objective	This command sends echo messages. The Packet Internet Groper (Ping) module is built based on the ICMP echo request and ICMP echo response messages. The network administrator uses this ping on a remote device to verify its presence. Ping involves sending ICMP echo messages repeatedly and measuring the time between transmission and reception of message. The output displays the time taken for each packet to be transmitted, number of packets transmitted, number of packets received, and packet loss percentage.
Syntax	**When VCM is enabled** **ping vrf <vrf-name> [ip] {<IpAddress> | <dns_host_name> } [data (0-65535)] [df-bit] [{repeat|count} <packet_count (1-10)>] [size <packet_size (36-2080)>][source <ip-address>] [timeout <time_out (1-100)>] [validate]** **When VCM is disabled** **ping [ip] {<IpAddress> | <dns_host_name> } [data (0-65535)] [df-bit] [{repeat|count} <packet_count (1-10)>] [size <packet_size (36-2080)>][source <ip-address>] [timeout <time_out (1-100)>] [validate]**
Parameter Description	• **vrf<vrf-name>** - Configures the Virtual Router for which the ping session is initiated. This value represents unique name of the VRF instance. This value is a string of maximum size 32. • **ip** - Configures the IP address of the node to be pinged. • **IpAddress** - Configures the source IP address of the node to be pinged. • **<dns_host_name>** - Configures the name of the host. This value is a string of maximum size 255. • **data (0-65535)** - Configures the size of the data. This value ranges from 0 to 65535. • **df-bit** - Configures Do not Fragment (DF) bit on the ping packet. • **repeat** - Configures number of ping messages to be repeated. • **count** - Configures the number of times the given node address is to be pinged. • **<packet_count (1-10)>** - Configures the packet count. This value ranges from 1 to 10.

	• **size <packet_size (36-2080)>** - Configures the size of the data portion of the PING PDU. This value ranges from 36 to 2080. • **source <ip-address>** - Configures the source IP address of the router for the probes. • **timeout <time_out (1-100)>** - Configures the time in seconds after which the entity waiting for the ping response times out. This value ranges from 1 to 100. • **validate** - Validates the reply data.
Mode	Privileged EXEC Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Default	• size - 64 • count - 3 • timeout - 1
Note:	VRF instance should be created before executing this command to send echo message for the context.
Example	**SEFOS# ping 12.0.0.1** Reply Received From :12.0.0.1, TimeTaken : 20 msecs Reply Received From : 12.0.0.12, TimeTaken : 10 msecs Reply Received From : 12.0.0.1, TimeTaken : 10 msecs --- 12.0.0.1 Ping Statistics --- 3 Packets Transmitted, 3 Packets Received, 0% Packets Loss PING : Data, Do-not-fragment, Source, Validate are not supported !
Related Command(s)	• **ip vrf** - Creates VRF instance.

22.2.2 ip route

Command Objective

This command adds a static route. The route defines the IP address or interface through which the destination can be reached.

The no form of this command deletes a static route.

Note: If the static route is configured without any metric value, then the route will be configured with metric value 1.

Syntax

```
ip route [vrf <vrf-name>] <prefix> <mask> {<next-hop> |
Vlan <vlan-id/vfi-id> | <interface-type> <interface-id> |
Linuxvlan <interface-name> | Cpu0 | tunnel <tunnel-id (0-
128)> | <IP-interface-type> <IP-interface-number> | ppp
<1-10> } [<distance (1-254)>] | [ private ] [ permanent ]
[ name <nexthop-name>]

no ip route [vrf <vrf-name>] <prefix> <mask> [{ <next-hop>
| Vlan <vlan-id/vfi-id> | <interface-type> <interface-id>
| Linuxvlan <interface-name> | Cpu0 | tunnel <tunnel-id
(0-128)>} | <IP-interface-type> <IP-interface-number> |
ppp <1-10> ] [private] [ permanent ] [ name <nexthop-name>
]
```

Parameter Description

- **vrf<vrf-name>** - Configures the static route for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32.
- **<prefix>** - Configures the number of high-order bits in the IP address. These bits are common among all hosts within a network.
- **<mask>** - Configures the subnet mask for the IP address. This is a 32-bit number which is used to divide the IP address into network address and host address.
- **<next-hop>** - Configures the IP address or IP alias of the next hop that can be used to reach that network.
- **Vlan <vlan-id/vfi-id>** - Configures the static route for the specified VLAN / VFI ID. This value ranges from 1 to 65535.
  - **<vlan –id>** - VLAN ID is a unique value that represents the specific VLAN. This value ranges from 1 to 4094.
  - **<vfi-id>** - VFI ID is a VLAN created in the system which contains pseudowires and attachment circuits as member ports. This creates a logical LAN for the VPLS service. This value ranges from 4096 to 65535.

    Note: The VLAN ID 4095 is reserved and may be used to indicate a wildcard match for the VID in management

operations or filtering database entries.

Note: VFI IDs 4096 and 4097 are reserved identifiers used in MPLS PW.

Note: The theoretical maximum for the maximum number of VFI is 65535 but the actual number of VFI supported is a sizing constant. Based on this, the maximum number of VFI ID accepted in the management interface is restricted. For example if 100 VFIs are supported, the maximum number of VFI supported will be restricted to a hundred added to the maximum number of VLANs. An error message is displayed for any value beyond this range.

- **<interface-type>** - Configures the static route for the specified type of interface. The interface can be:
  - **fastethernet** – Officially referred to as 100BASE-T standard. This is a version of LAN standard architecture that supports data transfer upto 100 Megabits per second.
  - **XL-ethernet** – A version of LAN standard architecture that supports data transfer upto 40 Gigabits per second.

    Note: As of release 2.0.0.3, all interfaces are referred to as extreme-ethernet.

  - **extreme-ethernet** – A version of Ethernet that supports data transfer upto 10 Gigabits per second.
  - **i-lan** -– Internal LAN created on a bridge per IEEE 802.1ap.

- **<interface-id>** - Configures the static route for the specified interface identifier. This is a unique value that represents the specific interface. This value is a combination of slot number and port number separated by a slash. For example: 0/1 represents that the slot number is 0 and port number is 1.

- **Linuxvlan<interface-name>** - Configures the interface name of the Linux VLAN Interface.

- **Cpu0** - Sets the Out of Band Management Interface for the route

- **tunnel<id>** - Configures the static route for the specified Tunnel Identifier. This value ranges from 0 to 128.

- **<IP-interface-type> -** Configures the static route for the specified L3 pseudowire interface in the system.

- **<IP-interface-number> -** Configures the static route for the specified L3 pseudowire interface identifier. This is a unique value that represents the specific interface. This value ranges from 1 to 65535 for pseudowire interface.

  Note: Maximum number of pseudowire interfaces supported in the system is 100.

	• **ppp <1-10>** - Configures the Point to Point Protocol (PPP) interface for the route. The value ranges from 1 to 10. • **<distance (1-254)>** - Configures the administrative distance for the specified next hop address or the interface. This value ranges from 1 to 254. • **private** - Sets the private route • **permanent** - Sets the permanent route. • **name <nexthop-name>** - Configures next hop name for the newly added static route.
Mode	Global Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Default	distance - -1
Note:	• When the next-hop object is unknown or not relevant, its value must be set to zero. • Interface must be a router port. • VRF instance other then "Default" should be created, before executing this command to add static route for the context. • VRF instance should be mapped to the IPv4 or IPv6 interface, before executing this command to add the static routes for the context in the interface.
Example	`SEFOS(config)# ip route 30.0.0.2 255.255.255.255 Vlan 1`
Related Command(s)	• **ip vrf** - Creates VRF instance. • **ip vrf forwarding** - Maps the IPv4 or IPv6 interface to the context. • **show ip route** - Displays the IP routing table. • **no switchport** – Configures the port as a router port.

22.2.3 ip routing

Command Objective	This command enables IP routing. IP routing is the path defined by set of protocols for the data to follow across multiple networks from source to its destination. When an IP packet is to be forwarded, the router uses its forwarding table to determine the next hop address for the packet to reach its destination. The header in the IP packet consists of the next hop information. The no form of this command disables IP routing.
Syntax	**`ip routing [vrf <vrf-name>]`** **`no ip routing [vrf <vrf-name>]`**
Parameter Description	• **`vrf<vrf-name>`** - Enables IP routing for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32.
Mode	Global Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Default	IP routing is enabled.
Note:	VRF instance should be created before executing this command to configure IP routing for the context.
Example	**`SEFOS(config)# ip routing`**
Related Command(s)	• **`ip vrf`** - Creates VRF instance. • **`show ip information`** - Displays IP configuration information. • **`show ip route`** - Displays the IP routing table.

22.2.4 ip default-ttl

Command Objective	This command sets the Time-To-Live (TTL) value. TTL is the time set for a unit of data (a packet) to remain in the network or computer before it could be discarded. This value ranges from 1 to 255 seconds. The no form of this command sets the TTL to the default value.
Syntax	**ip default-ttl [vrf <vrf-name>] <value (1-255)>** **no ip default-ttl [vrf <vrf-name>]**
Parameter Description	• **vrf<vrf-name>** - Sets the Time-To-Live (TTL) value for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32.
Mode	Global Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Default	64 seconds
Note:	VRF instance should be created before executing this command to configure TTL value for the context.
Example	**SEFOS(config)# ip default-ttl 1**
Related Command(s)	• **ip vrf** - Creates VRF instance. • **show ip information** - Displays IP configuration information.

22.2.5 arp timeout

Command Objective	This command sets the ARP (Address Resolution Protocol) cache timeout. The **arp timeout** defines the time period an ARP entry remains in the cache. When a new timeout value is assigned, it only affects the new ARP entries. All the older entries retain their old timeout values. The no form of this command sets the ARP cache timeout to its default value.
Syntax	**arp [vrf <vrf-name>] timeout <seconds (30-86400)>** **no arp [vrf <vrf-name>] timeout**
Parameter Description	• **vrf <vrf-name>** - Sets the ARP cache timeout for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32. • **timeout <seconds (30-86400)>** - Configures the Address Resolution Protocol cache timeout value. This value ranges from 30 to 86400 seconds. The timeout values can be assigned to dynamic ARP entries only. All static ARP entries remain unaltered by the timeout value.
Mode	Global Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Default	7200
Note:	VRF instance should be created before executing this command to configure ARP cache timeout for the context.
Example	**SEFOS(config)# arp timeout 35**
Related Command(s)	• **ip vrf** - Creates VRF instance. • **show ip arp** - Displays IP ARP table for the given VLAN ID, IP address of ARP entry, MAC Address of ARP entry, IP ARP summary table, or ARP configuration information.

22.2.6 arp – ip address

Command Objective	This command adds a static entry in the ARP cache. The ARP finds the hardware address of the client and stores them in ARP cache. The ARP entry can be configured manually by using this command. The entry is stored permanently in the ARP cache as a static entry. The no form of this command deletes a static entry from the ARP cache.
Syntax	**arp [vrf <vrf-name>] <ip address> <hardware address> {Vlan <vlan-id/vfi-id> [switch switch-name] | <interface-type> <interface-id> | Linuxvlan <interface-name>| Cpu0 | <IP-interface-type> <IP-interface-number>}** **no arp [vrf <vrf-name>] {<ip address> | access-list <access-list-name>}**
Parameter Description	• **vrf<vrf-name>** - Adds a static entry in the ARP cache for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32. • **<ip address>** - Defines the IP address or IP alias to map to the specified MAC address. • **<access-list-name> –** Deletes a static entry in the ARP cache for the specified access list name. This value is a string whose maximum size is 32. Note: The access-list parameter is currently not supported. • **<hardware address>** - Defines the MAC address to map to the specified IP address or IP alias. • **Vlan <vlan-id/vfi-id>** - Adds a static entry in the ARP cache for the specified VLAN / VFI ID. This value ranges from 1 to 65535. ▪ **<vlan –id>** - VLAN ID is a unique value that represents the specific VLAN. This value ranges from 1 to 4094. ▪ **<vfi-id>** - VFI ID is a VLAN created in the system which contains pseudowires and attachment circuits as member ports. This creates a logical LAN for the VPLS service. This value ranges from 4096 to 65535. Note: The VLAN ID 4095 is reserved and may be used to indicate a wildcard match for the VID in management operations or filtering database entries. Note: VFI IDs 4096 and 4097 are reserved identifiers used in MPLS PW. Note: The theoretical maximum for the maximum number of

VFI is 65535 but the actual number of VFI supported is a sizing constant. Based on this, the maximum number of VFI ID accepted in the management interface is restricted. For example if 100 VFIs are supported, the maximum number of VFI supported will be restricted to a hundred added to the maximum number of VLANs. An error message is displayed for any value beyond this range.

- **switch <switch-name >** - Adds a static entry in the ARP cache for the specified context. This value represents unique name of the switch context feature. This value is a string of maximum size 32.

- **<interface-type>** - Adds a static static entry in the ARP cache for the specified interface.
  - **fastethernet** – Officially referred to as 100BASE-T standard. This is a version of LAN standard architecture that supports data transfer upto 100 Megabits per second.
  - **XL-ethernet** – A version of LAN standard architecture that supports data transfer upto 40 Gigabits per second.
  - **extreme-ethernet** – A version of Ethernet that supports data transfer upto 10 Gigabits per second.
  - **i-lan** – Internal LAN created on a bridge per IEEE 802.1ap.

- **<interface-id**> - Adds a static static entry in the ARP cache for the specified interface identifier. This is a unique value that represents the specific interface. This value is a combination of slot number and port number separated by a slash, for interface type other than i-lan and port-channel. For example: 0/1 represents that the slot number is 0 and port number is 1. Only i-lan ID is provided, for interface types i-lan. For example:1 represents i-lan ID.

- **Linuxvlan<interface-name>** - Sets the Linux VLAN Interface.

- **Cpu0** - Sets the Out of Band Management Interface for the route.

- **<IP-interface-type> -** Adds a static static entry in the ARP cache for the specified L3 pseudowire interface in the system.

- **<IP-interface-number> -** Adds a static static entry in the ARP cache for the specified L3 pseudowire interface identifier. This is a unique value that represents the specific interface. This value ranges from 1 to 65535 for pseudowire interface.

  Note: Maximum number of pseudowire interfaces supported in the system is 100.

Mode	Global Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Note:	• Interface must be a router port.

	• VRF instance should be created before executing this command to add static entry for the context. • VRF instance should be mapped to the IPv4 or IPv6 interface, before executing this command to add static entry for the context in the interface.
Example	`SEFOS(config)#  arp 12.0.0.5 00:11:22:33:44:55 Vlan 1`
Related Command(s)	• **`ip vrf`** - Creates VRF instance. • **`ip vrf information`** - Maps the IPV4 or IPV6 interface to the context. • **`show ip arp`** - Displays IP ARP table for the given VLAN ID/IP Address of ARP entry/MAC Address of ARP entry/IP ARP summary table/ARP configuration information. • **`no switchport`** - Configures the port as a router port.

22.2.7 ip arp max-retries

Command Objective	This command sets the maximum number of ARP request retries. The maximum number of ARP requests that the switch generates before deleting an un-resolved ARP entry is defined. The no form of this command sets the maximum number of ARP request retries to its default value.
Syntax	**ip arp [vrf <vrf-name>] max-retries <value (2-10)>** **no ip arp [vrf <vrf-name>] max-retries**
Parameter Description	• **vrf<vrf-name>** - Sets maximum number of ARP request retries for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32. • **<value (2-10)>** - Configures the maximum number of ARP request entries.This value ranges from 2 to 10.
Mode	Global Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Default	3
Note:	VRF instance should be created before executing this command to configure the maximum number of ARP request retries for the context.
Example	**SEFOS(config)# ip arp max-retries 2**
Related Command(s)	• **ip vrf** - Creates VRF instance. • **show ip arp** - Displays IP ARP table for the given VLAN ID/IP Address of ARP entry/MAC Address of ARP entry/IP ARP summary table/ARP configuration information.

22.2.8 ip proxyarp-subnetoption

Command Objective	This command enables proxy ARP subnet check. SEFOS acts as ARP proxy for target address in different subnet, when subnet check is enabled. The no form of the command disables proxy ARP subnet check. SEFOS acts as ARP proxy for target address in same or different subnet that is used in IP-DSLAM (Digital Subscriber Line Access Multiplexer) case, when subnet check is disabled.
Syntax	**`ip proxyarp-subnetoption`** **`no ip proxyarp-subnetoption`**
Mode	Global Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Default	Proxy ARP subnet check is enabled.
Example	**`SEFOS(config)# ip proxyarp-subnetoption`**

22.2.9 ipv4 enable

Command Objective	This command enables IPv4 processing on the interface that has not been configured with an explicit IPv4 address. The no form of this command disables IPv4 processing on the interface.
Syntax	**ipv4 enable** **no ipv4 enable**
Mode	Interface Configuration Mode (VLAN)
Package	Workgroup, Enterprise, Metro_E, and Metro
Default	enable
Example	**SEFOS(config-if)# ipv4 enable**
Related Command(s)	• **show ip information** - Displays IP configuration information.

22.2.10 ip proxy-arp

Command Objective	This command enables proxy ARP for the interface. The no form of the command disables proxy ARP for the interface.
Syntax	**ip proxy-arp** **no ip proxy-arp**
Mode	Interface Configuration Mode (VLAN)
Package	Workgroup, Enterprise, Metro_E, and Metro
Default	Proxy ARP is disabled.
Example	**SEFOS(config-if)# ip proxy-arp**
Related Command(s)	• **show ip proxy-arp** - Displays the status of the proxy ARP for all the created interfaces.

22.2.11 show ip traffic

Command Objective	This command displays the IP protocol statistics.
Syntax	**show ip traffic [vrf <vrf-name>] [interface { Vlan<vlan-id/vfi-id> [switch <switch-name>] | tunnel <tunnel-id (1-128)> | <interface-type> <interface-id> | Linuxvlan <interface-name> | <IP-interface-type> <IP-interface-number> }] [hc]**
Parameter Description	• **vrf<vrf-name>** - Displays the IP protocol statistics for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32. • **Vlan <vlan-id/vfi-id>** - Displays the IP protocol statistics for the specified VLAN / VFI ID. This value ranges from 1 to 65535. ▪ **<vlan –id>** - VLAN ID is a unique value that represents the specific VLAN. This value ranges from 1 to 4094. ▪ **<vfi-id>** - VFI ID is a VLAN created in the system which contains pseudowires and attachment circuits as member ports. This creates a logical LAN for the VPLS service. This value ranges from 4096 to 65535. Note: The VLAN ID 4095 is reserved and may be used to indicate a wildcard match for the VID in management operations or filtering database entries. Note: VFI IDs 4096 and 4097 are reserved identifiers used in MPLS PW. Note: The theoretical maximum for the maximum number of VFI is 65535 but the actual number of VFI supported is a sizing constant. Based on this, the maximum number of VFI ID accepted in the management interface is restricted. For example if 100 VFIs are supported, the maximum number of VFI supported will be restricted to a hundred added to the maximum number of VLANs. An error message is displayed for any value beyond this range. • **switch<switch-name>** - Displays the IP protocol statistics for the specified context. This value represents unique name of the switch context feature. • **tunnel<tunnel-id (1-128)>** - Displays the Tunnel identifier. This value ranges from 1 to 128. • **<interface-type>** - Displays the IP protocol statistics for the specified interface type. The interface can be: ▪ **fastethernet** – Officially referred to as 100BASE-T standard. This is a version of LAN standard architecture that supports data transfer

upto 100 Megabits per second.

- **XL-ethernet** – A version of LAN standard architecture that supports data transfer upto 40 Gigabits per second.
- **extreme-ethernet** – A version of Ethernet that supports data transfer upto 10 Gigabits per second.
- **i-lan** – Internal LAN created on a bridge per IEEE 802.1ap.

- **<interface-id>** - Displays the interface ID. This is a unique value that represents the specific interface. This value is a combination of slot number and port number separated by a slash, for interface type other than i-lan. For example: 0/1 represents that the slot number is 0 and port number is 1. Only i-lan ID is provided for interface types i-lan. For example: 1 represents i-lan

- **Linuxvlan <interface-name>** - Displays the Linux IP VLAN identifier

- **<IP-interface-type> -** Displays the IP statistics for the specified L3 pseudowire interface in the system.

- **<IP-interface-number> -** Displays the IP statistics for the specified L3 pseudowire interface identifier. This is a unique value that represents the specific interface. This value ranges from 1 to 65535 for pseudowire interface.

  Note: Maximum number of pseudowire interfaces supported in the system is 100.

- **hc** - Displays the high counters statistics.

Mode Privileged EXEC Mode

Package Workgroup, Enterprise, Metro_E, and Metro

Example

```
SEFOS# show ip traffic
VRF Name:           default
-----------------
IP Statistics
--------------------
 Rcvd:  0 total, 0 header error discards
   0 bad ip address discards, 0 unsupported protocol
discards
 Frags: 0 reassembled, 30 timeouts, 0 needs reassembly
        0 fragmented, 0 couldn't fragment
 Bcast:  Sent:  0 forwarded, 0 generated requests
 Drop:
    0   InDiscards    0   InDelivers       0   InMcastPkts
    0   InTruncated   0   InOctets         0   InNoRoutes
```

```
    0   ReasmFails    0   InMcast Octets   0   InBcastPkts
    0   OutDiscards   0   OutMcastPkts     0
OutFrgCreates
    0   OutForwDgrms  0   OutTrnsmits      0   OutFrgRqds
    0   OutOctets     0   OutMcstOctets    0   OutBcstPkts
    0   DiscntTime       1000 RefrshRate

ICMP Statistics:

----------------

 Rcvd:  0 total, 0 checksum errors,  0 unreachable, 0
redirects
     0 time exceeded, 0 param problems,  0 quench
     0 echo, 0 echo reply,  0 mask requests, 0 mask
replies,
     0 timestamp , 0 time stamp reply,
 Sent:  0 total, 0 checksum errors,  0 unreachable, 0
redirects
     0 time exceeded, 0 param problems,  0 quench
     0 echo, 0 echo reply,  0 mask requests, 0 mask
replies,
        0 timestamp , 0 time stamp reply,

VRF Name:          vr1

----------------

IP Statistics

--------------------

 Rcvd:  0 total, 0 header error discards
   0 bad ip address discards, 0 unsupported protocol
discards
 Frags: 0 reassembled, 30 timeouts, 0 needs reassembly
        0 fragmented, 0 couldn't fragment
 Bcast:  Sent:  0 forwarded, 0 generated requests
 Drop:
    0   InDiscards    0   InDelivers       0   InMcastPkts
    0   InTruncated   0   InOctets         0   InNoRoutes
    0   ReasmFails    0   InMcast Octets   0   InBcastPkts
    0   OutDiscards   0   OutMcastPkts     0
OutFrgCreates
    0   OutForwDgrms  0   OutTrnsmits      0   OutFrgRqds
    0   OutOctets     0   OutMcstOctets    0   OutBcstPkts
    0   DiscntTime    1000 RefrshRate
```

```
ICMP Statistics:
----------------
 Rcvd:  0 total, 0 checksum errors,  0 unreachable, 0
redirects
     0 time exceeded, 0 param problems,  0 quench
     0 echo, 0 echo reply,  0 mask requests, 0 mask
replies,
     0 timestamp , 0 time stamp reply,
 Sent:  0 total, 0 checksum errors,  0 unreachable, 0
redirects
     0 time exceeded, 0 param problems,  0 quench
     0 echo, 0 echo reply,  0 mask requests, 0 mask
replies,
     0 timestamp , 0 time stamp reply,
SEFOS# show ip traffic vrf vr1
VRF Name:          vr1
----------------
IP Statistics
---------------------
 Rcvd:  0 total, 0 header error discards
   0 bad ip address discards, 0 unsupported protocol
discards
 Frags: 0 reassembled, 30 timeouts, 0 needs reassembly
        0 fragmented, 0 couldn't fragment
 Bcast:  Sent:  0 forwarded, 0 generated requests
 Drop:
    0   InDiscards    0   InDelivers       0   InMcastPkts
    0   InTruncated   0   InOctets         0   InNoRoutes
    0   ReasmFails    0   InMcast Octets   0   InBcastPkts
    0   OutDiscards   0   OutMcastPkts     0
OutFrgCreates
    0   OutForwDgrms  0   OutTrnsmits      0   OutFrgRqds
    0   OutOctets     0   OutMcstOctets    0   OutBcstPkts
    0   DiscntTime       1000 RefrshRate
ICMP Statistics:
----------------
 Rcvd:  0 total, 0 checksum errors,  0 unreachable, 0
redirects
     0 time exceeded, 0 param problems,  0 quench
```

```
     0 echo, 0 echo reply,  0 mask requests, 0 mask
replies,
     0 timestamp , 0 time stamp reply,
 Sent:  0 total, 0 checksum errors,  0 unreachable, 0
redirects
     0 time exceeded, 0 param problems,  0 quench
     0 echo, 0 echo reply,  0 mask requests, 0 mask
replies,
        0 timestamp , 0 time stamp reply,
```

22.2.12 show ip information

Command Objective	This command displays IP configuration information.
Syntax	**show ip information [vrf <vrf-name>]**
Parameter Description	• **vrf <vrf-name>** - Displays the configured IP information for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32.
Mode	Privileged EXEC Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Default	vrf - default
Note:	For Linux IP, this command displays only the IP Routing status and the default TTL value.
Example	**SEFOS# show ip information** VRF Name: default Global IP Configuration: ----------------------- IP routing is enabled default TTL is 64 ICMP redirects are always sent ICMP unreachables are always sent ICMP echo replies are always sent ICMP mask replies are always sent Number of aggregate routes is 50 Number of multi-paths is 2 Load sharing is disabled Path MTU discovery is disabled VRF Name: vr1 Global IP Configuration: ----------------------- IP routing is enabled default TTL is 64 ICMP redirects are always sent

```
 ICMP unreachables are always sent
 ICMP echo replies are always sent
 ICMP mask replies are always sent
 Number of aggregate routes is 50
 Number of multi-paths is 2
 Load sharing is disabled
 Path MTU discovery is disabled
SEFOS# show ip information vrf vr1
VRF  Name:     vr1
Global IP Configuration:
------------------------
 IP routing is enabled
 default TTL is 64
 ICMP redirects are always sent
 ICMP unreachables are always sent
 ICMP echo replies are always sent
 ICMP mask replies are always sent
 Number of aggregate routes is 50
 Number of multi-paths is 2
 Load sharing is disabled
 Path MTU discovery is disabled
```

Related Command(s)

- **ip redirects** - Enables sending ICMP.
- **ip unreachable** - Enables sending ICMP unreachable message.
- **ip mask-reply** - Enables sending ICMP Mask Reply messages.
- **ip echo-reply** - Enables sending ICMP Echo Reply messages.
- **maximum-paths** - Sets the maximum number of multipaths.
- **ip aggregrate-route** - Sets the maximum number of aggregate routes.
- **ip path mtu discover** - Enables path MTU discovery.
- **traffic-share** - Enables traffic sharing.
- **ip routing** – Enables IP routing.
- **ip default-ttl** - Sets the Time-To-Live (TTL) value.

- **`ipv4 enable`** - Enables IPv4 processing on the interface.

22.2.13 show ip route

Command Objective	This command displays the IP routing table.
Syntax	**show ip route [vrf <vrf-name>] [{ <ip-address> [<mask>] | bgp | connected | ospf | rip | static | summary | details }]**
Parameter Description	• **vrf<vrf-name>** - Displays the IP routing table for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32. • **<ip-address>** - Displays the IP routing table for the specified destination IP address. • **<mask>** - Displays the IP routing table for the specified prefix mask address. • **bgp** - Displays the Border Gateway Protocol if it is used by the table to get route information. • **connected** - Displays the Directly Connected Network Routes. • **ospf** - Displays the OSPF (Open Shortest Path First) protocol if it is used to get route information. • **rip** - Displays the RIP (Routing Information Protocol) if it is used to get route information. • **static** - Displays the static routes in the table. • **summary** - Displays the summary of all routes. • **details** - Displays the information about route status (Route in Hardware, Route Reachable, Best Route)
Mode	Privileged EXEC Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Default	vrf - default
Example	**SEFOS# show ip route** Codes: C - connected, S - static, R - rip, B - bgp, O - ospf IA - OSPF inter area, N1 - OSPF NSSA external type 1,

```
N2 - OSPF NSSA external type 2, E1 - OSPF external type 1,
E2 - OSPF external type 2
Vrf Name:          default
---------
C 12.0.0.0/8  is directly connected, vlan1
O IA 15.0.0.0/8  [2] via 12.0.0.7
O E2 20.0.0.0/8  [10] via 12.0.0.7
```

SEFOS# show ip route vrf vr1

```
Vrf Name:          vr1
---------
C 14.0.0.0/8  is directly connected, vlan3
```

SEFOS# show ip route summary

```
VRF Name:          default
----------------
Route SourceRoutes
connected         2
static            0
rip               0
bgp               0
ospf              2
Total             4
Total ECMP routes 2
```

SEFOS# show ip route static

```
Vrf Name:          default
----------------
S 30.0.0.2/32 is directly connected, vlan1
```

SEFOS# show ip route details

```
Codes: C - connected, S - static, R - rip, B - bgp, O -
ospf
IA - OSPF inter area, N1 - OSPF NSSA external type 1,
N2 - OSPF NSSA external type 2, E1 - OSPF external type 1,
E2 - OSPF external type 2
BR - Best Route
HW - Hardware Status, RE - Reachable Route

Vrf Name:          default
```

```
---------
C 12.0.0.0/8  HW  BR  is directly connected, vlan1
S 30.0.0.2/32 HW  BR  is directly connected, vlan1
```

Related Command(s)

- **`ip route`** - Adds a static route.
- **`ip routing`** - Enables IP routing.

22.2.14 show ip arp

Command Objective	This command displays IP ARP table.
Syntax	**show ip arp [vrf <vrf-name>][{ Vlan <vlan-id/vfi-id> [switch <switch-name>] | <interface-type> <interface-id> | <ipiftype> <ifnum> | <ip-address> | <mac-address> | summary | information | statistics }]**
Parameter Description	• **vrf<vrf-name>** - Displays the IP ARP information for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32. • **Vlan <vlan-id/vfi-id>** - Displays the IP ARP information for the specified VLAN / VFI ID. This value ranges from 1 to 65535. ▪ **<vlan –id>** - VLAN ID is a unique value that represents the specific VLAN. This value ranges from 1 to 4094. ▪ **<vfi-id>** - VFI ID is a VLAN created in the system which contains pseudowires and attachment circuits as member ports. This creates a logical LAN for the VPLS service. This value ranges from 4096 to 65535. Note: The VLAN ID 4095 is reserved and may be used to indicate a wildcard match for the VID in management operations or filtering database entries. Note: VFI IDs 4096 and 4097 are reserved identifiers used in MPLS PW. Note: The theoretical maximum for the maximum number of VFI is 65535 but the actual number of VFI supported is a sizing constant. Based on this, the maximum number of VFI ID accepted in the management interface is restricted. For example if 100 VFIs are supported, the maximum number of VFI supported will be restricted to a hundred added to the maximum number of VLANs. An error message is displayed for any value beyond this range. • **switch<switch-name>** - Displays the IP ARP information for the specified context. This value represents unique name of the switch context. • **<interface-type>** - Displays specified type of interface. The interface can be: ▪ **fastethernet** – Officially referred to as 100BASE-T standard. This is a version of LAN standard architecture that supports data transfer upto 100 Megabits per second. ▪ **XL-ethernet** – A version of LAN standard architecture that supports data transfer upto 40 Gigabits per second. ▪ **extreme-ethernet** – A version of Ethernet that supports data

transfer upto 10 Gigabits per second.

- **<interface-id>** - Displays the specified interface identifier. This is a unique value that represents the specific interface. This value is a combination of slot number and port number separated by a slash, For example: 0/1 represents that the slot number is 0 and port number is 1.
- **<ipiftype> -** Displays the IP ARP information for the specified L3 pseudowire interface in the system.
- **<ifnum> -** Displays the IP ARP information for the specified L3 pseudowire interface identifier. This is a unique value that represents the specific interface. This value ranges from 1 to 65535 for pseudowire interface.

  Note: Maximum number of pseudowire interfaces supported in the system is 100.

- **<ip-address>** - Displays the IP Address of ARP entry.
- **<mac-address>** - Displays the MAC Address of ARP entry.
- **summary** - Displays IP ARP table summary.
- **information** - Displays the ARP configuration information regarding maximum retries and ARP cache timeout.

Mode Privileged EXEC Mode

Package Workgroup, Enterprise, Metro_E, and Metro

Example

```
SEFOS# show ip arp
VRF Id  : 0
VRF Name: default
Address         Hardware Address   Type  Interface  Mapping
-------         ----------------   ----  ---------  -------
12.0.0.100        00:1b:11:c2:94:f6  ARPA  vlan1    Dynamic
15.0.0.10         00:03:02:03:01:04  ARPA  vlan2    Static
VRF Id  : 1
VRF Name: vr1
Address       Hardware Address   Type  Interface  Mapping
-------       ----------------   ----  ---------  ------
14.0.0.10     00:04:02:03:01:04  ARPA  vlan3      Static
SEFOS# show ip arp vrf vr1
VRF Id  : 1
VRF Name: vr1
```

```
Address        Hardware Address   Type  Interface  Mapping
-------        ----------------   ----  ---------  -------
14.0.0.10        00:04:02:03:01:04  ARPA  vlan3      Static
```

SEFOS# show ip arp 12.100

```
Address Hardware Address  Type  Interface  Mapping VRF Name
------- ---------------- ----  ---------  -------  --------
12.0.0.100  00:1b:11:c2:94:f6  ARPA  vlan1  Dynamic default
```

SEFOS# show ip arp 00:04:02:03:01:04

```
Address Hardware Address Type  Interface  Mapping VRF Name
------- ---------------- ----  ---------  -------  --------
14.0.0.10  00:04:02:03:01:04  ARPA  vlan1  Static   default
14.0.0.10  00:04:02:03:01:04  ARPA  vlan3  Static   vr1
```

SEFOS# show ip arp summary

```
VRF Name:     default
3 IP ARP entries, with 0 of them incomplete
VRF Name:     vr1
1 IP ARP entries, with 0 of them incomplete
```

SEFOS# show ip arp vrf vr1 summary

```
VRF Name:     vr1
1 IP ARP entries, with 0 of them incomplete
```

SEFOS# show ip arp information

```
ARP Configurations:
-------------------
VRF Name:  default
 Maximum number of ARP request retries is 3
 ARP cache timeout is 300 seconds
VRF Name:  vr1
 Maximum number of ARP request retries is 3
 ARP cache timeout is 300 seconds
```

SEFOS# show ip arp vrf vr1 information

```
ARP Configurations:
-------------------
VRF Name:  vr1
 Maximum number of ARP request retries is 3
 ARP cache timeout is 300 seconds
```

Related Command(s)	• **`arp timeout`** - Sets the ARP (Address Resolution Protocol) cache timeout. • **`arp – ip address`** - Adds a static entry in the ARP cache. • **`ip arp max-retries`** - Sets the maximum number of ARP request retries.

22.2.15 show ip proxy-arp

Command Objective	This command displays the status of the proxy ARP for all the created interfaces.
Syntax	**show ip proxy-arp [vrf <vrf-name>]**
Parameter Description	• **vrf<vrf-name>** - Displays the status of the proxy ARP for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32.
Mode	Privileged EXEC Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Example	**SEFOS# show ip proxy-arp** PROXY ARP Status ---------------- vlan1 : Disabled vlan2 : Disabled vlan3 : Disabled ---------- **SEFOS# show ip proxy-arp vrf default** PROXY ARP Status ---------------- vlan1 : Disabled vlan2 : Disabled ----------
Related Command(s)	• **ip proxy-arp** - Enables proxy ARP for the interface.

22.2.16 traceroute

Command Objective	This command traces route to the destination IP.
Syntax	**traceroute {<ip-address> | ipv6 <prefix>} [vrf <vrf-name>] [min-ttl <value (1-99)>] [max-ttl <value (1-99)>]**
Parameter Description	• **<ip-address>** - Configures the destination IP address to which a route has to be traced. • **ipv6<prefix>** - Configures the IPv6 prefix for the interface. • **vrf<vrf-name>** - Specifies the VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32. • **min-ttl<value (1-99)>** - Configures the minimum value of the TTL field to be filled up in the IP packets used for the trace route. This value ranges from 1 to 99 seconds. • **max-ttl<value (1-99)>** - Configures the maximum value of the TTL field to be filled up in the IP packets used for the trace route. This value ranges from 1 to 99 seconds.
Mode	Privileged EXEC Mode
Package	Workgroup, Enterprise, Metro, and Metro_E
Default	• min-ttl - 1 • max-ttl - 15
Note:	• VRF instance should be created before executing this command to trace routes for the context. • The maximum value of the TTL field should be always greater than the minimum value of the TTL field.
Example	**SEFOS# traceroute ipv6 4444::2222 min-ttl 1 max-ttl 2** Tracing Route to 4444::2222 with 2 hops max and 1 byte packets [!N - Network Unreachable !H - Host Unreachable !P - Protocol Unreachable] 1 4444::2222 20 ms 10 ms 10 ms
Related Command(s)	• **ip vrf** - Creates VRF instance.

CHAPTER 23

IPv6

IPv6 is a new version of IP which is designed to be an evolutionary step from IPv4. (Internet Protocol Version 6 is abbreviated to IPv6 (where the “6” refers to the assigned version number 6). The previous version of the Internet Protocol is version 4 (referred to as IPv4).

IPv6 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 (e.g. Gigabit Ethernet, OC-12, ATM, and so on) and at the same time still be efficient for low bandwidth networks (e.g. 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 diffused 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

23.1 ipv6 enable

Command Objective	This command 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.
Syntax	**ipv6 enable** **no ipv6 enable**
Mode	Interface Configuration Mode (VLAN)
Package	Workgroup, Enterprise, Metro, and Metro_E
Default	Disabled
Example	**SEFOS(config-if)# ipv6 enable**
Related Command(s)	• **ipv6 address – prefix and prefix length** - 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. • **ipv6 unnumbered** - Sets the associated interface for this unnumbered interface • **ipv6 nd proxy** - Enables ND (Neighbor Discovery) Proxy in the upstream interface. • **ipv6 nd proxy** - Enables the ND Proxy feature in local or global subnet. • **ipv6 nd proxy upstream** - Sets the interface as upstream or downstream Proxy interface.

23.2 ipv6 unicast-routing

Command Objective	This command enables unicast routing which is used for one to one communication across the IPv6 internet. An IPv6 unicast address is an identifier for a single interface, on a single node. A packet that is sent to a unicast address is delivered to the interface identified by that address. The no form of the command disables unicast routing only in the control plane, however the data plane forwarding will not be affected.
Syntax	**`ipv6 unicast-routing [vrf <vrf-name>]`** **`no ipv6 unicast-routing [vrf <vrf-name>]`**
Parameter Description	• **`vrf<vrf-name>`** - Configures IPv6 for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32.
Mode	Global Configuration Mode
Package	Workgroup, Enterprise, Metro, and Metro_E
Default	Enabled
Note:	VRF instance should be created before executing this command to configure the unicast routing in the context.
Example	**`SEFOS(config)# ipv6 unicast-routing`**
Related Command(s)	• **`ipv6 router rip / ipv6 router rip – name`** - Enables RIP6 and enters into the router configuration mode. • **`ip vrf`** - Creates VRF instance.

23.3 ipv6 address - prefix and prefix length

Command Objective	This command configures IPv6 address on the interface. The no form of the command deletes the configured IPv6 address.
Syntax	**ipv6 address <prefix> <prefix Len> [{unicast | anycast | eui64}]** **no ipv6 address <prefix> <prefix Len> [{unicast | anycast | eui64}]**
Parameter Description	• **<prefix>** - Configures the IPv6 prefix for the interface. • **<prefix Len>** - Configures the number of high-order bits in the IPv6 address. These bits are common among all hosts within a network. This value ranges from 0 to 128. • **unicast** - Configures the address type of the prefix as Unicast. • **anycast** - Configures the address type of the prefix as Anycast. • **eui64** - Configures the type of prefix where the latter 64 bits are formed from the link layer address.
Mode	Interface Configuration Mode (VLAN)
Package	Workgroup, Enterprise, Metro, and Metro_E
Default	unicast
Note:	The prefix length for eui64 type must be 64.
Example	**SEFOS(config-if)# ipv6 address 3333::1111 64 unicast**
Related Command(s)	• **show ipv6 interface** - Displays the IPv6 interfaces.

23.4 ipv6 address - ipv6prefix/prefix_length

Command Objective	This command configures IPv6 address on the interface. The no form of this command deletes the configured IPv6 address on the interface. This command is a standardized implementation of the existing command **ipv6 address – prefix** and **prefix length**. It operates similar to the existing command.
Syntax	**ipv6 address {<ipv6prefix/prefix_length> | <string>} [{unicast | anycast | eui-64| link-local}]** **no ipv6 address <ipv6prefix/prefix_length> [{unicast | anycast | eui-64}]**
Parameter Description	• **<ipv6prefix>** - Configures the IPv6 prefix for the interface. • **<prefix_length>** - Configures the length of the prefix (in bits) associated with the IPv6 address. This value ranges from 0 to 128. • **<string>** - Configures both IPv6 prefix and prefix length (in bits) for the interface. • **unicast** - Configures the address type of the prefix as Unicast. • **anycast** - Configures the address type of the prefix as Anycast. • **eui-64** - Configures the address type of prefix as eui-64. In eui-64, the latter 64 bits are formed from the link layer address. Note: The prefix length for eui64 type must be 64. • **link-local** - Configures the address type of the prefix as link-local.
Mode	Interface Configuration Mode (VLAN)
Package	Workgroup, Enterprise, Metro, and Metro_E
Default	unicast
Example	**SEFOS(config-if)# ipv6 address 3333::1111/64 unicast**
Related Command(s)	• **show ipv6 interface** - Displays the IPv6 interfaces. • **ipv6 address – prefix and prefix length** - Configures IPv6

address on the interface.

23.5 ipv6 address - link local

Command Objective	This command configures the IPv6 link-local address on the interface. The link-local address is an IP address that is intended only for communications within the segment of a local network or a point-to-point connection. The no form of the command deletes the configured IPv6 link-local address.
Note:	The configured IPv6 link-local address will be effective only after the expiry of DAD Timer. Hence, for configuring another IPv6 link-local address, a minimum interval of 2 seconds is expected.
Syntax	**`ipv6 address <prefix> link-local`** **`no ipv6 address <prefix> link-local`**
Parameter Description	• **`<prefix>`** - Configures the IPv6 prefix for the interface. Note: The prefix for link-local address should start with "0xfe80". • **`link-local`** - Configures the link local type prefix.
Mode	Interface Configuration Mode (VLAN)
Package	Workgroup, Enterprise, Metro, and Metro_E
Default	fe80::204:2ff:fe03:401 [Down] [scope:Linklocal]
Note:	The prefix specified must be a valid link-local prefix.
Example	**`SEFOS(config-if)# ipv6 address fe80::2222 link-local`**
Related Command(s)	• **`show ipv6 interface`** - Displays the IPv6 interfaces.

23.6 ipv6 - static routes

Command Objective

This command configures static routes which are manually configured and define an explicit path between two networking devices. The static routes are not automatically updated and must be manually reconfigured if the network topology changes.

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

Syntax

```
ipv6 route [vrf <vrf-name>] <prefix> <prefix len>
([<NextHop>] { vlan <vlan-id/vfi-id> [switch <switch-
name> [<administrative distance>] [{unicast |
anycast}]]|[tunnel <id>][<administrative distance>]
[unicast] |  [<administrative distance>] [unicast] |
[<interface-type> <interface-id>] [<administrative
distance>] [unicast] | <IP-interface-type> <IP-interface-
number> [<administrative distance>] [unicast]})
```

```
no ipv6 route [vrf <vrf-name>] <prefix> <prefix len>
([<NextHop>] {[vlan <vlan-id/vfi-id> [switch <switch-
name>]]|[tunnel <id>]}) [<administrative distance>]
[unicast] | [<interface-type> <interface-id>]
[<administrative distance>] [unicast] | <IP-interface-
type> <IP-interface-number> [<administrative distance>]
[unicast]
```

Parameter Description

- **vrf<vrf-name>** - Configures IPv6 for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32.
- **<prefix>** - Configures the IPv6 prefix of the destination.
- **<prefix len>** - Configures the number of high-order bits in the IPv6 address. These bits are common among all hosts within a network. This value ranges from 0 to 128.
- **<Next-Hop>** - Configures the IPv6 prefix of the next hop that is used to reach the next destination network
- **vlan <vlan-id/vfi-id>** - Configures IPv6 static routes for the specified VLAN / VFI ID. This value ranges from 1 to 65535.
  - **<vlan –id>** - VLAN ID is a unique value that represents the specific VLAN. This value ranges from 1 to 4094.
  - **<vfi-id>** - VFI ID is a VLAN created in the system which contains pseudowires and attachment circuits as member ports. This creates a logical LAN for the VPLS service. This value ranges from 4096 to 65535.

    Note: The VLAN ID 4095 is reserved and may be used to indicate a wildcard match for the VID in management

operations or filtering database entries.

Note: VFI IDs 4096 and 4097 are reserved identifiers used in MPLS PW.

Note: The theoretical maximum for the maximum number of VFI is 65535 but the actual number of VFI supported is a sizing constant. Based on this, the maximum number of VFI ID accepted in the management interface is restricted. For example if 100 VFIs are supported, the maximum number of VFI supported will be restricted to a hundred added to the maximum number of VLANs. An error message is displayed for any value beyond this range.

- **switch<switch-name>** - Configures IPv6 for the specified context. This value represents unique name of the switch context. This value is a string of maximum size 32. This parameter is specific to multiple instance feature.
- **<administrative distance>** - Configures the metric to reach the destination. This value ranges from 0 to 65535.
- **unicast** – Configures the prefix type as Unicast.
- **anycast** – Configures the prefix type as Anycast.

- **tunnel<id>** - Configures the IPv6 static routes for Tunnel Identifier. The value ranges from 0 to 128.
  - **<administrative distance>** - Configures the metric to reach the destination. This value ranges from 0 to 65535.
  - **unicast** - Configures the prefix type as Unicast.

- **<administrative distance>** - Configures the metric to reach the destination. This value ranges from 0 to 65535

- **unicast** - Configures the prefix type as Unicast.

- **<interface-type> -** Configures static routes for the specified type of interface. The interface can be:
  - **fastethernet** – Officially referred to as 100BASE-T standard. This is a version of LAN standard architecture that supports data transfer upto 100 Megabits per second.
  - **XL-ethernet** – A version of LAN standard architecture that supports data transfer upto 40 Gigabits per second.
  - **extreme-ethernet** – A version of Ethernet that supports data transfer upto 10 Gigabits per second.
  - internal-lan – Internal LAN created on a bridge per IEEE 802.1ap.

- **<interface-id>** - Configures static routes for the specified interface identifier. This is a unique value that represents the specific interface. This value is a combination of slot number and port number separated by a slash, For example: 0/1 represents that the slot number is 0 and port number is 1. Only i-lan ID is provided, for interface internal-lan. For example: 1 represents internal-lan ID.

- **<administrative distance>** - Configures the metric to reach the destination. This value ranges from 0 to 65535.
- **unicast** - Configures the prefix type as Unicast.

- **<IP-interface-type> -** Configures static routes in the specified L3 pseudowire interface in the system.
- **<IP-interface-number> -** Configures static routes for the specified L3 pseudowire interface identifier. This is a unique value that represents the specific interface. This value ranges from 1 to 65535 for pseudowire interface.

  Note: Maximum number of pseudowire interfaces supported in the system is 100.

  - **<administrative distance>** - Configures the metric to reach the destination. This value ranges from 0 to 65535.
  - **unicast** - Configures the prefix type as Unicast.

Mode

Global Configuration Mode

Package

Workgroup, Enterprise, Metro, and Metro_E

Default

- administrative distance – 1
- vrf - default
- unicast

Note:

- A route will be configured only when a proper route exists for the next-hop prefix in the route table. Also, the duplicate address detection should be completed and the address should not be in tentative state.
- VRF instance should be created before executing this command to configure the static routes for the context.
- VRF instance should be mapped to the IPv4 or IPv6 interface, before executing this command to configure the static routes for the context in the interface.

Example

```
SEFOS(config)# ipv6 route 1111::2872 7 3333::1111 vlan 1
switch default
```

Related Command(s)

- **ipv6 – link local address** – Configures the IPv6 link-local address on the interface.
- **show ipv6 route** - Displays the IPv6 routes.
- **show ipv6 route – summary** - Displays the IPv6 routes summary information.
- **ip vrf –** Creates VRF instance.

- **`ip vrf forwarding`** - Maps the IPv4 or IPv6 interface to the context.

23.7 ipv6 - neighbor

Command Objective

This command 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.

Syntax

```
ipv6 neighbor [vrf <vrf-name>] <prefix> {vlan <vlan-
id/vfi-id> | tunnel <id> | <IP-interface-type> <IP-
interface-number> } <MAC ADDRESS (xx:xx:xx:xx:xx:xx)>

no ipv6 neighbor [vrf <vrf-name>] <prefix> {vlan <vlan-
id/vfi-id> | tunnel <id> | <IP-interface-type> <IP-
interface-number> } <MAC ADDRESS (xx:xx:xx:xx:xx:xx)>
```

Parameter Description

- **vrf<vrf-name>** - Configures IPv6 for the specified VRF instance. This value is a string of maximum size 32.
- **<prefix>** - Configures the IPv6 prefix of the neighbor.
- **vlan <vlan-id/vfi-id>** - Configures a static entry in the IPv6 neighbor cache table for the specified VLAN / VFI ID. This value ranges from 1 to 65535.
  - **<vlan –id>** - VLAN ID is a unique value that represents the specific VLAN. This value ranges from 1 to 4094.
  - **<vfi-id>** - VFI ID is a VLAN created in the system which contains pseudowires and attachment circuits as member ports. This creates a logical LAN for the VPLS service. This value ranges from 4096 to 65535.

    Note: The VLAN ID 4095 is reserved and may be used to indicate a wildcard match for the VID in management operations or filtering database entries.

    Note: VFI IDs 4096 and 4097 are reserved identifiers used in MPLS PW.

    Note: The theoretical maximum for the maximum number of VFI is 65535 but the actual number of VFI supported is a sizing constant. Based on this, the maximum number of VFI ID accepted in the management interface is restricted. For example if 100 VFIs are supported, the maximum number of VFI supported will be restricted to a hundred added to the maximum number of VLANs. An error message is displayed for any value beyond this range.
- **tunnel<id>** - Configures the Tunnel Identifier. ID range varies between 0 and 128.
- **<IP-interface-type> -** Configures static entry in the IPv6 neighbor

	cache table for the specified L3 pseudowire interface in the system. • **<IP-interface-number> -** Configures static entry in the IPv6 neighbor cache table for the specified interface identifier. This is a unique value that represents the specific interface. This value ranges from 1 to 65535 for pseudowire interface. Note: Maximum number of pseudowire interfaces supported in the system is 100. • **<MAC ADDRESS(xx:xx:xx:xx:xx:xx)>** - Configures the Link layer address of the interface address range.
Mode	Global Configuration Mode
Package	Workgroup, Enterprise, Metro, and Metro_E
Example	**SEFOS(config)# ipv6 neighbor 3333::1111 vlan 1 00:11:22:33:44:55**
Related Command(s)	• **clear ipv6 neighbors** - Removes all the entries in the IPv6 neighbor table. • **show ipv6 neighbors** - Displays the IPv6 Neighbor Cache entries. • **ip vrf** - Creates VRF instance. • **ip vrf forwarding** - Maps the IPv4 or IPv6 interface to the context. • **int tunnel** – Creates Tunnel ID.

23.8 ipv6 default – hop limit

Command Objective	This command sets the default hop limit for IPv6 Datagrams, where the Hop Limit value should be placed in the router advertisements sent on the IPv6 interface. The no form of command resets default hop limit for IPv6 Datagrams.
Syntax	**`ipv6 default-hop limit [vrf <vrf-name>] <HopLimit (1-255)>`** **`no ipv6 default-hop limit [vrf <vrf-name>]`**
Parameter Description	• **`vrf<vrf-name>`** - Configures IPv6 for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32. • **`<HopLimit (1-255)>`** - Configures the hop limit value for the IPv6 datagrams. This value ranges from 1 to 255.
Mode	Global Configuration Mode
Package	Workgroup, Enterprise, Metro, and Metro_E
Note:	VRF instance should be created before executing this command to configure the default hop limit for the context.
Example	**`SEFOS(config)# ipv6 default-hop limit 100`**
Related Command(s)	• **`ip vrf`** – Creates VRF instance.

23.9 ipv6 nd suppress-ra

Command Objective	This command suppresses IPv6 router advertisement. The no form of the command enables IPv6 router advertisement.
Syntax	**ipv6 nd suppress-ra** **no ipv6 nd suppress-ra**
Mode	Interface Configuration Mode (VLAN)
Package	Workgroup, Enterprise, Metro, and Metro_E
Default	Router advertisements are suppressed.
Example	**SEFOS(config-if)# ipv6 nd suppress-ra**
Related Command(s)	• **show ipv6 interface –** Displays the IPv6 interfaces. • **show ipv6 traffic –** Displays the IPv6 ICMP and UDP statistics.

23.10 ipv6 nd managed-config flag

Command Objective	This command sets the 'managed config flag' which allows the host to use DHCP for address configuration. This flag is used to enable or disable Path MTU Discovery for the node. The no form of the command resets the 'managed config flag' which does not allow the host to use DHCP for address configuration.
Syntax	**ipv6 nd managed-config flag** **no ipv6 nd managed-config flag**
Mode	Interface Configuration Mode (VLAN)
Package	Workgroup, Enterprise, Metro, and Metro_E
Example	**SEFOS(config-if)# ipv6 nd managed-config flag**

23.11 ipv6 nd other-config flag

Command Objective	This command 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'
Syntax	**`ipv6 nd other-config flag`** **`no ipv6 nd other-config flag`**
Mode	Interface Configuration Mode (VLAN)
Package	Workgroup, Enterprise, Metro, and Metro_E
Example	**`SEFOS(config-if)# ipv6 nd other-config flag`**
Related Command(s)	• **`no ip v6 nd suppress-ra`** – Enables IPv6 router advertisement.

23.12 ipv6 hop-limit

Command Objective	This command configures the maximum hop limit for all IPv6 packets originating from the interface. The hop limit value ranges between 0 and 255. Note: The hop limit value ranges between 1 and 255 if the unicast routing is disabled on the interface. The no form of the command resets the hop limit to default value for all IPv6 packets.
Syntax	**`ipv6 hop-limit <HopLimit (0-255)>`** **`no ipv6 hop-limit`**
Mode	Interface Configuration Mode (VLAN)
Package	Workgroup, Enterprise, Metro, and Metro_E
Default	64
Example	**`SEFOS(config-if)# ipv6 hop-limit 100`**
Related Command(s)	• **`ipv6 unicast-routing`** - Enables unicast routing on the interface.

23.13 ipv6 nd ra-lifetime

Command Objective	This command sets the IPv6 Router Advertisement lifetime and specifies the preferred lifetime in seconds for the address prefixes corresponding to those addresses which use this profile. The value of the lifetime ranges between 0 and 9000. The no form of the command resets the IPv6 Router Advertisement lifetime to its default value.
Syntax	**ipv6 nd ra-lifetime <LifeTime (0-9000)>** **no ipv6 nd ra-lifetime**
Mode	Interface Configuration Mode (VLAN)
Package	Workgroup, Enterprise, Metro, and Metro_E
Default	The default value is equal to `3* MaxRtrAdvInterval`. Generally, the default value is1800 seconds, as the default value for MaxRtrAdvInterval is 600 seconds.
Note:	The ND RA lifetime value must be greater than or equal to the RA interval. (**ipv6 nd ra-interval**)
Example	**SEFOS(config-if)# ipv6 nd ra-lifetime 9000**
Related Command(s)	• **ipv6 nd ra-interval** – Sets the IPv6 Router Advertisement interval. • **no ipv6 nd suppress-ra** – Enables IPv6 router advertisement. • **ipv6 nd ra-interval** – Sets the IPv6 Router Advertisement interval. • **show ipv6 interface** – Displays the IPv6 interfaces.

23.14 ipv6 nd dad attempts

Command Objective	This command sets the number of duplicate address detection (DAD) attempts, where the maximum number of neighbor solicitations are sent for the purpose of duplicate address detection on a tentative address. The value of the number of duplicate address detection attempt ranges between 0 and 10. The no form of the command resets the duplicate address detection attempts to its default value.
Syntax	**`ipv6 nd dad attempts <no of attempts (1-10)>`** **`no ipv6 nd dad attempts`**
Mode	Interface Configuration Mode (VLAN)
Package	Workgroup, Enterprise, Metro, and Metro_E
Default	1
Example	**`SEFOS(config-if)# ipv6 nd dad attempts 5`**
Related Command(s)	• **`show ipv6 interface`** – Displays the IPv6 interfaces. • **`no ip v6 nd suppress-ra`** – Enables IPv6 router advertisement.

23.15 ipv6 nd reachable-time

Command Objective	This command sets the advertised reachability time which is to be indicated in the router advertisements sent on this IPv6 interface and is also used by this entity. The no form of the command resets the advertised reachability time to default value.
Syntax	**ipv6 nd reachable-time {<Reachable Time (0-3600)> | msec <Reachable Time (0-3600000)> }** **no ipv6 nd reachable-time**
Parameter Description	• **<Reachable Time (0-3600)>** - Defines the time in seconds that a neighboring node is considered to be reachable after having received the reachability confirmation from that node. This value ranges from 0 to 3600. • **msec <Reachable Time (0-3600000)>** - Defines the time in milliseconds that a neighboring node is considered to be reachable after having received the reachability confirmation from that node. This value ranges from 0 to 3600 in milliseconds.
Mode	Interface Configuration Mode (VLAN)
Package	Workgroup, Enterprise, Metro, and Metro_E
Default	30
Example	**SEFOS(config-if)# ipv6 nd reachable-time 500**
Related Command(s)	• **show ipv6 interface** – Displays the IPv6 interfaces. • **no ip v6 nd suppress-ra** – Enables IPv6 router advertisement.

23.16 ipv6 nd ns - interval

Command Objective	This command sets the advertised retransmission time which is to be indicated in the router advertisements sent on this IPv6 interface and also used by this entity. Defines the time in milliseconds between retransmitted Neighbor Solicitations which is used during address resolution, unreachability detection, and duplicate address detection. This value ranges from 1000 to 3600000 in milliseconds. The no form of the command resets the advertised retransmission time to default value.
Syntax	**ipv6 nd ns-interval <Retranmission time (1000-3600000) in milliseconds>** **no ipv6 nd ns-interval**
Mode	Interface Configuration Mode (VLAN)
Package	Workgroup, Enterprise, Metro, and Metro_E
Example	**SEFOS(config-if)# ipv6 nd ns-interval 1000**
Related Command(s)	• **show ipv6 interface** – Displays the IPv6 interfaces.

23.17 ipv6 nd ra mtu

Command Objective	This command sets router advertisement MTU optional value which contains an entry for a specific path traversed by packets exchanged between the source and destination nodes. The value ranges from 1280 to 1500. The no form of the command resets router advertisement MTU option value to its default value.
Syntax	**ipv6 nd ra-mtu <router advertisement MTU option value(1280-1500)>** **no ipv6 nd ra-mtu**
Mode	Interface Configuration Mode (VLAN)
Package	Workgroup, Enterprise, Metro, and Metro_E
Default	1500
Example	**SEFOS(config-if)# ipv6 nd ra-mtu 1300**
Related Command(s)	• **show ipv6 interface** - Displays the IPv6 interfaces.

23.18 ipv6 nd ra-interval

Command Objective	This command sets the IPv6 Router Advertisement interval. The no form of the command resets the IPv6 Router Advertisement interval to its default value.
Syntax	**ipv6 nd ra-interval <maximum-interval-secs(4-1800)> [<minimum-interval-secs(3-1350)>]** **no ipv6 nd ra-interval**
Parameter Description	• **<maximum interval-secs (4-1800)>** - Configures the maximum time in seconds between sending unsolicited router advertisements. This value ranges from 4 to 1800. Maximum interval should be greater than or equal to 4/3 times of the minimum interval. • **<minimum-interval-secs(3-1350)>** - Configures the minimum time in seconds allowed between sending unsolicited router advertisements. The default value is 1/3 the default value of router advertisement time. This value ranges from 3 to 1350 seconds.
Mode	Interface Configuration Mode (VLAN)
Package	Workgroup, Enterprise, Metro, and Metro_E
Default	• Maximum interval - 600 seconds • Minimum interval – 198 seconds
Example	**SEFOS(config-if)# ipv6 nd ra-interval 1800**
Related Command(s)	• **show ipv6 interface** - Displays the IPv6 interfaces. • **ipv6 nd ra-lifetime** – Sets the IPv6 Router Advertisement lifetime. • **no ip v6 nd suppress-ra** – Enables IPv6 router advertisement. • **ipv6 nd ra-lifetime** – Sets the IPv6 Router Advertisement lifetime • **ipv6 ra rdnss-lifetime** - Configures Recursive DNS Server (RDNSS) Lifetime value.

23.19 ipv6 nd prefix

Command Objective	This command configures the prefix and sets the flag for the respective prefix to be advertised in IPv6 Router Advertisement. The no form of the command removes the prefix from the IPv6 Router Advertisement.
Syntax	**ipv6 nd prefix {<prefix addr> <prefixlen(1-128)> | default} [{{<valid lifetime> | infinite | at <var valid lifetime> }{<preferred lifetime> |infinite | at <var preferred lifetime>} | no-advertise}][{off-link | on-link}]** **ipv6 nd prefix {<prefix addr> <prefixlen(1-128)> | default} [{{<valid lifetime> | infinite | at <var valid lifetime>}{<preferred lifetime> |infinite | at <var preferred lifetime>} | no-advertise}] ([no-autoconfig] [embedded-rp])** **no ipv6 nd prefix {<prefix addr> <prefix len> | default}**
Parameter Description	• **<prefix addr>** - Configures the IPv6 prefix to be advertised. • **<prefixlen(1-128)>** - Configures the number of high-order bits in the IPv6 address. These bits are common among all hosts within a network. This value ranges from 1 to128. • **default** - Configures the default profile parameters. For new IPv6 prefix configured without specifying any parameters, default profile parameters will be considered. Note: In the no form of the command this parameter sets all the configured parameters to system defaults. • **<valid lifetime>** - Sets the valid lifetime value for the prefix in seconds for the address prefixes corresponding to those addresses which use this profile. This is sent in router advertisements by this entity. The value 4294967295 represents infinity. This value ranges from 0 to 4294967295. • **infinite** - Sets the valid lifetime value as infinite for the specified prefix address. • **at <var valid lifetime>** - Sets the variable valid lifetime value for the prefix. This value ranges from 0 to 4294967295. • **<preferred lifetime>** - Sets the preferred lifetime value for the prefix in seconds for the address prefixes corresponding to those addresses

which use this profile. This is sent in router advertisements by this entity. The value 4294967295 represents infinity. This value ranges from 0 to 4294967295.

- **infinite** - Sets the infinite preferred lifetime value for the prefix
- **at<var preferred lifetime>** - Sets the variable preferred lifetime value for the prefix. This value ranges from 0 to 4294967295.
- **no-advertise** - Sets the No-Advertise flag for the prefix. This specifies that address prefix will not be advertised.
- **off-link** - Sets the off-link flag for the prefix. This specifies that the address prefixes will not have the on-link flag set, if advertised.

  Note: This parameter cannot be configured if rfc5942 compatibility is disabled.

- **on-link** - Sets the on-link flag for the prefix. This specifies that the address prefixes corresponding to those addresses which use this profile will be advertised with on-link flag set in the router advertisements sent by this entity. These prefixes can be used for on-link determination by hosts which receive these router advertisements.

  Note: This parameter cannot be set in FSIP (TARGET_IP).

  Note: This parameter cannot be configured if rfc5942 compatibility is disabled.

- **no-autoconfig** - Sets the no-autoconfig flag for the prefix. This specifies that the address prefixes using this profile will not be advertised with autonomous address configuration flag, set in the router advertisements sent by the entity.
- **embedded-rp** - Sets the flag to control the usage of associated IPv6 Prefix address as a valid embedded-RP prefix on specified interface.

Mode Interface Configuration Mode (VLAN)

Package Workgroup, Enterprise, Metro, and Metro_E

Default

- ra valid lifetime - 4294967295 seconds
- ra preferred lifetime - 60,4800 seconds
- By default, embedded-rp is off.
- By default, auto-config flag is on.
- By default, on-link flag is enabled.

Note: Valid life-time must be greater than or equal to preferred life-time.

Example	**SEFOS(config-if)# ipv6 nd prefix 3333::1111 64 500 400 off-link** **SEFOS(config-if)# ipv6 nd prefix 3333::1111 64 500 400 on-link** **SEFOS(config-if)# ipv6 nd prefix 3333::1111 64 600 500 embedded-rp no-autoconfig**
Related Command(s)	• **show ipv6 interface** - Displays the IPv6 interfaces. • **ipv6 compatible rfc5942** - Configures IPv6 compatibility with RFC5942.

23.20 ping ipv6

Command Objective	This command sends IPv6 echo messages along with the total number of packets to the destination.
Syntax	**ping [vrf <vrf-name>] ipv6 { host <string(255)> | <prefix%interface> } [data <hex_str>] [repeat <count>] [size <value>] [anycast] [source {vlan <vlan-id/vfi-id> [switch <switch-name>] | tunnel <id> | <source_prefix>}] [timeout <value (1-100)>]**
Parameter Description	• **vrf<vrf-name>** - Configures IPv6 for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32. • **host <string(255)>** - Configures the host name. This value is a string of size 255. Note: Since string and token appear at the same junction, auto completion for the token host will not happen due to framework limitation. • **<prefix%interface>** - Configures the IPv6 Destination Prefix. Note: **%Interface** format is applicable only for Linklocal Address. It is not applicable for Global Address. • **data<hex_str>** - Configures the data which is to be sent in ping message. • **repeat<count>** - Configures the number of ping messages. This value ranges from 0 to 10. • **size<value>** - Configures the size of the data portion of the ping packet in the message. • **anycast** - Configures the type of prefix. • **source** - Configures the Source Interface of the ping message. • **vlan <vlan-id/vfi-id>** - Sends IPv6 echo messages for the specified VLAN / VFI ID. This value ranges from 1 to 65535. ▪ **<vlan-id>** - VLAN ID is a unique value that represents the specific VLAN. This value ranges from 1 to 4094. ▪ **<vfi-id>** - VFI ID is a VLAN created in the system which contains pseudowires and attachment circuits as member ports. This creates a logical LAN for the VPLS service. This value ranges from 4096 to 65535.

Note: The VLAN ID 4095 is reserved and may be used to indicate a wildcard match for the VID in management operations or filtering database entries.

Note: VFI IDs 4096 and 4097 are reserved identifiers used in MPLS PW.

Note: The theoretical maximum for the maximum number of VFI is 65535 but the actual number of VFI supported is a sizing constant. Based on this, the maximum number of VFI ID accepted in the management interface is restricted. For example if 100 VFIs are supported, the maximum number of VFI supported will be restricted to a hundred added to the maximum number of VLANs. An error message is displayed for any value beyond this range.

- **switch<switch-name>** - Configures IPv6 for the specified context. This value represents unique name of the switch context. This value is a string of maximum size 32. This parameter is specific to multiple instance feature.
- **tunnel <id>** - Configures tunnel source interface of the ping message. This value ranges from 0 to 128.
- **<source_prefix>** - Configures source prefix of the ping message.
- **timeout <value (1-100)>** - Configures the time in seconds after which this entity times out while waiting for a particular ping response. This value ranges from 1 to 100.

Mode

Privileged EXEC Mode

Package

Workgroup, Enterprise, Metro, and Metro_E

Default

- data - a5a5
- repeat <count> - 5
- size - 100 bytes
- timeout - 5 seconds

Note:

- VRF instance should be created before executing this command, to send echo messages for the context.
- VRF instance should be mapped to the IPv4 or IPv6 interface, before executing this command, to send echo messages for the context in the interface.
- Tunnel ID must be created before executing the command.

Example

```
SEFOS# ping ipv6 1111::2222 data a6b6
```

Related Command(s)	• **`ip vrf –`** Creates VRF instance. • **`ip vrf forwarding`** - Maps the IPv4 or IPv6 interface to the context. • **`int tunnel`** - Creates tunnel ID.

23.21 debug ipv6

Command Objective	This command enables IPv6 Trace. The no form of the command disables IPv6 Trace.
Syntax	**debug ipv6 [vrf <vrf-name>] {IP6|ICMP|UDP6|ND|PING6|TUNNEL}** **no debug ipv6 [vrf <vrf-name>]**
Parameter Description	• **vrf<vrf-name>** - Configures IPv6 for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32. • **IP6** - Generates debug statements for IP6 Trace. • **ICMP** - Generates debug statements for ICMP Trace. • **UDP6** - Generates debug statements for UDP6 Trace. • **ND** - Generates debug statements for Neighbor Discovery Trace. • **PING6** - Generates debug statements for PING6 Trace. • **TUNNEL** - Generates debug statements for Tunnel Trace.
Mode	Privileged EXEC Mode
Package	Workgroup, Enterprise, Metro, and Metro_E
Default	Debug traces are disabled
Note:	VRF instance should be created before executing this command to configure IPv6 trace for the context.
Example	**SEFOS# debug ipv6 IP6**
Related Command(s)	• **ip vrf** - Creates VRF instance.

23.22 traceroute6

Command Objective	This command traces route to the destination.
Note:	This is a deprecated command. For the same functionality refer **traceroute** command.
Syntax	**traceroute6 <ip-address> [vrf <vrf-name>] [min-ttl <value (1-99)>] [max-ttl <value (1-99)>]**
Parameter Description	• **<ip-address>** - Configures the destination IP address to which a route has to be traced. • **vrf<vrf-name>** - Configures IPv6 for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32. • **min-ttl<value (1-99)>** - Configures the minimum value of the TTL field to be filled up in the IP packets used for the trace route. This value ranges from 1 to 99 seconds. • **max-ttl<value (1-99)>** - Configures the maximum value of the TTL field to be filled up in the IP packets used for the trace route. This value ranges from 1 to 99 seconds.
Mode	Privileged EXEC Mode
Package	Workgroup, Enterprise, Metro, and Metro_E
Default	• min-ttl - 1 • max-ttl - 15
Note:	• VRF instance should be created before executing this command to trace routes for the context. • The maximum value of the TTL field should be always greater than the minimum value of the TTL field.
Example	**SEFOS# traceroute6 4444::1111 min-ttl 20 max-ttl 99**
Related Command(s)	• **ip vrf** - Creates VRF instance.

23.23 clear ipv6 neighbors

Command Objective	This command removes all the entries in the IPv6 neighbor table.
Syntax	**clear ipv6 neighbors [vrf <vrf-name>]**
Parameter Description	• **vrf<vrf-name>** - Clears IPv6 for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32.
Mode	Privileged EXEC Mode
Package	Workgroup, Enterprise, Metro, and Metro_E
Note:	VRF instance should be created before executing this command to clear neighbor entries for the context.
Example	**SEFOS# clear ipv6 neighbors**
Related Command(s)	• **ipv6 neighbor** - Configures a static entry in the IPv6 neighbor cache table. • **show ipv6 neighbours** - Displays the IPv6 neighbor cache entries.

23.24 clear ipv6 traffic

Command Objective	This command removes all the entries in the IPv6 traffic table.
Syntax	**clear ipv6 traffic [vrf <vrf-name>]**
Parameter Description	• **vrf<vrf-name>** - Clears entries for the specified VRF instance in the IPv6 traffic table. This value represents unique name of the VRF instance. This value is a string of maximum size 32.
Mode	Privileged EXEC Mode
Package	Workgroup, Enterprise, Metro, and Metro_E
Note:	VRF instance should be created before executing this command to clear traffic entries for the context.
Example	**SEFOS# clear ipv6 traffic**
Related Command(s)	• **show ipv6 traffic** - Displays the IPv6 ICMP and UDP statistics. • **ip vrf** - Creates VRF instance.

23.25 clear ipv6 route

Command Objective	This command removes all the entries in IPv6 route table.
Syntax	**clear ipv6 route [vrf <vrf-name>]**
Parameter Description	• **vrf<vrf-name>** - Clears entry for the specified VRF instance in the IPv6 route table. This value represents unique name of the VRF instance. This value is a string of maximum size 32.
Mode	Privileged EXEC Mode
Package	Workgroup, Enterprise, Metro, and Metro_E
Note:	VRF instance should be created before executing this command to clear traffic entries for the context.
Example	**SEFOS# clear ipv6 route**
Related Command(s)	• **show ipv6 route** - Displays the IPv6 routes. • **ip vrf** - Creates VRF instance.

23.26 show ipv6 interface

Command Objective	This command displays the IPv6 interfaces.
Syntax	**show ipv6 interface [vrf <vrf-name>] [{vlan <vlan-id/vfi-id> | tunnel <id> | <interface-type> <if-num> | <ipiftype> <ifnum> | [loopback <short(0-100)>]} [prefix]]**
Parameter Description	• **vrf<vrf-name>** - Displays the IPv6 interface details for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32. • **vlan <vlan-id/vfi-id>** - Displays the IPv6 interface details for the specified VLAN / VFI ID. This value ranges from 1 to 65535. ▪ **<vlan –id>** - VLAN ID is a unique value that represents the specific VLAN. This value ranges from 1 to 4094. ▪ **<vfi-id>** - VFI ID is a VLAN created in the system which contains pseudowires and attachment circuits as member ports. This creates a logical LAN for the VPLS service. This value ranges from 4096 to 65535. Note: The VLAN ID 4095 is reserved and may be used to indicate a wildcard match for the VID in management operations or filtering database entries. Note: VFI IDs 4096 and 4097 are reserved identifiers used in MPLS PW. Note: The theoretical maximum for the maximum number of VFI is 65535 but the actual number of VFI supported is a sizing constant. Based on this, the maximum number of VFI ID accepted in the management interface is restricted. For example if 100 VFIs are supported, the maximum number of VFI supported will be restricted to a hundred added to the maximum number of VLANs. An error message is displayed for any value beyond this range. • **tunnel<id>** - Displays the IPv6 interface details for tunnel source interface of the ping message. • **<interface-type>** - Displays IPv6 information for the specified type of interface. The interface can be: ▪ **fastethernet** – Officially referred to as 100BASE-T standard. This is a version of LAN standard architecture that supports data transfer upto 100 Megabits per second. ▪ **XL-ethernet** – A version of LAN standard architecture that supports data transfer upto 40 Gigabits per second. ▪ **extreme-ethernet** – A version of Ethernet that supports data transfer upto 10 Gigabits per second.

- internal-lan– Internal LAN created on a bridge per IEEE 802.1ap.
- port-channel – Logical interface that represents an aggregator which contains several ports aggregated together.

- **<if-num>** - Displays IPv6 information for the specified interface identifier. This is a unique value that represents the specific interface. This value is a combination of slot number and port number separated by a slash, for interface type other than i-lan. For example: 0/1 represents that the slot number is 0 and port number is 1. Only i-lan ID is provided, for interface types i-lan. For example: 1 represents i-lan ID.

- **<ipiftype> -** Displays the IPv6 configuration for the specified L3 pseudowire interface in the system.

- **<ifnum> -** Displays IPv6 information for the specified L3 pseudowire interface identifier. This is a unique value that represents the specific interface. This value ranges from 1 to 65535 for pseudowire interface.

  Note: Maximum number of pseudowire interfaces supported in the system is 100.

- **loopback <short(0-100)> -** Displays loopback-related information. This value ranges from 0 to 100.

- **prefix** - Displays the IPv6 interface details for the prefix information for the IPv6 interface.

Mode Privileged EXEC Mode

Package Workgroup, Enterprise, Metro, and Metro_E

Note: The command will execute only if IPv6 is enabled on the interface

Example

```
SEFOS# show ipv6 interface

Forwarding operationally Enabled
Default-hop limit value is 100
RFC5095 is compatible

VRF Id  : 0
VRF Name: default
vlan1 is up, line protocol is up
    Forwarding operationally Enabled
    Link local address:
        fe80::2222 [scope: Linklocal]
    Global unicast address(es):
        3333::1111/64 [Scope:GLOBAL]
```

```
        Joined group address(es):
            ff02::1 Scope:[Multicast linklocal]
            ff02::2 Scope:[Multicast linklocal]
            ff02::1:ff00:1111 Scope:[Multicast linklocal]
            ff02::1:ff00:2222 Scope:[Multicast linklocal]
        ipv6 nd prefix default
                        Addr Profile Valid Life Time Flag :
Fixed
                        Addr Profile Valid Time : 2592000
                        Addr Profile Prefered Life Time Flag :
Fixed
                        Addr Profile Prefered Time : 604800
                        Addr Profile On Link Adv Status : ON
                        Addr Profile Auto conf Adv Status : ON

        ipv6 nd prefix 3333:: 64
                        Addr Profile Valid Life Time Flag :
Fixed
                        Addr Profile Valid Time : 600
                        Addr Profile Prefered Life Time Flag :
Fixed
                        Addr Profile Prefered Time : 500
                        Addr Profile On Link Adv Status :
OFF(off-link)
                        Addr Profile Auto conf Adv Status :
OFF(no-autoconfig)
                        Embedded-rp support enabled

        MTU is 1500
        ICMP redirects are enabled
        ND DAD is enabled, Number of DAD attempts: 5
        Destination Unreachable error messages enabled
        ICMPv6 Error Rate Limiting Enabled
        ICMPv6 Error Rate-Limit Interval: 65534
        ICMPv6 Error Rate-Limit Bucket Size: 178
        ICMPv6 Redirects Enabled
        ND router advertisement is disabled
        RDNSS is disabled
        RDNSS service flag is not set as open
```

```
    RDNSS Preference value  0
    RDNSS Lifetime  value  0
     ND reachable time is 500000 milliseconds
     ND retransmit time is 1000 milliseconds
     ND router advertisements minimum value 198 seconds
     ND router advertisements maximum value 1800 seconds
     ND Router Advertisemnt Life-time: 9000 seconds
     ND router advertisement Link MTU 1300
     ND router advertisement hop-limit 100
     ND Router Advertisement Flag:
        Other-Stateful Flag: Enabled
        Managed Address Flag: Enabled
     ND Proxy Admin Status: Enabled
     ND Proxy Mode : Local
     ND Proxy Upstream : Enabled
     ND Proxy Operational Status : Enabled
Ex0/2 is up, line protocol is down
    Forwarding operationally Enabled
    Link local address:
        fe80::3311   [Down] [scope:Linklocal]
        fe80::202:2ff:fe03:401   [Down] [scope:Linklocal]
    Interface is unnumbered.
    Associated ipv6 interface-index is vlan1.
    Global unicast address(es) of Associated interface:
        3333::1111/64 [Scope:GLOBAL]
    Joined group address(es):
        Not Configured.
    ipv6 nd prefix default
                    Addr Profile Valid Life Time Flag :
Fixed
                    Addr Profile Valid Time : 2592000
                    Addr Profile Prefered Life Time Flag :
Fixed
                    Addr Profile Prefered Time : 604800
                    Addr Profile On Link Adv Status : ON
                    Addr Profile Auto conf Adv Status : ON
```

```
 MTU is 1500
 ICMP redirects are enabled
 ND DAD is enabled, Number of DAD attempts: 1
 Destination Unreachable error messages enabled
 ICMPv6 Error Rate Limiting Enabled
 ICMPv6 Error Rate-Limit Interval: 65534
 ICMPv6 Error Rate-Limit Bucket Size: 178
 ICMPv6 Redirects Enabled
 ND router advertisement is disabled
 RDNSS is disabled
 RDNSS service flag is not set as open
RDNSS Preference value  0
RDNSS Lifetime  value  0
 ND reachable time is 0 milliseconds
 ND retransmit time is 0 milliseconds
 ND router advertisements minimum value 0 seconds
 ND router advertisements maximum value 0 seconds
 ND Router Advertisemnt Life-time: 0 seconds
 ND router advertisement Link MTU 0
 ND router advertisement hop-limit 0
 ND Router Advertisement Flag:
    Other-Stateful Flag: Disabled
    Managed Address Flag: Disabled
 ND Proxy Admin Status: Enabled
 ND Proxy Mode : Local
 ND Proxy Upstream : Enabled
 ND Proxy Operational Status : Enabled
```

```
SEFOS # show ipv6 interface loopback 0 prefix
VRF Id  : 0
VRF Name: default
Codes: A - Address ,  P - Prefix-Advertisement
       D - Default , N - Not Advertised
```

Related Command(s)

- **ipv6 enable** - Enables IPv6 processing on an interface that has not been configured with an explicit IPv6 address.
- **ipv6 address – prefix/prefix length** – Configures IPv6 address on the interface.

- **ipv6 - link local address** – Configures the IPv6 link-local address on the interface.
- **ipv6 nd suppress-ra** – Suppresses 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.
- **ipv6 unnumbered** – Sets the associated interface for this unnumbered interface.
- **ipv6 ra rdnss** – Enables IPv6 RDNSS (Recursive DNS Server) of router advertisement globally.
- **ipv6 ra rdnss-open** – Enables IPv6 RDNSS (Recursive DNS Server) of router advertisement and the RDNSS continues to be available to hosts.
- **ipv6 ra rdnss-preference** – Enables or configures RDNSS (Recursive DNS Server) Preference value.
- **ipv6 ra rdnss-lifetime** – Configures RDNSS (Recursive DNS Server) Lifetime value.
- **ipv6 icmp redirect** – Enables or disables the ICMPv6 redirect messages for an interface.
- **ipv6 ra advt-interval** – Enables advertisement Interval Option flag on an IPv6 for router advertisement.
- **ipv6 ra advt-linklocal** – Enables advertisement link local address flag on an IPv6 for router advertisement.
- **ipv6 compatible rfc5942** – Configures IPv6 compatibility with RFC5942.
- **ipv6 nd proxy** – Enables ND (Neighbor Discovery) Proxy in the upstream interface.
- **ipv6 nd proxy** – Enables the ND Proxy feature in local or global subnet.
- **ipv6 nd proxy upstream** – Sets the interface as upstream or

downstream Proxy interface.

23.27 show ipv6 route

Command Objective	This command displays the IPv6 Routes.
Syntax	**show ipv6 route [vrf <vrf-name>]**
Parameter Description	• **vrf<vrf-name>** - Displays IPv6 information for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32.
Mode	Privileged EXEC Mode
Package	Workgroup, Enterprise, Metro, and Metro_E
Example	**SEFOS# show ipv6 route** VRF Name: default ----------

```
IPv6 Routing Table  -  2 entries
Codes : C - Connected, S - Static
        O - OSPF, R - RIP, B - BGP
C   1111::/64   [1/20]
        via ::, vlan1
C   2222::/64   [1/20]
        via ::, vlan2
VRF    Name:      vr1
----------
IPv6 Routing Table  -  1 entries
Codes : C - Connected, S - Static
        O - OSPF, R - RIP, B - BGP
C   2222::/64   [1/20]
        via ::, vlan3
```

SEFOS# show ipv6 route vrf vr1

```
VRF    Name:      vr1
----------
IPv6 Routing Table  -  1 entries
Codes : C - Connected, S - Static
        O - OSPF, R - RIP, B - BGP
C   2222::/64   [1/20]
```

```
                                via ::, vlan3
```

Related Command(s)

- **`ipv6 - static routes`** – Configures static routes.

23.28 show ipv6 route - summary

Command Objective	This command displays the summary of IPv6 Routes.
Syntax	**show ipv6 route [vrf <vrf-name>] summary**
Parameter Description	• **vrf<vrf-name>** - Displays the summary of the IPv6 routes for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32.
Mode	Privileged EXEC Mode
Package	Workgroup, Enterprise, Metro, and Metro_E
Example	**SEFOS# show ipv6 route summary** VRF Name: default ---------- IPv6 Routing Table Summary - 2 entries 1 Connected, 1 Static, 0 RIP, 0 BGP, 0 OSPF , 0 ISIS Number of prefixes: Total Number of ECMP6 routes: 0 /7: 1 /64: 1
Related Command(s)	• **ipv6 - static routes** – Configures static routes.

23.29 show ipv6 neighbors

Command Objective	This command displays the IPv6 Neighbor Cache entries.
Syntax	**show ipv6 neighbors [vrf <vrf-name>]**
Parameter Description	• **vrf<vrf-name>** - Displays IPv6 information of the neighbors for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32.
Mode	Privileged EXEC Mode
Package	Workgroup, Enterprise, Metro, and Metro_E
Example	**SEFOS# show ipv6 neighbors** VRF Id : 0 VRF Name: default IPv6 Address Link-layer Addr State Interface ------------ --------------- ----- --------- 1111::1222 00:03:02:03:01:04 Static vlan1 2222::1333 00:1b:11:c2:94:f6Reachable vlan2 fe80::21b:11ff:fec2:94f6 00:1b:11:c2:94:f6 Stale vlan2 VRF Id : 1 VRF Name: vr1 IPv6 Address Link-layer Addr State Interface ------------ --------------- ----- -------- 4444::1111 00:03:02:03:01:04 Static vlan3 **SEFOS# show ipv6 neighbors vrf vr1** VRF Id : 1 VRF Name: vr1 IPv6 Address Link-layer Addr State Interface ------------ --------------- ----- -------- 4444::1111 00:03:02:03:01:04 Static vlan3
Related Command(s)	• **ipv6 - neighbor** – Configures a static entry in the IPv6 neighbor cache table. • **clear ipv6 neighbors** - Removes all the entries in the IPv6 neighbor table.

23.30 show ipv6 traffic

Command Objective	This command displays the IPv6 ICMP and UDP statistics.
Syntax	**show ipv6 traffic [vrf <vrf-name>] [interface { vlan <vlan-id/vfi-id> | tunnel <tunnel-id> | <interface-type> <if-num> | <IP-interface-type> <IP-interface-number>}] [hc]**
Parameter Description	• **vrf<vrf-name>** - Displays the IPv6 ICMP and UDP statistics for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32. • **vlan <vlan-id/vfi-id>** - Displays the IPv6 ICMP and UDP statistics for the specified VLAN / VFI ID. This value ranges from 1 to 65535. ▪ **<vlan –id>** - VLAN ID is a unique value that represents the specific VLAN. This value ranges from 1 to 4094. ▪ **<vfi-id>** - VFI ID is a VLAN created in the system which contains pseudowires and attachment circuits as member ports. This creates a logical LAN for the VPLS service. This value ranges from 4096 to 65535. Note: The VLAN ID 4095 is reserved and may be used to indicate a wildcard match for the VID in management operations or filtering database entries. Note: VFI IDs 4096 and 4097 are reserved identifiers used in MPLS PW. Note: The theoretical maximum for the maximum number of VFI is 65535 but the actual number of VFI supported is a sizing constant. Based on this, the maximum number of VFI ID accepted in the management interface is restricted. For example if 100 VFIs are supported, the maximum number of VFI supported will be restricted to a hundred added to the maximum number of VLANs. An error message is displayed for any value beyond this range. • **tunnel-id <tunnel-id>** - Displays the IPv6 ICMP and UDP statisticsfor the specified tunnel ID. The tunnel ID value ranges between 0 and 128. • **<interface-type>** - Displays the IPv6 ICMP and UDP statistics for the specified type of interface. The interface can be: ▪ **fastethernet** – Officially referred to as 100BASE-T standard. This is a version of LAN standard architecture that supports data transfer upto 100 Megabits per second. ▪ **XL-ethernet** – A version of LAN standard architecture that supports data transfer upto 40 Gigabits per second.

- **extreme-ethernet** – A version of Ethernet that supports data transfer upto 10 Gigabits per second.
- **i-lan**– Internal LAN created on a bridge per IEEE 802.1ap.

- **<if-num>** - Displays the IPv6 ICMP and UDP statistics for the specified interface identifier. This is a unique value that represents the specific interface. This value is a combination of slot number and port number separated by a slash, for interface type other than i-lan. For example: 0/1 represents that the slot number is 0 and port number is 1. Only i-lan ID is provided, for interface types i-lan. For example: 1 represents i-lan ID.

- **<IP-interface-type> -** Displays the IPv6 ICMP and UDP statistics for the specified L3 pseudowire interface in the system.

- **<IP-interface-number> -** Displays the IPv6 ICMP and UDP statistics for the specified L3 pseudowire interface identifier. This is a unique value that represents the specific interface. This value ranges from 1 to 65535 for pseudowire interface.

  Note: Maximum number of pseudowire interfaces supported in the system is 100.

- **hc** - Displays the High counters for the ping messages.

  Note: In BCM target, Interface index for all interfaces, for example, VLAN, tunnel, and so on, are unused.

Mode Privileged EXEC Mode

Package Workgroup, Enterprise, Metro, and Metro_E

Example

```
SEFOS# show ipv6 traffic
VRF   Name:          default
---------------
    IPv6 Statistics
    ***************
17Rcvd          0   HdrErrors
0    AddrErrors    0   FwdDgrams     0   UnknownProtos
0    Discards      17   Delivers      11   OutRequests
0    OutDiscards   0   OutNoRoutes   0 ReasmReqds
0ReasmOKs      0 ReasmFails
 Sent:  0    FragOKs     0   FragFails     0   FragCreates
0RcvdMCastPkt  5   SentMcastPkts 0   TruncatedPkts
0RcvdRedirects       0    SentRedirects
 2364   InOctets   0   InNoRoutes        0   OutFwdDatgrms
0   OutFrgRqds     11   OutTrnsmit       1140   OutOctets
```

```
0   InMcstOctets  128   OutMcastOctets     0   InBcstPkts
0   OutBcstPkts   0   DiscntTime       1000 RefrshRate
    ICMP Statistics
    ***************
Received :
17 ICMPPkts  0 ICMPErrPkt    0 DestUnreach  0 TimeExcds
0 ParmProbs 0 PktTooBigMsg   5 ICMPEchoReq 10 ICMPEchoReps
0 RouterSols 0 RouterAdv        1 NeighSols    1 NeighAdv
0 Redirects  0 AdminProhib
    Sent
15   ICMPMsgs  0 ICMPErrMsgs    0 DstUnReach   0 TimeExcds
0   ParmProbs  0 PktTooBigs    10 EchoReq      5 EchoReply
0 RouterSols   0 RouterAdv    5 NeighSols    1 NeighborAdv
0 RedirectMsgs 0 AdminProhibMsgs
    UDP statistics
    **************
Received :
0 UDPDgrams    0 UDPNoPorts       0 UDPErrPkts
    Sent :
0 UDPDgrams
VRF   Name:          vr1
----------------
    IPv6 Statistics
    ***************
0Rcvd          0   HdrErrors
0    AddrErrors    0   FwdDgrams     0   UnknownProtos
0    Discards      0   Delivers      2   OutRequests
0    OutDiscards   0   OutNoRoutes   0 ReasmReqds
0ReasmOKs      0 ReasmFails
 Sent:  0    FragOKs       0   FragFails     0
FragCreates
0RcvdMCastPkt  2   SentMcastPkts 0   TruncatedPkts
0RcvdRedirects   0    SentRedirects
 0   InOctets    0   InNoRoutes          0   OutFwdDatgrms
 0   OutFrgRqds      2   OutTrnsmit        128   OutOctets
 0   InMcstOctets    48   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
    Sent
0 ICMPMsgs   0 ICMPErrMsgs      0 DstUnReach  0 TimeExcds
0 ParmProbs  0 PktTooBigs       0 EchoReq     0 EchoReply
0 RouterSols 0 RouterAdv        2 NeighSols   0
NeighborAdv
0 RedirectMsgs 0 AdminProhibMsgs
    UDP statistics
    **************
Received :
0 UDPDgrams    0 UDPNoPorts       0 UDPErrPkts
    Sent :
0 UDPDgrams
SEFOS# show ipv6 traffic vrf default
VRF   Name:          default
----------------
    IPv6 Statistics
    ***************
17Rcvd          0   HdrErrors
0    AddrErrors    0   FwdDgrams     0   UnknownProtos
0    Discards      17   Delivers      11   OutRequests
0    OutDiscards   0   OutNoRoutes   0 ReasmReqds
0ReasmOKs      0 ReasmFails
 Sent:  0    FragOKs       0   FragFails     0
FragCreates
0RcvdMCastPkt  5   SentMcastPkts 0   TruncatedPkts
0RcvdRedirects       0    SentRedirects
 2364  InOctets      0   InNoRoutes     0   OutFwdDatgrms
 0   OutFrgRqds     11   OutTrnsmit       1140   OutOctets
 0   InMcstOctets   128   OutMcastOctets    0   InBcstPkts
```

```
 0   OutBcstPkts     0   DiscntTime       1000 RefrshRate
  ICMP Statistics
    ***************
Received :
17 ICMPPkts    0 ICMPErrPkt     0 DestUnreach  0 TimeExcds
0  ParmProbs   0 PktTooBigMsg  5 ICMPEchoReq  10
ICMPEchoReps
0 RouterSols   0 RouterAdv      1 NeighSols    1 NeighAdv
0 Redirects    0 AdminProhib
    Sent
15   ICMPMsgs   0 ICMPErrMsgs  0 DstUnReach   0 TimeExcds
0   ParmProbs   0 PktTooBigs   10 EchoReq      5 EchoReply
0 RouterSols  0 RouterAdv     5 NeighSols    1 NeighborAdv
0 RedirectMsgs 0 AdminProhibMsgs
  UDP statistics
    **************
Received :
0 UDPDgrams    0 UDPNoPorts       0 UDPErrPkts
    Sent :
0 UDPDgrams
```

Related Command(s)

- **`clear ipv6 traffic`** - Removes all the entries in the IPv6 traffic table.

23.31 ipv6 path mtu discover

Command Objective	This command enables path MTU discovery for the node. Path MTU (Maximum Transmission Unit) discovery in IPv6 allows a host to dynamically discover and adjust to differences in the MTU size of every link along a given data path. The no form of the command disables path MTU discovery.
Syntax	**ipv6 [vrf <vrf-name>] path mtu discover** **no ipv6 [vrf <vrf-name>] path mtu discover**
Parameter Description	• **vrf <vrf-name>** - Configures the path MTU discovery on an interface for specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32.
Mode	Global configuration Mode
Package	Enterprise, Work Group, Metro_E, and Metro
Default	Path mtu discovery is enabled
Note:	• VRF instance should be created before executing this command to configure the path MTU discovery on an interface in the context. • VRF instance should be mapped to the IPv4 or IPv6 interface, before executing this command to configure the static routes for the context in the interface.
Example	**SEFOS(config)# ipv6 path mtu discover**
Related Command(s)	• **ip vrf** - Creates VRF instance. • **show ipv6 pmtu** - Displays the configured PMTU entries. • **ip vrf forwarding** - Maps the IPv4 or IPv6 interface to the context.

23.32 ipv6 path mtu

Command Objective	This command configures Maximum Transmission Unit (MTU) for usage in PMTU discovery. Every network link has a maximum packet size called the link's MTU (Maximum Transmission Unit). The full path from one system to another may travel across many links with different MTUs. The smallest MTU for all the links in a path is the path MTU. The no form of the command removes MTU for usage in PMTU discovery.
Syntax	**ipv6 path mtu [vrf <vrf-name>] <prefix addr> <mtu>** **no ipv6 path mtu [vrf <vrf-name>] <prefix addr>**
Parameter Description	• **vrf <vrf-name>** - Configures MTU for usage in PMTU discovery for specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32. • **<prefix addr>** - Configures the destination IPv6 address. • **<mtu>** - Configures the maximum transmission unit value. This value ranges from 1280 to 65535.
Mode	Global configuration Mode
Package	Enterprise, Work Group, Metro_E, and Metro
Default	mtu - 1500
Note:	• VRF instance should be created before executing this command to configure MTU for usage in PMTU discovery in the context. • VRF instance should be mapped to the IPv4 or IPv6 interface, before executing this command to configure the static routes for the context in the interface.
Example	**SEFOS(config)# ipv6 path mtu 11::22 1288**
Related Command(s)	• **ip vrf** - Creates VRF instance. • **show ipv6 pmtu** - Displays the configured PMTU entries. • **show ipv6 interface** - Displays the IPv6 interfaces. • **ip vrf forwarding** - Maps the IPv4 or IPv6 interface to the context.

23.33 show ipv6 pmtu

Command Objective	This command displays the configured PMTU entries.
Syntax	**show ipv6 pmtu [vrf <vrf-name>]**
Parameter Description	• **vrf <vrf-name>** - Displays the configured PMTU entries on an interface for specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32.
Mode	Privileged EXEC Mode
Package	Enterprise, Work Group, Metro_E, and Metro
Note:	• VRF instance should be created before executing this command to display configured PMTU entries in the context. • VRF instance should be mapped to the IPv4 or IPv6 interface, before executing this command to configure the static routes for the context in the interface.
Example	**SEFOS# show ipv6 pmtu** PMTU discovery is enabled in default Ipv6 Path MTU Table ---------- Vrf Name Destination PMTU -------- ---------- ---- Default 11::22 88
Related Command(s)	• **ip vrf** - Creates VRF instance. • **ipv6 path mtu** - Configures Maximum Transmission Unit for usage in PMTU discovery. • **ipv6 path mtu discover** - Enables path MTU discovery for the node. • **ip vrf forwarding** - Maps the IPv4 or IPv6 interface to the context.

23.34 ipv6 interface-identifier

Command Objective	This command configures 64 bit IPv6 identifier on the interface. The Interface Identifier is combined with an address prefix to form an interface address. The prefix value ranges between 0 and 64 bits. The no form of the command deletes IPv6 interface identifier.
Syntax	**`ipv6 interface-identifier <prefix>`** **`no ipv6 interface-identifier <prefix>`**
Mode	Interface configuration Mode (VLAN / Router)
Package	Enterprise, Work Group, Metro_E, and Metro
Default	IPv6 interface identifier is configured.
Example	**`SEFOS(config-if)# ipv6 interface-identifier ::3311`**
Related Command(s)	• **`show ipv6 interface`** - Displays the IPv6 interfaces.

23.35 ipv6 icmp error-interval

Command Objective	This command configures ICMPv6 (Internet Control Message Protocol) error rate limit for limiting the rate at which IPv6 ICMP error messages are sent out on the network. The maximum number of tokens allowed in the bucket can be specified, and for every error message to be sent, one token is removed from the bucket. If a series of error messages is generated, error messages can be sent until the bucket is empty. When the bucket is empty of tokens, IPv6 ICMP error messages are not sent until a new token is placed in the bucket. The no form of the command removes ICMPv6 error rate limit.
Syntax	**ipv6 icmp error-interval <milliseconds(1-65535)> [<bucketsize(1-200)>]** **no ipv6 icmp error-interval**
Parameter Description	• **<milliseconds(1-65535)>** - Configures the time interval between tokens being placed in the bucket. This value ranges from 1 to 65535. • **<bucketsize(1-200)>** - Configures the maximum number of tokens stored in the ICMPv6 bucket. This value ranges from 1 to 200.
Mode	Interface configuration Mode (VLAN / Router)
Package	Enterprise, Work Group, Metro_E, and Metro
Default	• ICMPv6 error rate limiting is enabled. • milliseconds - 100 • bucketsize - 10
Example	**SEFOS(config-if)# ipv6 icmp error-interval 65534 178**
Related Command(s)	• **show ipv6 interface** - Displays the IPv6 interfaces.

23.36 ipv6 icmp dest-unreachable

Command Objective	This command enables or disables ICMPv6 destination unreachable messages on the interface that has been configured. When a ping ECHO request is sent, and if the destination is not reachable, then the reply is sent with destination unreachable flag enabled. Thereby this error message can be sent or dropped using this command. The ICMP Unreachable Destination Counters feature enables clearing and displaying packets that have been discarded because of an unreachable destination, and configuring a threshold interval for triggering error messages.
Syntax	**`ipv6 icmp dest-unreachable { enable | disable }`**
Parameter Description	• **`enable`** - Enables ICMPv6 destination unreachable messages on the interface. • **`disable`** - Disables ICMPv6 destination unreachable messages on the interface.
Mode	Interface configuration Mode (VLAN / Router)
Package	Enterprise, Work Group, Metro_E, and Metro
Default	ICMPv6 destination unreachable error messages are enabled.
Example	**`SEFOS(config-if)# ipv6 icmp dest-unreachable enable`**
Related Command(s)	• **`show ipv6 interface`** - Displays the IPv6 interfaces.

23.37 ipv6 policy-prefix

Command Objective	This command configures IPv6 prefix in the policy table. This table is used for default address selection in IPv6 and to configure the precedence and label associated with a source or destination address. The no form of the command deletes the IPv6 prefix from the policy table.
Syntax	**ipv6 policy-prefix <prefix> <prefix Len> precedence <integer> label <integer>** **no ipv6 policy-prefix <prefix> <prefix Len> precedence <integer> label <integer>**
Parameter Description	• **<prefix>** - Configures the IPv6 address for which the policy needs to be configured. • **<prefix Len>** - Configures the number of high-order bits in the IPv6 address. These bits are common among all hosts within a network. This value ranges from 0 to 128. • **precedence <integer>** - Configures the precedence value associated with the address in the policy table which is the prefix for sorting destination addresses. The precedence is higher for higher value. This value ranges from 1 to 128. • **label <integer>** - Configures label value of the prefix associated with the address in the policy table. This value ranges from 0 to 255.
Mode	Interface configuration Mode (VLAN / Router)
Package	Enterprise, Work Group, Metro_E, and Metro
Default	• precedence - 30 • label - 2
Note:	If the prefix length is ‘n’, then for the first ‘n’ number of bits, prefix should be greater than 0.
Example	**SEFOS(config-if)# ipv6 policy-prefix 22::44 53 precedence 2 label 3**
Related Command(s)	• **show ipv6 addr-sel-policy-table** - Displays the address selection policy table.

23.38 ipv6 compatible rfc5095

Command Objective	This command configures IPv6 compatibility with RFC5095 which is used for the deprecation of routing headers of type 0. The no form of the command disables IPv6 compatibility with RFC5095.
Syntax	**ipv6 compatible rfc5095 [vrf <vrf-name>]** **no ipv6 compatible rfc5095 [vrf <vrf-name>]**
Parameter Description	• **vrf <vrf-name>** - Configures the IPv6 compatibility with RFC5095 for specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32.
Mode	Global Configuration Mode
Package	Enterprise, Work Group, Metro_E, and Metro
Default	IPv6 compatibility with RFC5095 is enabled.
Note:	• VRF instance should be created before executing this command to configure IPv6 compatibility with RFC5095 in the context. • VRF instance should be mapped to the IPv4 or IPv6 interface, before executing this command to configure the static routes for the context in the interface.
Example	**SEFOS(config)# ipv6 compatible rfc5095 vrf default**
Related Command(s)	• **ip vrf** - Creates VRF instance. • **ip vrf forwarding** - Maps the IPv4 or IPv6 interface to the context.

23.39 ipv6 unicast-routing – interface configuration

Command Objective	This command enables unicast routing which is used for one to one communication across the IPv6 Internet. An IPv6 unicast address is an identifier for a single interface, on a single node. A packet that is sent to a unicast address is delivered to the interface identified by that address. The no form of the command disables unicast routing.
Syntax	**`ipv6 unicast-routing`** **`no ipv6 unicast-routing`**
Mode	Interface configuration Mode (VLAN / Router)
Package	Enterprise, Work Group, Metro_E, and Metro
Default	Unicast routing is enabled
Note:	The physical interface should be configured as router port, before executing this command for the physical interface.
Example	**`SEFOS(config-if)# ipv6 unicast-routing`**
Related Command(s)	• **`no switchport`** - Configures the port as router port. • **`ipv6 hop-limit`** - Configures the maximum hop limit for all IPv6 packets originating from the interface.

23.40 ipv6 default scope-zone

Command Objective	This command configures a default scope-zone for a particular scope.
Syntax	**ipv6 default scope-zone {interfacelocal | linklocal | subnetlocal | adminlocal | sitelocal | scope6 | scope7 | orglocal | scope9 | scopeA | scopeB | scopeC | scopeD } <zone-index>**
Parameter Description	• **interfacelocal** - Configures zone for interface local scope on the interface. This scope spans only a single interface on a node and is useful only for loopback transmission of multicast addresses. • **linklocal** - Configures zone for link local scope on the interface. This scope is applicable for unicast or anycast addresses. • **subnetlocal** - Configures zone for subnet local scope on the interface. • **adminlocal** - Configures zone for admin local scope on the interface. This is the smallest scope that must not be automatically derived from physical connectivity or other non-multicast-related configurations. • **sitelocal** - Configures zone for site local scope which is intended to span a single site on the interface. • **scope6** - Configures default scope-zone for scope 6 on the interface. • **scope7** - Configures default scope-zone for scope 7 on the interface. • **orglocal** - Configures zone for organisation local which is intended to span multiple sites belonging to a single organization on the interface. • **scope9** - Configures default scope-zone for scope 9 on the interface. • **scopeA** - Configures default scope-zone for scope A on the interface. • **scopeB** - Configures default scope-zone for scope B on the interface. • **scopeC** - Configures default scope-zone for scope C on the interface. • **scopeD** - Configures default scope-zone for scope D on the interface. • **<zone-index>** - Configures zone index. This value ranges from 1 to 65535. This is the instance of a specific scope uniquely within the system. The zone index is used to associate, unambiguously, an IPv6 address to a specific zone.
Mode	Global Configuration Mode

Package	Enterprise, Work Group, Metro_E, and Metro
Note:	This command executes only if the scope-zones is created on the interface. To modify the scope-zone to other than global scope-zone, execute the command **`no ipv6 enable.`**
Example	**`SEFOS(config-if)# ipv6 scope-zone sitelocal 1`** **`SEFOS(config)# ipv6 default scope-zone sitelocal 1`**
Related Command(s)	• **`ipv6 enable`** - Enables IPv6 processing on an interface. • **`ipv6 scope-zone`** - Creates IPv6 scope-zone on an interface. • **`show ipv6 default scope-zone`** - Displays the default scope-zone for a particular scope.

23.41 ipv6 scope-zone

Command Objective	This command creates IPv6 scope-zone on an interface. Scope is a 4-bit value that describes the scope of an IPV6 address. A unicast address can possibly have 2 scopes (Linklocal and Global) only and a multicast address can have a maximum of 11 scopes. The no form of the command removes IPv6 scope-zone on the interface
Syntax	**ipv6 scope-zone {interfacelocal | linklocal | subnetlocal | adminlocal | sitelocal | scope6 | scope7 | orglocal | scope9 | scopeA | scopeB | scopeC | scopeD | global} <zone-index>** **no ipv6 scope-zone {interfacelocal | linklocal | subnetlocal | adminlocal | sitelocal | scope6 | scope7 | orglocal | scope9 | scopeA | scopeB | scopeC | scopeD | global } <zone-index>**
Parameter Description	• **interfacelocal** - Configures zone for interface local scope on the interface. This scope spans only a single interface on a node and is useful only for loopback transmission of multicast. • **linklocal** - Configures zone for link local scope on the interface. This scope is applicable for unicast or anycast addresses. • **subnetlocal** - Configures zone for subnet local scope on the interface. • **adminlocal** - Configures zone for admin local scope on the interface. This is the smallest scope that must not be automatically derived from physical connectivity or other non-multicast-related configurations. • **sitelocal** - Configures zone for site local scope which is intended to span a single site on the interface. • **scope6** - Configures zone for scope 6 on the interface. • **scope7** - Configures zone for scope 7 on the interface. • **orglocal** - Configures zone for organisation local which is intended to span multiple sites belonging to a single organization on the interface. • **scope9** - Configures zone for scope 9 on the interface. • **scopeA** - Configures zone for scope A on the interface. • **scopeB** - Configures zone for scope B on the interface.

- **scopeC** - Configures zone for scope C on the interface.
- **scopeD** - Configures zone for scope D on the interface.
- **global** - Configures zone for global scope on the interface which is used for uniquely identifying interfaces anywhere in the Internet. This scope is applicable for unicast/ anycast addresses.
- **<zone-index>** - Configures zone index. This is the instance of a specific scope uniquely within the system. The zone index is used to associate unambiguously an IPv6 address to a specific zone. This value ranges from 1 to 65535.

Mode

Interface configuration Mode (VLAN/ Router)

Package

Enterprise, Work Group, Metro_E, and Metro

Default

- scope-zone - linklocal and interfacelocal
- zone-index - 1

Note: On any interface, IPv6 scope-zone can be configured only after enabling IPv6 on it.

Example

```
SEFOS(config)# interface vlan 3
SEFOS(config-if)# ipv6 enable
SEFOS(config-if)# ipv6 scope-zone sitelocal 1

SEFOS(config)# interface vlan 2
SEFOS(config-if)# ipv6 enable
SEFOS(config-if)# ipv6 scope-zone scopeC 1
```

Related Command(s)

- **ipv6 enable** - Enables IPv6 processing on an interface.
- **ip pim component** – Configures the PIM component in the router.
- **show ipv6 zone** - Displays the interface associated with a scope-zone.

23.42 show ipv6 addr-sel-policy-table

Command Objective	This command displays the address selection policy table which is used for default address selection.
Syntax	**show ipv6 addr-sel-policy-table**
Mode	Privileged EXEC Mode
Package	Enterprise, Work Group, Metro_E, and Metro
Example	**SEFOS# show ipv6 addr-sel-policy-table** --- IP6 PREFIX PREFIXLEN PRECEDENCE LABEL ADDRTYPE :: 0 40 1 unicast :: 96 20 3 unicast ::1 128 50 0 unicast ::ffff:0:0 96 10 4 unicast 2002:: 16 30 2 unicast ---
Related Command(s)	• **ipv6 policy-prefix** - Configures IPv6 prefix in the policy table.

23.43 show ipv6 scope-zone interface

Command Objective	This command displays the scope-zone configured on an interface.
Syntax	**show ipv6 scope-zone [vrf <vrf-name>] [interface { vlan <vlan-id/vfi-id> [switch <switch-name>] | tunnel <tunnel-id> | <interface-type> <if-num> | <IP-interface-type> <IP-interface-number>}]**
Parameter Description	• **vrf <vrf-name>** - Displays the scope-zone configured on an interface for specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32. • **vlan <vlan-id/vfi-id>** - Displays the scope-zone configured on an interface for the specified VLAN / VFI ID. This value ranges from 1 to 65535. ▪ **<vlan –id>** - VLAN ID is a unique value that represents the specific VLAN. This value ranges from 1 to 4094. ▪ **<vfi-id>** - VFI ID is a VLAN created in the system which contains pseudowires and attachment circuits as member ports. This creates a logical LAN for the VPLS service. This value ranges from 4096 to 65535. Note: The VLAN ID 4095 is reserved and may be used to indicate a wildcard match for the VID in management operations or filtering database entries. Note: VFI IDs 4096 and 4097 are reserved identifiers used in MPLS PW. Note: The theoretical maximum for the maximum number of VFI is 65535 but the actual number of VFI supported is a sizing constant. Based on this, the maximum number of VFI ID accepted in the management interface is restricted. For example if 100 VFIs are supported, the maximum number of VFI supported will be restricted to a hundred added to the maximum number of VLANs. An error message is displayed for any value beyond this range. • **switch <switch-name>** - Displays the scope-zone configured on an interface for the specified context. This value represents unique name of the switch context. This value is a string of maximum size 32. This parameter is specific to multiple instance feature. • **tunnel <id>** – Displays the scope-zone configured on the specified tunnel interface. This value ranges from 0 to 128. • **<interface-type>** – Displays the scope-zone for the specified type of interface. The interface can be: ▪ **fastethernet** – Officially referred to as 100BASE-T standard. This

is a version of LAN standard architecture that supports data transfer upto 100 Megabits per second.

- **XL-ethernet** – A version of LAN standard architecture that supports data transfer upto 40 Gigabits per second.
- **extreme-ethernet** – A version of Ethernet that supports data transfer upto 10 Gigabits per second.
- **i-lan** – Internal LAN created on a bridge per IEEE 802.1ap.

- **<if-num>** - Displays the scope-zone for the specified interface identifier. This is a unique value that represents the specific interface. This value is a combination of slot number and port number separated by a slash, For example: 0/1 represents that the slot number is 0 and port number is 1. Only i-lan ID is provided, for interface types i-lan. For example: 1 represents i-lan ID.

- **<IP-interface-type> -** Displays the scope-zone in the specified L3 pseudowire interface in the system.

- **<IP-interface-number> -** Displays the scope-zone for the specified interface identifier. This is a unique value that represents the specific interface. This value ranges from 1 to 65535 for pseudowire interface.

Note: Maximum number of pseudowire interfaces supported in the system is 100.

Mode

Privileged EXEC Mode

Package

Enterprise, Work Group, Metro_E, and Metro

Note:

- VRF instance should be created before executing this command to display the scope-zone configured on an interface in the context.
- VRF instance should be mapped to the IPv4 or IPv6 interface, before executing this command to add the static routes for the context in the interface.

Example

```
SEFOS# show ipv6 scope-zone interface
   Scope-Zones Interface Map Table
VRF Id  : 0
VRF Name: default
Interface           Scope-Zones
 vlan1           interfacelocal 1   linklocal 1
```

Related Command(s)

- **ipv6 enable** - Enables IPv6 processing on an interface that has not been configured with an explicit IPv6 address.
- **ip vrf** - Creates VRF instance.
- **ipv6 scope-zone** - Creates IPv6 scope-zone on an interface.

- **`ip vrf forwarding`** - Maps the IPv4 or IPv6 interface to the context.

23.44 show ipv6 zone - if-list

Command Objective	This command displays the interface associated with a scope-zone.
Syntax	**show ipv6 zone <Zone-Name> if-list [vrf <vrf-name>]**
Parameter Description	• **<Zone-Name>** - Displays the scope-zone name for which the interface list needs to be displayed. • **vrf <vrf-name>** - Displays the interface associated with a scope-zone for specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32.
Mode	Privileged EXEC Mode
Package	Enterprise, Work Group, Metro_E, and Metro
Note:	• VRF instance should be created before executing this command to display interface associated with a scope-zone in the context. • VRF instance should be mapped to the IPv4 or IPv6 interface, before executing this command to configure the static routes for the context in the interface.
Example	**SEFOS# show ipv6 zone interfacelocal1 if-list**
Related Command(s)	• **ip vrf** - Creates VRF instance. • **ipv6 scope-zone** - Creates IPv6 scope-zone on an interface. • **ip vrf forwarding** - Maps the IPv4 or IPv6 interface to the context.

23.45 show ipv6 default scope-zone

Command Objective	This command displays the default scope-zone for a particular scope.
Syntax	**show ipv6 default scope-zone [vrf <vrf-name>]**
Parameter Description	• **vrf <vrf-name>** - Displays the scope-zone configured on an interface for specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32.
Mode	Privileged EXEC Mode
Package	Enterprise, Work Group, Metro_E, and Metro
Note:	• VRF instance should be created before executing this command to display the scope-zone configured on an interface in the context. • VRF instance should be mapped to the IPv4 or IPv6 interface, before executing this command to configure the static routes for the context in the interface.
Example	**SEFOS# show ipv6 default scope-zone** Scope default-Scope-Zone interfacelocal interfacelocal 1 linklocal linklocal 1
Related Command(s)	• **ip vrf** - Creates VRF instance • **ipv6 scope-zone** - Creates IPv6 scope-zone on an interface • **ipv6 default scope-zone** - Configures a default scope-zone for a particular scope • **ip vrf forwarding** - Maps the IPv4 or IPv6 interface to the context

23.46 ipv6 unnumbered

Command Objective	This command configures associated source interface for the unnumbered interface whose IPv6 address is used as source address for the unnumbered interface.
Syntax	**ipv6 unnumbered {vlan <vlan-id/vfi-id> | <iftype> <ifnum> | loopback <loopback-id(0-100)>}** **no ipv6 unnumbered**
Parameter Description	• **vlan <vlan-id/vfi-id>** - Configures the IPv6 interface details for the specified VLAN / VFI ID. This value ranges from 1 to 65535. ▪ **<vlan –id>** - Sets unique VLAN ID value that represents the specific VLAN. This value ranges from 1 to 4094. ▪ **<vfi-id>** - Sets VFI ID that is created in the system which contains pseudowires and attachment circuits as member ports. This creates a logical LAN for the VPLS service. This value ranges from 4096 to 65535. Note: The VLAN ID 4095 is reserved and may be used to indicate a wildcard match for the VID in management operations or filtering database entries. Note: VFI IDs 4096 and 4097 are reserved identifiers used in MPLS PW. Note: The theoretical maximum for the maximum number of VFI is 65535 but the actual number of VFI supported is a sizing constant. Based on this, the maximum number of VFI ID accepted in the management interface is restricted. For example if 100 VFIs are supported, the maximum number of VFI supported will be restricted to a hundred added to the maximum number of VLANs. An error message is displayed for any value beyond this range • **<iftype>** - Configures the IPv6 interface details for the specified type of interface. The interface can be: ▪ **fastethernet** – Officially referred to as 100BASE-T standard. This is a version of LAN standard architecture that supports data transfer upto 100 Megabits per second. ▪ **XL-ethernet** – A version of LAN standard architecture that supports data transfer upto 40 Gigabits per second. ▪ **extreme-ethernet** – A version of Ethernet that supports data transfer upto 10 Gigabits per second. ▪ **i-lan** – Internal LAN created on a bridge per IEEE 802.1ap. • **<ifnum>** - Configures IPv6 information for the specified interface identifier. This is a unique value that represents the specific interface. This

	value is a combination of slot number and port number separated by a slash, for interface type other than i-lan. For example: 0/1 represents that the slot number is 0 and port number is 1. Only i-lan ID is provided, for interface types i-lan. For example: 1 represents i-lan ID. • **loopback <loopback-id(0-100)>** - Configures loopback-related information. This value ranges from 0 to 100.
Mode	Interface configuration Mode (VLAN/Router)
Package	Enterprise, Work Group, Metro_E, and Metro
Note:	• The command will execute only if IPv6 is enabled on the interface. • The unnumbered interface cannot be configured if IPv6 address is already configured.
Example	**SEFOS (config-if)# ipv6 unnumbered vlan 1**
Related Command(s)	• **show ipv6 interface** - Displays the IPv6 interfaces • **ipv6 enable** - Enables IPv6 processing on an interface that has not been configured with an explicit IPv6 address

23.47 ipv6 ra rdnss

Command Objective	This command enables IPv6 RDNSS (Recursive DNS Server) of router advertisement globally. The no form of this command disables IPv6 RDNSS of router advertisement globally.
Syntax	**ipv6 ra rdnss <ip6_addr> [<ip6_addr> [<ip6_addr>]]** **no ipv6 ra rdnss**
Parameter Description	• **<ip6_addr>** - Configures the first IPv6 address for the interface • **<ip6_addr>** - Configures the second IPv6 address for the interface ▪ **<ip6_addr>** - Configures the third IPv6 address for the interface
Mode	Interface configuration Mode (VLAN/Router)
Package	Enterprise, Work Group, Metro_E, and Metro
Default	IPv6 RDNSS is disabled
Example	**SEFOS (config-if)# ipv6 ra rdnss 1111::2222 1111::2121 1111::1313**
Related Command(s)	• **show ipv6 interface** - Displays the IPv6 interfaces.

23.48 ipv6 ra rdnss-open

Command Objective	This command configures IPv6 RDNSS (Recursive DNS Server) of router advertisement. The RDNSS continues to be available to hosts even if it is moved to a different subnet. The no form of this command disables IPv6 RDNSS of router advertisement and the RDNSS will not be available to hosts.
Syntax	**ipv6 ra rdnss-open** **no ipv6 ra rdnss-open**
Mode	Interface Configuration Mode (VLAN/Router)
Package	Enterprise, Work Group, Metro_E, and Metro
Example	**SEFOS (config-if)# ipv6 ra rdnss-open**
Related Command(s)	• **show ipv6 interface** - Displays the IPv6 interfaces.

23.49 ipv6 ra rdnss-preference

Command Objective	This command configures RDNSS (Recursive DNS Server) Preference value.
Syntax	**ipv6 ra rdnss-preference <RDNSS Preference (0-15)>** **no ipv6 ra rdnss-preference**
Parameter Description	• **<RDNSS Preference (0-15)>** - Configures RDNSS Preference. The preference of the specified DNS server is advertised and used after comparing with existing DNS servers.This value ranges from 0 to 15. Note: Low importance preference value ranges from 0 to 7, and high importance preference value ranges from 12 to 15.
Mode	Interface Configuration Mode (VLAN/Router)
Package	Enterprise, Work Group, Metro_E, and Metro
Default	8
Example	**SEFOS (config-if)#** ipv6 ra rdnss-preference 1
Related Command(s)	• **show ipv6 interface** - Displays the IPv6 interfaces.

23.50 ipv6 ra rdnss-lifetime

Command Objective	This command configures RDNSS (Recursive DNS Server) Lifetime value.
Syntax	**ipv6 ra rdnss-lifetime <RDNSS Lifetime (0-1200)>** **no ipv6 ra rdnss-lifetime**
Parameter Description	• **<RDNSS Lifetime (0-1200)>** - Configures RDNSS Lifetime value. It is the maximum duration at which the RDNSS entries are used for name resolution. This value ranges from 0 to 1200. Note: A Lifetime value of 0 means the nameserver should no longer be used .If the value is other than 0, it must be at least MaxRtrAdvInterval. Note: To remove stale RDNSS info, the Lifetime value should not be greater than `2 * MaxRtrAdvInterval`.
Mode	Interface Configuration Mode (VLAN/Router)
Default	The default value is equal to `2 * MaxRtrAdvInterval`. Generally, the default value is 1200 seconds, as the default value for MaxRtrAdvInterval is 600 seconds.
Package	Enterprise, Work Group, Metro_E, and Metro
Example	**SEFOS (config-if)# ipv6 ra rdnss-lifetime 8**
Related Command(s)	• **show ipv6 interface** - Displays the IPv6 interfaces. • **ipv6 nd ra-interval** – Sets the IPv6 Router Advertisement interval.

23.51 ipv6 icmp redirect

Command Objective	This command enables or disables the ICMPv6 redirect messages status for an interface.
Syntax	**ipv6 icmp redirect { enable | disable }**
Parameter Description	• **enable** - Enables the ICMP redirect messages for an interface. • **disable** - Disables the ICMP redirect messages for an interface.
Mode	Interface Configuration Mode (VLAN/Router)
Package	Enterprise, Work Group, Metro_E, and Metro
Default	disable
Example	**SEFOS (config-if)# ipv6 icmp redirect enable**
Related Command(s)	• **show ipv6 interface** - Displays the IPv6 interfaces.

23.52 ipv6 compatible rfc5942

Command Objective	This command configures IPv6 compatibility with RFC5942. This allows prefix to be configured as on-link or off-link. The no form of the command disables IPv6 compatibility with RFC5942. Note: RFC5942 compatibility cannot be disabled when a prefix is configured as off-link.
Note:	This command can be executed only if TARGET_IP set as LINUXIP.
Syntax	**`ipv6 compatible rfc5942`** **`no ipv6 compatible rfc5942`**
Mode	Global Configuration Mode
Package	Workgroup, Enterprise, Metro, and Metro_E
Default	IPv6 compatibility with RFC5942 is disabled.
Example	**`SEFOS (config)# ipv6 compatible rfc5942`**
Related Command(s)	• **`show ipv6 interface`** - Displays the IPv6 interfaces. • **`ipv6 nd prefix`** - Configures the prefix and sets the flag for the respective prefix to be advertised in IPv6 Router Advertisement.

23.53 ipv6 ra advt-interval

Command Objective	This command enables Advertisement Interval Option flag on an IPv6 interface. The no form of the command disables Advertisement Interval Option flag on an IPv6 interface.
Syntax	**`ipv6 ra advt-interval`** **`no ipv6 ra advt-interval`**
Mode	Interface Configuration Mode (VLAN/Router)
Package	Workgroup, Enterprise, Metro, and Metro_E
Default	Advertisement Interval Option flag is disabled.
Example	**`SEFOS (config-if)# ipv6 ra advt-interval`**
Related Command(s)	• **`show ipv6 interface`** - Displays the IPv6 interfaces.

23.54 ipv6 ra advt-linklocal

Command Objective	This command enables advertisement link local address flag on an IPv6 interface. The no form of the command disables advertisement link local address flag on an IPv6 interface.
Syntax	**`ipv6 ra advt-linklocal`** **`no ipv6 ra advt-linklocal`**
Mode	Interface Configuration Mode (VLAN/Router)
Package	Workgroup, Enterprise, Metro, and Metro_E
Default	Advertisement link local address flag is disabled.
Example	**`SEFOS (config-if)# ipv6 ra advt-interval`**
Related Command(s)	• **`show ipv6 interface`** - Displays the IPv6 interfaces.

23.55 ipv6 nd proxy

Command Objective	This command enables ND (Neighbor Discovery) Proxy feature in the interface. ND Proxy is a mechanism in which IPv6 hosts on connected subnets communicate without being aware of the existence of subnets. ND Proxying supports proxying of the packets of types Neighbor Solicitations, Neighbor Advertisements, Router Advertisements, and Redirects. The no form of this command disables ND (Neighbor Discovery) Proxy feature in the interface.
Syntax	**`ipv6 nd proxy`** **`no ipv6 nd proxy`**
Mode	Interface Configuration Mode (VLAN/Router)
Package	Workgroup, Enterprise, Metro, and Metro_E
Default	By default, ND Proxy feature is disabled.
Note:	The command executes only if IPV6 is enabled on the interface.
Example	**`SEFOS (config-if)# ipv6 nd proxy`**
Related Command(s)	• **`ipv6 enable`** - Enables IPv6 processing on an interface that has not been configured with an explicit IPv6 address. • **`show ipv6 interface`** - Displays the IPv6 interfaces.

23.56 ipv6 nd local-proxy

Command Objective	This command enables the ND Proxy feature in local subnet and the router acts as ND proxy for target address which is in same subnet. The no form of the command enables ND proxy feature in the global subnet where router does act as ND proxy for target address which is in same subnet
Syntax	**ipv6 nd local-proxy** **no ipv6 nd local-proxy**
Mode	Interface Configuration Mode (VLAN/Router)
Package	Workgroup, Enterprise, Metro, and Metro_E
Default	ND proxy feature is enabled for global subnet.
Note:	• The command executes only if IPv6 is enabled on the interface. • The command is effective only if IPv6 ND proxy is enabled on the interface.
Example	**SEFOS (config-if)# ipv6 nd local-proxy**
Related Command(s)	• **ipv6 enable** - Enables IPv6 processing on an interface that has not been configured with an explicit IPv6 address. • **ipv6 nd proxy -** Enables ND (Neighbor Discovery) Proxy feature in the interface. • **show ipv6 interface** - Displays the IPv6 interfaces.

23.57 ipv6 nd proxy upstream

Command Objective	This command sets the interface as upstream Proxy interface. The no form of this command sets the interface as downstream Proxy interface.
Syntax	**`ipv6 nd proxy upstream`** **`no ipv6 nd proxy upstream`**
Mode	Interface Configuration Mode (VLAN/Router)
Package	Workgroup, Enterprise, Metro, and Metro_E
Default	The interface is set as downstream interface.
Note:	• The command executes only if IPv6 is enabled on the interface. • The command is effective only if IPv6 ND proxy is enabled on the interface.
Example	**`SEFOS (config-if)# ipv6 nd proxy upstream`**
Related Command(s)	• **`ipv6 enable`** - Enables IPv6 processing on an interface that has not been configured with an explicit IPv6 address. • **`ipv6 nd proxy -`** Enables ND (Neighbor Discovery) Proxy feature in the interface. • **`show ipv6 interface`** - Displays the IPv6 interfaces.

CHAPTER 24

OSPF

OSPF (Open Shortest Path First) protocol, is an Interior Gateway Protocol 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 problems like routing loops and Count-to-Infinity (when routers continuously increment the hop count to a particular network). This makes for a stable network.

Before configuring OSPF, RRD must be enabled. This can be done by defining RRD_WANTED in LR/make.h in compilation. In addition, all OSPF interface-related configurations can be done only when the global OSPF is enabled.

The list of CLI commands for the configuration of OSPF is common to both Single Instance and Multiple Instance except for a difference in the prompt that appears for the Switch with Multiple Instance support.
The prompt for the Global Configuration Mode is,
`SEFOS(config)#`

The parameters specific to Multiple Instance are stated so, against the respective parameter descriptions in this document.

The outputs of the show commands differ for Single Instance and Multiple Instance. Hence both the outputs are documented while depicting the show command examples.

24.1 router ospf

Command Objective	This command enables OSPF routing process and enters into the OSPF Router Configuration Mode, which allows the user to execute all commands supporting this mode. The no form of this command disables the OSPF Router Admin Status to terminate the OSPF process.
Syntax	**router ospf [vrf <name>]** **no router ospf [vrf <name>]**
Parameter Description	• **vrf <name>** - Enables OSPF for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string with maximum size 32.
Mode	Global Configuration Mode
Package	Enterprise and Metro_E
Note:	VRF instance should be created before executing this command to enable the OSPF in the context.
Example	**SEFOS(config)# router ospf** **SEFOS(config-router)#**
Related Command(s)	• **ip vrf** - Creates VRF instance. • **router-id** – Sets the router-ID for the OSPF process. • **area – virtual-link** - Defines an OSPF virtual link. • **area – stub** - Specifies an area as a stub area. • **area – nssa** - Configures an area as a not-so-stubby area (NSSA) • **area – default cost** - Specifies a cost for the default summary route sent into a stub or NSSA. • **area – stability-interval** - Configures the stability interval for NSSA. • **area – translation-role** - Configures the translation role for the NSSA. • **area – range –** Consolidates and summarizes routes at an area

boundary.

- **ip ospf demand-circuit** - Configures OSPF to treat the interface as an OSPF demand circuit.
- **ip ospf retransmit-interval** – Configures the time interval between link-state advertisement (LSA) retransmissions.
- **ip ospf transmit-delay** – Configures the estimated time required to transmit a link state update packet.
- **ip ospf priority** - Sets the router priority.
- **ip ospf hello-interval** - Specifies the time interval between hello packets sent.
- **ip ospf dead-interval** - Sets the interval at which hello packets must not be seen before neighbors declare the router down.
- **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.
- **ip ospf authentication** - Specifies the authentication type for an interface.
- **default-information originate always** - Enables generation of a default external route into an OSPF routing domain.
- **distance** - Enables the administrative distance.
- **distribute-list route-map** – Enables inbound filtering for routes.
- **neighbor** - Specifies a neighbor router and its priority.
- **set nssa asbr-Default-route translator** - Enables setting of P bit in the default Type-7 LSA generated.
- **redist-config** - Configures the information to be applied to routes learned from RTM.
- **redistribute** - Configures the protocol from which the routes have to be redistributed into OSPF.
- **passive-interface** - Suppresses routing updates on an interface.
- **abr-type** - Sets the Alternative ABR Type.
- **passive-interface default** - Suppresses routing updates on all interfaces.

- **passive-interface** - Suppresses routing updates on an interface and makes the interface passive.
- **distribute-list route-map in** - Enables inbound filtering for routes.
- **capability opaque** - Enables the capability of storing opaque LSAs.
- **nsf ietf restart-support** - Enables the graceful restart support.
- **nsf ietf restart-interval** - Configures the OSPF graceful restart timeout interval.
- **nsf ietf helper-support** - Enables the helper support.
- **nsf ietf helper gracetimelimit** - Configures the graceful restart interval limit in helper side.
- **nsf ietf helper strict-lsa-checking** - Enables the strict LSA check option in helper.
- **nsf ietf grace lsa ack required** - Enables Grace Ack Required state in restarter.
- **nsf ietf grlsa retrans count** - Configures the maximum number of retransmissions for unacknowledged GraceLSA.
- **nsf ietf restart-reason** - Configures the reason for graceful restart.
- **distance** - Enables the administrative distance of the routing protocol and sets the administrative distance value.
- **route-calculation staggering** - Enables OSPF route calculation staggering feature.
- **route-calculation staggering-interval** - Configures the OSPF route calculation staggering interval.
- **network** – Defines the interfaces on which OSPF runs and 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.
- **timers spf** - Configures the delay time and the hold time between two consecutive SPF calculations.
- **area –virtual link key start-accept** – Configures the Start Accept Time for Cryptographic Key.

- **area –virtual link key start-generate** – Configures Start Generate Time for Cryptographic Key.
- **area –virtual link key stop-accept** – Configures Stop Accept Time for Cryptographic Key.
- **area –virtual link key stop-generate** – Configures Stop Generate Time for Cryptographic Key.
- **enable bfd** – Enables BFD feature in OSPF.
- **disable bfd** – Disables BFD feature in OSPF.
- **bfd** – Enables BFD monitoring on all or specific OSPF interfaces.
- **show ip ospf** – Displays general information about OSPF routing process.

24.2 router-id

Command Objective	This command sets the router-ID for the OSPF process. The router ID is set to an IP address of a loopback interface if it is configured. 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-ID must match with one of the router's IP interface addresses. The no form of this command resets the configured router-ID and dynamically selects the least interface IP as router-ID for OSPF process.
Syntax	**`router-id <router ip address>`** **`no router-id`**
Mode	OSPF Router Configuration Mode
Package	Enterprise and Metro_E
Example	**`SEFOS(config-router)# router-id 12.0.0.1`**
Related Command(s)	• **`router ospf`** – Enables OSPF routing process. • **`summary-address`** – Creates aggregate addresses for OSPF. • **`show ip ospf`** - Displays OSPF Link state request list. • **`show ip ospf - retransmission-list`** - Displays list of all OSPF Link state retransmission list information. • **`show ip ospf`** - Displays general information about the OSPF routing process. • **`show ip ospf – database`** - Displays OSPF LSA database summary.

24.3 area - virtual-link

Command Objective

This command defines an OSPF virtual link and its related parameter. 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 values must be the same for all routers and access servers on a specific network.

The no form of this command removes an OSPF virtual link.

Syntax

```
area <area-id> virtual-link <router-id> [authentication { simple |message-digest | sha-1 | sha-224 | sha-256 | sha384 | sha-512 | null}] [hello-interval <value (1-65535)>] [retransmit-interval <value (1-3600)>] [transmit-delay <value (1-3600)>] [dead-interval <value>] [{authentication-key <key (8)> | message-digest-key <Key-id (0-255)> {md5 | sha-1 | sha-224 | sha-256 | sha-384 | sha-512} <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)>}]
```

Parameter Description

- **<area-id>** - Configures the area ID assigned to the transit area that the virtual link traverses. It is specified as an IP address This can be either a decimal value or a valid IP address.
- **<router-id>** - Configures the router ID of the virtual neighbor.
- **authentication** - Configures the authentication type. The list contains:
  - **simple** – Sets the simple password authentication mechanism.
  - **message-digest** – Sets the message digest authentication mechanism.
  - **simple** – Sets the authentication type as simple password authentication mechanism.
  - **message-digest** – Sets the authentication type as message digest authentication mechanism.
  - **sha-1** - Sets the authentication type as Secure Hash Algorithm 1 (SHA1) authentication. SHA1 generates Authentication digest of length 20 bytes.
  - **sha-224** - Sets the authentication type as Secure Hash Algorithm 224 (SHA224) authentication. SHA224 generates Authentication digest of length 28 bytes.
  - **sha-256** - Sets the authentication type as Secure Hash Algorithm 256 (SHA256) authentication. SHA256 generates Authentication digest of length 32 bytes.

- **sha-384** - Sets the authentication type as Secure Hash Algorithm 384 (SHA384) authentication. SHA384 generates Authentication digest of length 48 bytes.
- **sha-512** - Sets the authentication type as Secure Hash Algorithm 512 (SHA512) authentication. SHA512 generates Authentication digest of length 64 bytes.
- **null** – Sets the no password authentication.

- **hello-interval<value (1-65535)>** - Sets the interval between hello packets that the software sends on the OSPF virtual link interface. This value ranges from 1 to 65535 in seconds.

- **retransmit-interval <value (1-3600)>** - Sets the time between link-state advertisement (LSA) retransmissions for adjacencies belonging to the OSPF virtual link interface. This value ranges from 1 to 3600 in seconds.

- **transmit-delay <value (1-3600)>** - Sets the time in which the router will stop using this key for packets generation. Estimated time required to send a link-state update packet on the interface. Integer value that must be greater than zero. LSAs in the update packet have their age incremented by this amount before transmission. This value ranges from 1 to 3600 in seconds.

- **dead-interval <value>** - Sets the interval at which hello packets must not be seen before its neighbors declare the router down. As with the hello interval, this value must be the same for all routers and access servers attached to a common network. This value ranges from 1 to 65535 seconds.

- **authentication-key <key (8)>** - Identifies the secret key used to create the message digest appended to the OSPF packet password to be used by neighboring routers. This string acts as a key that will allow the authentication procedure to generate or verify the authentication field in the OSPF header. This is a string with maximum string size 8.

- **message-digest-key <Key-id (0-255)>** - Enables Message Digest 5 (MD5) authentication on the area specified by the area-ID. This value ranges from 0 to 255.

- **md5** - Configures the authentication type as Message Digest 5 (MD5) authentication.

- **sha-1** - Sets the authentication type as Secure Hash Algorithm 1 (SHA1) authentication. SHA1 generates Authentication digest of length 20 bytes.

- **sha-224** - Sets the authentication type as Secure Hash Algorithm 224 (SHA224) authentication. SHA224 generates Authentication digest of length 28 bytes.

- **sha-256** - Sets the authentication type as Secure Hash Algorithm 256 (SHA256) authentication. SHA256 generates Authentication digest of

	length 32 bytes. • **sha-384** - Sets the authentication type as Secure Hash Algorithm 384 (SHA384) authentication. SHA384 generates Authentication digest of length 48 bytes. • **sha-512** - Sets the authentication type as Secure Hash Algorithm 512 (SHA512) authentication. SHA512 generates Authentication digest of length 64 bytes. • **<key (16)>** - Configures the cryptographic key value which is used to create the message digest appended to the OSPF packet. All neighboring routers on the same network must have the same key identifier and key to route OSPF traffic. This is a string with maximum string size 16.
Mode	Router Configuration Mode
Package	Enterprise and Metro_E
Default	• Authentication - null • hello-interval - 10 seconds • retransmit-interval - 5 seconds • transmit-delay - 1 seconds • dead-interval - 40 seconds
Note:	This command executes only if area is defined using the network command.
Example	**SEFOS(config-router)# area 1.1 virtual-link 0.0.0.1 authentication simple hello-interval 65 retransmit-interval 654 dead-interval 200 message-digest-key 20 sha-512 key11**
Related Command(s)	• **router ospf** – Enables OSPF routing process. • **ip ospf authentication** – Specifies the authentication type for an interface. • **network** – Defines the interfaces on which OSPF runs and area ID for those interfaces. • **show ip ospf** – Displays general information about OSPF routing process. • **show ip ospf – virtual –links** - Displays parameters and the current state of OSPF virtual links • **show ip ospf** – Displays general information about OSPF routing process.

- **area –virtual link key start–accept** – Configures the Start Accept Time for Cryptographic Key.
- **area –virtual link key start–generate** – Configures Start Generate Time for Cryptographic Key.
- **area –virtual link key stop-accept** – Configures Stop Accept Time for Cryptographic Key.
- **area –virtual link key stop–generate** – Configures Stop Generate Time for Cryptographic Key.

24.4 area - stub

Command Objective	This command specifies an area as a stub area and other parameters related to that area. This command is configured on all routers and access servers in the stub area. The no form of the command removes an area or converts stub or NSSA to normal area.
Syntax	**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]}]**
Parameter Description	• **<area-id>** - Configures the identifier of the area associated with the OSPF address range for which authentication is to be enabled. The identifier can be specified as either a decimal value or an IP address. • **no-summary** - Prevents an Area Border Router (ABR) from sending summary link advertisements into the stub area by neither originating nor propagating summary LSA into the stub area. • **nssa** - Configures the area as Not-So-Stubby Area (NSSA). ▪ **no-redistribution** -Disables redistribution of routes from the given protocol into OSPF. • **Default-information originate** - Configures default route into OSPF. ▪ **metric <value>** - Configures metric-related configurations applied to the route before it is advertised into the OSPF domain. This value ranges from 0 to 16777215. ▪ **metric-type <Type(1-3)>** - Configures the metric type applied to the route before it is advertised into the OSPF domain. This value ranges from 1 to 3. • **no-summary**- Allows an area to be a not-so-stubby area but not have summary routes injected into it.
Mode	OSPF Router Configuration Mode
Package	Enterprise and Metro_E
Default	• Metric – 10 • Metric Type - 2

Example	`SEFOS(config-router)# area 10.0.0.1 stub`
Related Command(s)	• **`router ospf`** – Enables OSPF routing process. • **`show ip ospf`** – Displays general information about OSPF routing process.

24.5 area - nssa

Command Objective	This command configures a particular area as not-so-stubby area (NSSA).
Syntax	**area <area-id> nssa [{ no-summary | default-information-originate [metric <value (0-16777215)>] [metric-type <Type(1-3)>] [tos <tos value (0-30)>] [no-redistribution] }]** **no area <area-id> [{ stub [no-summary] | nssa [no-redistribution] [Default-information-originate [metric<value>] [metric-type <Type(1-3)>]][no-summary]}]**
Parameter Description	• **<area-id>** - Configures the identifier of the area associated with the OSPF address range for which authentication is to be enabled. The identifier can be specified as either a decimal value or an IP address. • **no-summary** - Allows an area to be a not-so-stubby area but not have summary routes injected into it. • **Default-information-originate** - Configures the default route into OSPF and used to generate a Type 7 default into the NSSA area. ▪ **metric <value (0-16777215)>**- The Metric value applied to the route before it is advertised into the OSPF domain. This value ranges from 0 to 16777215. ▪ **metric-type <Type(1-3)>** - The Metric Type applied to the route before it is advertised into the OSPF domain. This value ranges from 1 to 3. ▪ **tos <tos value (0-30)>** - Type of Service of the route being configured. This value ranges from 0 to 30. It can be configured only if the code is compiled with TOS Support ▪ **no-redistribution** - Disables redistribution of routes from the given protocol into OSPF.
Mode	Router Configuration Mode
Package	Enterprise and Metro_E
Default	• metric - 10 • metric-type - 1 • tos - 0
Note:	• The **no area <area-id> [{ stub | nssa }]** command removes an area or converts stub or NSSA to normal area.

	• The backbone area cannot be set as stub or NSSA.
Example	`SEFOS(config-router)# area 10.0.0.1 nssa`
Related Command(s)	• **`router ospf`** – Enables OSPF routing process. • **`area – default cost`** - Specifies a cost for the default summary route. • **`area – stability interval`** - Configures the stability interval for NSSA. • **`area – translation-role`** - Configures the translation role for the NSSA. • **`area - range`** – Consolidates and summarizes routes at an area boundary. • **`show ip ospf`** - Displays general information about the OSPF routing process. • **`summary-address`** - Creates aggregate addresses for OSPF.

24.6 area - default cost

Command Objective	This command specifies a cost for the default summary route sent into a stub or NSSA. This command is used only on an Area Border Router (ABR) attached to a stub or NSSA. This command provides the metric for the summary default route generated by the ABR into the stub area. The no form of the command removes the assigned default route cost.
Syntax	**area <area-id> default-cost <cost> [tos <tos value(0-30)>]** **no area <area-id> default-cost [tos <tos value (0-30)>]**
Parameter Description	• **<area-id>** - Configures the identifier for the stub or NSSA. The identifier can be specified as either a decimal value or as an IP address. • **Default-cost<cost>** - Configures the cost for the default summary route used for a stub or NSSA. A default cost can be defined only for a valid area. This value ranges from 0 to 16777215. • **tos<tos value(0-30)>** - Configures the Type of Service of the route being configured. This value ranges from 0 to 30. It can be configured only if the code is compiled with TOS Support.
Mode	OSPF Router Configuration Mode
Package	Enterprise and Metro_E
Default	• Default-cost - 1 • tos - 0
Note:	This command executes only if NSSA is configured.
Example	**SEFOS(config-router)# area 10.0.0.1 default-cost 5**
Related Command(s)	• **router ospf** – Enables OSPF routing process. • **area- nssa** - Configures an area as a NSSA and other parameters related to that area. • **ip ospf cost** – Specifies the cost of sending a packet on an interface. • **ip ospf authentication** – Specifies the authentication type for an interface.

24.7 area - stability interval

Command Objective	This command configures the stability interval for NSSA where the information describing the configured parameters and cumulative statistics of one of the router's attached areas. The no form of the command configures default stability interval for NSSA.
Syntax	**area <area-id> stability-interval <Interval-Value (0 - 0x7fffffff)>** **no area <area-id> stability-interval**
Parameter Description	• **<area-id>** - Configures the area ID associated with the OSPF address range(IPv4 address). Area ID 0.0.0.0 is used for the OSPF backbone. • **<Interval-Value (0 - 0x7fffffff)>** - Configures the time interval after an elected translator determines its services are no longer required, that it must continue to perform its translation duties. The interval value ranges between 0-0x7fffffff in seconds.The OSPF Sequence Number is a 32 bit signed integer. It starts with the value '80000001'h, -- or -'7FFFFFFF', and increments until '7FFFFFFF'h. Thus, a typical sequence number will be negative.
Mode	OSPF Router Configuration Mode
Package	Enterprise and Metro_E
Default	40 seconds
Note:	This command executes only if NSSA is configured.
Example	**SEFOS(config-router)# area 10.0.0.1 stability-interval 10000**
Related Command(s)	• **router ospf** – Enables OSPF routing process. • **area- nssa** - Configures an area as a NSSA and other parameters related to that area.

24.8 area - translation-role

Command Objective	This command configures the translation role for the NSSA. The no form of the command configures the default translation role for the NSSA.
Syntax	**area <area-id> translation-role { always | candidate }** **no area <area-id> translation-role**
Parameter Description	• **<area-id>** - Configures the area ID associated with the OSPF address range. It is specified as an IP address. • **translation-role** -Configures an NSSA Border router's ability to perform NSSA Translation of Type-7 LSAs to Type-5 LSAs.The options are : ▪ **always** – Sets translator role where the Type-7 LSAs are always translated into Type-5 LSAs. Type-5 LSAs- Originated by AS (Autonomous System) boundary routers, and flooded through-out 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. ▪ **candidate** – Sets translator role where an NSSA border router participates in the translator election process.
Mode	OSPF Router Configuration Mode
Package	Enterprise and Metro_E
Default	Candidate
Example	**SEFOS(config-router)# area 10.0.0.1 translation-role always**
Related Command(s)	• **router ospf** – Enables OSPF routing process. • **area-nssa-** Configures an area as an NSSA and other parameters related to that area.

24.9 area - range

Command Objective

This command consolidates and summarizes routes at an area boundary which is used only with Area Border Routers (ABRs). The result is that a single summary route is advertised to other areas by the ABR.

The no form of the command deletes the summary address.

Syntax

```
area <AreaId> range <Network> <Mask> {summary | Type7}
[{advertise | not-advertise}] [tag <value>]

no area <AreaId> range <Network> <Mask> [type7]
[{advertise | not-advertise}] [tag <tag-value>] [cost
<value>]
```

Note: If the no command is executed without the optional parameter Type7, it deletes the Summary LSA.

Note: Advertise, not-advertise, tag-value, and cost value are not supported to delete an area range in OSPF.

Parameter Description

- **<AreaId>** - Configures the area associated with the OSPF address range and the identifier of the area about which routes are to be summarized. It can be specified as either a decimal value or as an IP address.
- **<Network>** - Configures the IP address of the network indicated by the range.
- **<Mask>** - Configures the subnet mask that pertains to the range. 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 describes a single route to the collection of destinations 128.185.0.0 - 128.185.255.255.
- **summary** - Sets the LSA type as summary LSA.
- **Type7** - Sets the LSA type as Type-7 LSA.
- **advertise** - Sets the address range status to **advertise** and generates a Type 3 summary link-state advertisement (LSA). When associated area ID is 0.0.0.0, aggregated Type-5 are generated. For associated areas other than 0.0.0.0 aggregated Type-7 is generated in NSSA x.x.x.x.

  Note: This parameter is currently not supported in the no form of the command.

- **not-advertise** - Sets the address range status to **not advertise**. The Type 3 summary LSA is suppressed, and the component networks remain hidden from other networks. 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. For associated area ID 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. Note: This parameter is currently not supported in the no form of the command. • **tag <tag-value>** - Configures the tag type which describes whether tags will be generated automatically or manually configured. This value ranges from 0 to 2147483647. Note: This parameter is currently not supported in the no form of the command. • **cost <value>** - Configures the route path cost. Note: This parameter is currently not supported in the no form of the command.
Mode	Router Configuration Mode
Package	Enterprise and Metro_E
Default	tag - 2
Note:	This command executes only if a particular area is configured as NSSA.
Example	**SEFOS(config-router)# area 10.0.0.1 range 10.0.0.0 255.0.0.0 summary advertise tag 10**
Related Command(s)	• **router ospf** – Enables OSPF routing process. • **area – nssa** - Configures a particular area as NSSA. • **summary-address** – Creates aggregate addresses for OSPF. • **show ip ospf - summary address** – Displays OSPF summary-address redistribution information.

24.10 compatible rfc1583

Command Objective	This command sets OSPF compatibility list that is compatible with RFC 1583 and controls the preference rules while choosing from multiple AS external LSAs that are advertising the same destination. When **compatible** is set to **enable**, the preference rules remain those specified by RFC1583. When **compatible** is set to **disabled**, the preference rules are those stated in RFC2178. The no form of the command disables RFC 1583 compatibility.
Syntax	**compatible rfc1583** **no compatible rfc1583**
Mode	OSPF Router Configuration Mode
Package	Enterprise and Metro_E
Default	OSPF is compatible.
Example	**SEFOS(config-router)# compatible rfc1583**
Related Command(s)	• **router ospf** – Enables OSPF routing process.

24.11 abr-type

Command Objective	This command sets the alternative ABR type. The no form of the command resets the configured alternative ABR type.
Syntax	**abr-type { standard | cisco | ibm }** **no abr-type**
Parameter Description	• **standard** - Configures the standard ABR type as defined in RFC 2328. • **cisco** - Configures the CISCO ABR type as defined in RFC 3509. • **ibm** - Configures the IBM ABR type as defined in RFC 3509.
Mode	OSPF Router Configuration Mode
Package	Enterprise and Metro_E
Default	standard
Note:	• RFC 2328 – OSPF Version 2. • RFC-3509 -- Alternative implementations of OSPF Area Border Routers.
Example	**SEFOS(config-router)# abr-type standard**
Related Command(s)	• **router ospf** – Enables OSPF routing process. • **show ip ospf** – Displays general information about the OSPF routing process.

24.12 neighbor

Command Objective	This command specifies a neighbor router and its priority. This command configures the Router ID of the OSPF routers interconnecting to non-broadcast networks. The no form of this command removes the neighbor and resets the neighbor priority to its default value.
Syntax	**neighbor <neighbor-id> [priority <priority value (0-255)>] [poll-interval seconds] [cost number] [database-filter all]** **no neighbor <neighbor-id> [priority] [poll-interval seconds] [cost number] [database-filter all out]**
Parameter Description	• **<neighbor-id>** - Configures the neighbor router ID based on which the priority of the neighbor is defined. • **priority <priority value (0-255)>** - Indicates a number value that specifies the router priority and the priority of the non-broadcast neighbor router associated with the specified IP address. The router with the highest priority becomes the designated router. This value ranges from 0 to 255. The value 0 signifies that the neighbor is not eligible to become the designated router on this particular network. • **poll-interval seconds** - Configures the poll interval between the hello packets sent to an inactive non-broadcast multi-access neighbor. • **cost number** - Configure route path cost value. • **database-filter all** - Configures database filter.
Mode	OSPF Router Configuration Mode
Package	Enterprise and Metro_E
Default	priority - 1
Example	**SEFOS(config-router)# neighbor 12.0.0.8 priority 25**
Related Command(s)	• **router ospf** – Enables OSPF routing process. • **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.

24.13 default-information originate always

Command Objective	This command 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.
Syntax	**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)>]**
Parameter Description	• **always** - Advertises the default route always, regardless of whether the software has a default route. • **metric <metric-value (0-0xffffff)>** - Sets the metric value applied to the route before it is advertised into the OSPF Domain Metric used for generating the default route. If you omit a value and do not specify a value using the default-metric router configuration command, the default metric value is 1. The value used is specific to the protocol. • **metric-type <type (1-2)>** - Sets the metric type applied to the route before it is advertised into the OSPF Domain External link type associated with the default route advertised into the OSPF routing domain. It can be one of the following values: ▪ 1—Sets Type 1 external route. ▪ 2—Sets Type 2 external route.
Mode	OSPF Router Configuration Mode
Package	Enterprise and Metro_E
Default	• metric - 10 • metric-type - 2
Example	**SEFOS(config-router)# default-information originate always metric 1 metric-type 1**
Related Command(s)	• **router ospf** – Enables OSPF routing process. • **redistribute** – Configures the protocol from which the routes have to be redistributed into OSPF.

24.14 ASBR Router

Command Objective	This command specifies this router as ASBR. 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 autonomous system boundary router (ASBR). The no form of the command disables this router as ASBR.
Syntax	**`ASBR Router`** **`no ASBR Router`**
Mode	OSPF Router Configuration Mode
Package	Enterprise and Metro_E
Example	**`SEFOS(config-router)# ASBR Router`**
Related Command(s)	• **`router ospf`** – Enables OSPF routing process. • **`redistribute`** - Configures the protocol from which the routes have to be redistributed into OSPF. • **`redist-config`** - Configures the information to be applied to routes learned from RTM. • **`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.

24.15 summary-address

Command Objective

This command creates aggregate addresses for OSPF and helps in reducing the size of the routing table.

The no form of the command deletes the External Summary Address.

Syntax

```
summary-address <Network> <Mask> <AreaId> [{allowAll |
denyAll |  advertise | not-advertise}] [Translation
{enabled | disabled}][tag tag-value]

no summary-address <Network> <Mask> <AreaId> [not-
advertise] [tag tag-value]
```

Parameter Description

- **<Network>** - Configures the IP address of the Net indicated by the range.
- **<Mask>** - Configures the subnet mask that pertains to the range.
- **<AreaId>** - Configures the area associated with the OSPF address range and the identifier of the area about which routes are to be summarized. It can be specified as either a decimal value or as an IP address.

  Note: The area ID should be of backbone area or NSSA area.

- **allowAll** - Configures allowAll option and sets associated area ID as 0.0.0.0 which generates the aggregated Type-5 for the specified range. In addition aggregated Type-7 are generated in all attached NSSA, for the specified range. This parameter is valid only for area ID 0.0.0.0.
- **denyAll** - Configures denyAll in which neither Type-5 nor Type-7 will be generated for the specified range. This parameter is valid only for area ID 0.0.0.0.
- **advertise** - Sets the address range status to advertise and generates a Type 3 summary link-state advertisement (LSA). 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** - Sets the address range status to not-advertise. The Type 3 summary LSA is suppressed, and the component networks remain hidden from other networks. 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. This parameter is currently not supported in the no form of the command.
- **Translation** - Indicates how an NSSA border router is performing NSSA

translation of Type-7 to Type-5 LSAs.

- **enabled** – Sets P Bit in the generated Type-7 LSA.
- **disabled** - Clears P Bit in the generated Type-7 LSA.

- **tag tag-value** - Configures the tag option for OSPF. This parameter is currently not supported.

Mode

OSPF Router Configuration Mode

Package

Enterprise and Metro_E

Default

- summary-address - advertise
- translation - enabled

Note: This command executes only for backbone or NSSA area.

Example

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

Related Command(s)

- **router ospf** – Enables OSPF routing process.
- **area - nssa** - Configures a particular area as not-so-stubby area (NSSA).
- **area - range** – Consolidates and summarizes routes at an area boundary.
- **show ip ospf - summary address** – Displays OSPF summary-address redistribution information.
- **show ip ospf - database summary** – Displays OSPF LSA Database summary.

24.16 redistribute

Command Objective	This command configures the protocol from which the routes have to be redistributed into OSPF and advertises the routes learned by other protocols. The no form of the command disables redistribution of routes from the given protocol
Syntax	**redistribute {static | connected | rip | bgp | isis [{level-1 | level-2 | level-1-2}] | all} [route-map <name(1-20)>] [metric <mertic_value(0-16777214)>] [metric-type {1-2}]** **no redistribute {static | connected | rip | bgp | all} [route-map <name(1-20)>] [metric]**
Parameter Description	• **static** - Redistributes routes, configured statically in the OSPF routing process. • **connected** - Redistributes directly connected networks' routes into OSPF routing process. • **rip** - Redistributes routes that are learned by the RIP process into OSPF routing process. • **bgp** - Redistributes routes that are learned by the BGP process into OSPF routing process. • **isis** - Redistributes routes learned by ISIS in the OSPF routing process. ▪ **level-1** - Imports routes learned by ISIS level-1 in the OSPF routing process. ▪ **level-2** - Imports routes learned by ISIS level-2 in the OSPF routing process. ▪ **level-1-2** - Imports all routes learned by ISIS in the OSPF routing process. • **all** - Imports all routes learned in the OSPF routing process. • **route-map <name(1-20)>** - Identifies the specified route-map in the list of route-maps. This is a string with maximum string size 20. Note: Redistribution can be configured for only one route map. Another route map can be assigned, only if the already assigned route map is disabled. • **metric <mertic_value(0-16777214)> -** Configures the metric values for the routes to be redistributed into OSPF. This value ranges from 0 to 16777214.

	• **metric-type {1-2} -** Configures the metric type applied to the routes to be redistributed. This value ranges from 1 to 2.
Mode	OSPF Router Configuration Mode
Package	Enterprise and Metro_E
Default	• Metric – 10 • Metric type - 2
Example	**SEFOS(config-router)# redistribute static**
Related Command(s)	• **router ospf** – Enables OSPF routing process.

24.17 distribute-list route-map in

Command Objective	This command enables inbound filtering for routes and defines the conditions for distributing the routes from one routing protocol to another. The no form of the command disables inbound filtering for the routes.
Syntax	**distribute-list route-map <name(1-20)> in** **no distribute-list route-map <name(1-20)> in**
Parameter Description	• **<name(1-20)>** - Configures the name of the route map for which filtering should be enabled. Only one route map can be set for inbound routes. Another route map can be assigned, only if the already associated route map is disassociated. This value is a string with maximum string size 20.
Mode	OSPF Router Configuration Mode
Package	Enterprise and Metro_E
Example	**SEFOS(config-router)# distribute-list route-map rmap-test in**
Related Command(s)	• **router ospf** – Enables OSPF routing process.

24.18 redist-config

Command Objective	This command 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.
Syntax	**redist-config <Network> <Mask> [metric-value <metric (1 - 16777215)>] [metric-type {asExttype1 | asExttype2}] [tag <tag-value>}** **no redist-config <Network> <Mask>**
Parameter Description	• **<Network>** - Configures the IP address of the destination route. • **<Mask>** - Configures the mask of the destination route. • **metric-value <metric (1 - 16777215)>** - Configures the metric value applied to the route before it is advertised into the OSPF domain. This value ranges from 1 to 16777215. • **metric-type** - Configures the metric type applied to the route before it is advertised into the OSPF domain. The list options are: ▪ **asExttype1** – Sets the metric type as AS external type 1. ▪ **asExttype2** - Sets the metric type as AS external type 2. • **tag <tag-value>** - Configures the tag type. Describes whether tags will be automatically generated or will be manually configured. This value ranges from 0 to 4294967295. 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. To execute this command with the `tag` option, the router must to set as ASBR.
Mode	OSPF Router Configuration Mode
Package	Enterprise and Metro_E
Default	• metric-value - 10 • metric-type - asExttype2 • tag - manual
Note:	This command executes only if the router is set as ASBR.

Example	**`SEFOS(config-router)# redist-config 10.0.0.0 255.0.0.0 metric-value 100 metric-type asExttype1`**
Related Command(s)	• **`router ospf`** – Enables OSPF routing process. • **`ASBR router`** – Sets the router as ASBR. • **`redistribute`** – Configures the protocol from which the routes have to be redistributed into OSPF.

24.19 capability opaque

Command Objective	This command enables the capability of storing opaque LSAs. The no form of the command disables the opaque capability.
Syntax	**capability opaque** **no capability opaque**
Mode	OSPF Router Configuration Mode
Package	Enterprise and Metro_E
Default	Opaque capability is disabled
Example	**SEFOS(config-router)# capability opaque**
Related Command(s)	• **router ospf** – Enables OSPF routing process. • **nsf ietf restart-support –** Enables the graceful restart support.

24.20 nsf ietf restart-support

Command Objective	This command enables the graceful restart support in OSPF router. Graceful restart support is provided for both unplanned and planned restart, if the command is executed without any option. The graceful restart mechanism allows forwarding of data packets to continue along known routes, while the routing protocol information is being restored following a processor switch over. The entity should save any change made using this command in a non-volatile storage, as the configuration set using this command is persistent. The no form of the command disables the graceful restart support.
Syntax	**`nsf ietf restart-support [plannedOnly]`** **`no nsf ietf restart-support`**
Parameter Description	• **`plannedOnly`** - Configures planned-only graceful restart mechanism in the OSPF router.
Mode	OSPF Router Configuration Mode
Package	Enterprise and Metro_E
Default	Graceful restart support is disabled.
Note:	This command executes only if the • OSPF is enabled • Opaque functionality is enabled.
Example	**`SEFOS(config-router)# nsf ietf restart-support`**
Related Command(s)	• **`router ospf`** – Enables OSPF routing process. • **`capability opaque`** - Enables the capability of storing opaque LSAs. • **`show ip ospf`** – Displays general information about OSPF routing process.

24.21 nsf ietf restart-interval

Command Objective	This command configures the OSPF graceful restart timeout interval. This value specifies the graceful restart interval, in seconds, during which the restarting router has to reacquire OSPF neighbors that are fully operational prior to the graceful restart. This value ranges from 1 to 1800 seconds. The value is provided as an intimation of the grace period to all neighbors. The entity should save any change made using this command in a non-volatile storage, as the configuration set using this command is persistent. The no form of the command resets the interval to default value.
Syntax	**`nsf ietf restart-interval <grace period(1-1800)>`** **`no nsf ietf restart-interval`**
Mode	OSPF Router Configuration Mode
Package	Enterprise and Metro_E
Default	120 seconds
Example	**`SEFOS(config-router)# nsf ietf restart-interval 200`**
Related Command(s)	• **`router ospf`** – Enables OSPF routing process. • **`show ip ospf`** – Displays general information about OSPF routing process.

24.22 nsf ietf helper-support

Command Objective	This command enables the helper support. The helper support is enabled for all the options, if the command is executed without any option. The helper support can be enabled for more than one option, one after the other. The entity should save any change made using this command in a non-volatile storage, as the configuration set using this command is persistent. The no form of the command disables the helper support. The helper support is disabled for all the options, if the command is executed without any option.
Syntax	**`nsf ietf helper-support [{unknown | softwareRestart | swReloadUpgrade | switchToRedundant}]`** **`no nsf ietf helper-support [{unknown | softwareRestart | swReloadUpgrade | switchToRedundant}]`**
Parameter Description	• **`unknown`** - Configures helper support for restarting of system due to unplanned events (such as restarting after a crash). • **`softwareRestart`** - Configures helper support for restarting of system due to restart of software. • **`swReloadUpgrade`** - Configures helper support for restarting of system due to reload or upgrade of software. • **`switchToRedundant`** - Configures helper support for restarting of system due to switchover to a redundant support processor.
Mode	OSPF Router Configuration Mode
Package	Enterprise and Metro_E
Default	Helper support is enabled
Note:	This command executes only if OSPF routing process is enabled.
Example	**`SEFOS(config-router)# nsf ietf helper-support switchToRedundant`**
Related Command(s)	• **`router ospf`** – Enables OSPF routing process. • **`nsf ietf helper gracetimelimit`** - Configures the graceful restart interval limit in helper side. • **`nsf ietf helper strict-lsa-checking`** - Enables the strict LSA check option in helper.

- **`show ip ospf`** – Displays general information about OSPF routing process.

24.23 nsf ietf helper gracetimelimit

Command Objective	This command configures the grace period till which the OSPF router acts as helper. During this period, the router advertises that the restarting router is active and is in FULL state. This value ranges from 0 to 1800 seconds. The value is provided as an intimation of the restart period to the neighbors that do not support graceful restart or that are connected using multipoint interfaces.
Syntax	**`nsf ietf helper gracetimelimit <gracelimit period(0-1800)>`**
Mode	OSPF Router Configuration Mode
Package	Enterprise and Metro_E
Default	0
Note:	This command executes only if • OSPF router is enabled. • Helper Mode is enabled.
Example	**`SEFOS(config-router)# nsf ietf helper gracetimelimit 100`**
Related Command(s)	• **`router ospf`** – Enables OSPF routing process. • **`nsf ietf helper-support`** - Enables the helper support. • **`show ip ospf`** – Displays general information about OSPF routing process.

24.24 nsf ietf helper strict-lsa-checking

Command Objective	This command enables the strict LSA check option in helper. The strict LSA check option allows the helper to terminate the graceful restart, once a changed LSA that causes flooding during the restart process is detected. The entity should save any change made using this command in a non-volatile storage, as the configuration set using this command is persistent. The no form of the command disables the strict LSA check option in helper.
Syntax	**`nsf ietf helper strict-lsa-checking`** **`no nsf ietf helper strict-lsa-checking`**
Mode	OSPF Router Configuration Mode
Package	Enterprise and Metro_E
Default	Strict LSA check option is disabled in helper.
Note:	This command executes only if • OSPF router is enabled. • Helper mode is enabled.
Example	**`SEFOS(config-router)# nsf ietf helper strict-lsa-checking`**
Related Command(s)	• **`router ospf`** – Enables OSPF routing process. • **`nsf ietf helper-support`** - Enables the helper support. • **`show ip ospf`** – Displays general information about OSPF routing process.

24.25 nsf ietf grace lsa ack required

Command Objective	This command enables Grace Ack Required state in restarter. The Grace LSAs sent by the router are expected to be acknowledged by peers, if the Grace Ack Required state is enabled. The entity should save any change made using this command in a non-volatile storage, as the configuration set using this command is persistent. The no form of the command disables the Grace Ack Required state in restarter.
Syntax	**`nsf ietf grace lsa ack required`** **`no nsf ietf grace lsa ack required`**
Mode	OSPF Router Configuration Mode
Package	Enterprise and Metro_E
Default	Grace Ack Required state is enabled in restarter.
Note:	This command executes only if OSPF router is enabled.
Example	**`SEFOS(config-router)# nsf ietf grace lsa ack required`**
Related Command(s)	• **`router ospf`** – Enables OSPF routing process. • **`show ip ospf`** – Displays general information about OSPF routing process.

24.26 nsf ietf grlsa retrans count

Command Objective	This command configures the maximum number of retransmissions for unacknowledged Grace LSAs. This value ranges from 0 to 180.
Syntax	**nsf ietf grlsa retrans count <grlsacout (0-180)>**
Mode	OSPF Router Configuration Mode
Package	Enterprise and Metro_E
Default	2
Note:	This command executes only if OSPF router is enabled.
Example	**SEFOS(config-router)# nsf ietf grlsa retrans count 100**
Related Command(s)	• **router ospf** – Enables OSPF routing process. • **show ip ospf** – Displays general information about OSPF routing process.

24.27 nsf ietf restart-reason

Command Objective	This command configures the reason for graceful restart in the OSPF router. The reason for restart can be software upgrade, scheduled restart, or switch to redundant router. The entity should save any change made using this command in a non-volatile storage, as the configuration set using this command is persistent.
Syntax	**`nsf ietf restart-reason [{unknown | softwareRestart | swReloadUpgrade | switchToRedundant}]`**
Parameter Description	• **`unknown`** - Configures the system to restart due to unplanned events (such as restarting after a crash). • **`softwareRestart`** - Configures the system to restart due to software restart. • **`swReloadUpgrade`** - Configures the system to restart due to reloading or upgrading of software. • **`switchToRedundant`** - Configures the system to restart due to switchover to a redundant support processor.
Mode	OSPF Router Configuration Mode
Package	Enterprise and Metro_E
Default	Unknown
Note:	This command executes only if OSPF router is enabled.
Example	**`SEFOS(config-router)# nsf ietf restart-reason softwareRestart`**
Related Command(s)	• **`router ospf`** – Enables OSPF routing process. • **`show ip ospf`** – Displays general information about OSPF routing process.

24.28 distance

Command Objective	This command enables the administrative distance (that is, the metric to reach the destination) of the routing protocol and sets the administrative distance value. The distance value ranges between 1 and 255. The administrative distance can be enabled for only one route map. The distance should be dissociated for the already associated route map, if distance needs to be associated for another route map. The no form of the command disables the administrative distance.
Syntax	**`distance <1-255> [route-map <name(1-20)>]`** **`no distance [route-map <name(1-20)>]`**
Parameter Description	• **`route-map <name(1-20)>`** - Configures the name of the route map for which the distance value should be enabled and set. This value is a string with maximum string size 20.
Mode	OSPF Router Configuration Mode
Package	Enterprise and Metro_E
Default	0 (Represents directly connected route)
Note:	This command executes only if OSPF router is enabled.
Example	**`SEFOS(config-router)# distance 10 route-map rmap-test`**
Related Command(s)	• **`router ospf`** – Enables OSPF routing process.

24.29 route-calculation staggering

Command Objective	This command enables OSPF route calculation staggering feature and also sets the staggering interval to the last configured value. This feature staggers the OSPF route calculation at regular intervals for processing neighbor keep alive and other OSPF operations. The no form of the command disables OSPF route calculation staggering and removes the staggering interval.
Syntax	**`route-calculation staggering`** **`no route-calculation staggering`**
Mode	OSPF Router Configuration Mode
Package	Enterprise and Metro_E
Default	OSPF route calculation staggering is enabled.
Note:	This command executes only if OSPF router is enabled.
Example	**`SEFOS(config-router)# route-calculation staggering`**
Related Command(s)	• **`router ospf`** – Enables OSPF routing process. • **`route-calculation staggering-interval`** - Configures the OSPF route calculation staggering interval. • **`show ip ospf`** – Displays general information about OSPF routing process.

24.30 route-calculation staggering-interval

Command Objective	This command configures the OSPF route calculation staggering interval (in milliseconds). This value represents the time after which the route calculation is suspended for doing other OSPF operations. This value ranges from 1000 to 2147483647 milliseconds.
Syntax	**route-calculation staggering-interval <milli-seconds (1000-2147483647)>**
Mode	OSPF Router Configuration Mode
Package	Enterprise and Metro_E
Default	10000 milliseconds (OSPF route calculation staggering interval is equal to hello interval)
Note:	This command executes only if OSPF router is enabled.
Example	**SEFOS(config-router)# route-calculation staggering-interval 2000**
Related Command(s)	• **router ospf** – Enables OSPF routing process. • **route-calculation staggering** - Enables OSPF route calculation staggering feature. • **show ip ospf** – Displays general information about OSPF routing process.

24.31 network

Command Objective

This command defines the interfaces on which OSPF runs and the area ID for those interfaces. 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. The IP address for the entry should be same as that of the configured interface.

The no form of the command disables OSPF routing for interfaces defined and removes the area ID of that interface.

Note: When OSPF routing is enabled using the `network` command, the session established is properly mapped with the interface only if the interface administrative status is up. This is because to enable OSPF in an interface, both IP address and interface index are used.

Syntax

`network <Network number> area <area-id> [unnum { Vlan <vlan-id/vfi-id> | <interface-type> <interface-num> | <IP-interface-type> <IP-interface-number>}]`

`no network <Network number> area <area-id> [unnum { Vlan <vlan-id/vfi-id> | <interface-type> <interface-num> | <IP-interface-type> <IP-interface-number>}]`

Parameter Description

- **`<Network number>`** - Configures the network type for the interfaces.
- **`<area-id>`** - Configures the area associated with the OSPF address range and the identifier of the area about which routes are to be summarized. It can be specified as either a decimal value or as an IP address.
- **`unnum { Vlan <vlan-id/vfi-id>`** - Configures the network type for the specified VLAN / VFI ID. This value ranges from 1 to 65535.
  - **`<vlan –id>`** - VLAN ID is a unique value that represents the specific VLAN. This value ranges from 1 to 4094.
  - **`<vfi-id>`** - VFI ID is a VLAN created in the system which contains pseudowires and attachment circuits as member ports. This creates a logical LAN for the VPLS service. This value ranges from 4096 to 65535.

    Note: The VLAN ID 4095 is reserved and may be used to indicate a wildcard match for the VID in management operations or filtering database entries.

    Note: VFI IDs 4096 and 4097 are reserved identifiers used in MPLS PW.

    Note: The theoretical maximum for the maximum number of VFI is 65535 but the actual number of VFI supported is a

sizing constant. Based on this, the maximum number of VFI ID accepted in the management interface is restricted. For example if 100 VFIs are supported, the maximum number of VFI supported will be restricted to a hundred added to the maximum number of VLANs. An error message is displayed for any value beyond this range.

- **<interface-type>** - Configures the network type for the specified type of interface. The interface can be:
  - **fastethernet** – Officially referred to as 100BASE-T standard. This is a version of LAN standard architecture that supports data transfer upto 100 Megabits per second.
  - **XL-ethernet** – A version of LAN standard architecture that supports data transfer upto 40 Gigabits per second.
  - **extreme-ethernet** – A version of Ethernet that supports data transfer upto 10 Gigabits per second.
  - **i-lan** – Internal LAN created on a bridge per IEEE 802.1ap.
- **<interface-num>** - Configures the network type for the specified interface identifier. This is a unique value that represents the specific interface. This value is a combination of slot number and port number separated by a slash, for interface type other than i-lan. For example: 0/1 represents that the slot number is 0 and port number is 1. Only i-lan ID is provided, for interface types i-lan. For example: 1 represents i-lan ID.
- **<IP-interface-type> -** Configures the network type for the specified L3 pseudowire interface in the system.
- **<IP-interface-number> -** Configures the network type for the specified L3 pseudowire interface identifier. This is a unique value that represents the specific interface. This value ranges from 1 to 65535 for pseudowire interface.

  Note: Maximum number of pseudowire interfaces supported in the system is 100.

Mode	OSPF Router Configuration Mode
Package	Enterprise and Metro_E
Example	**SEFOS(config-router)# network 0.0 area 0.0 unnum gi 0/2**
Related Command(s)	• **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. • **area –virtual link key start–accept** – Configures the Start Accept Time for Cryptographic Key.

- **area –virtual link key start–generate** – Configures Start Generate Time for Cryptographic Key.
- **area –virtual link key stop-accept** – Configures Stop Accept Time for Cryptographic Key.
- **area –virtual link key stop–generate** – Configures Stop Generate Time for Cryptographic Key.

24.32 set nssa asbr-default-route translator

Command Objective	This command enables or disables setting of P bit in the default Type-7 LSA generated by NSSA-internal ASBR.
Syntax	**set nssa asbr-default-route translator { enable | disable }**
Parameter Description	• **enable** - Sets P-Bit in the generated Type-7 default LSA, when NSSA ASBR is set to `enabled`. • **disable** - Clears P-Bit in the generated default LAS, when NSSA ASBR is set to `disabled`.
Mode	OSPF Router Configuration Mode
Package	Enterprise Metro_E and Metro
Default	Disable
Example	**SEFOS(config-router)# set nssa asbr-default-route translator enable**
Related Command(s)	• **router ospf** – Enables OSPF routing process.

24.33 passive-interface vlan

Command Objective	This command suppresses routing updates on an interface and makes the interface passive. 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. The no form of the command enables routing updates on an interface.
Syntax	**passive-interface {vlan <vlan-id/vfi-id> | <interface-type> <interface-id> | <IP-interface-type> <IP-interface-number>}** **no passive-interface {vlan <vlan-id/vfi-id> | <interface-type> <interface-id> | <IP-interface-type> <IP-interface-number>}**
Parameter Description	• **vlan <vlan-id/vfi-id>** - Configures the specified VLAN / VFI ID as passive interface.This value ranges from 1 to 65535. ▪ **<vlan –id>** - VLAN ID is a unique value that represents the specific VLAN. This value ranges from 1 to 4094. ▪ **<vfi-id>** - VFI ID is a VLAN created in the system which contains pseudowires and attachment circuits as member ports. This creates a logical LAN for the VPLS service. This value ranges from 4096 to 65535. Note: The VLAN ID 4095 is reserved and may be used to indicate a wildcard match for the VID in management operations or filtering database entries. Note: VFI IDs 4096 and 4097 are reserved identifiers used in MPLS PW. Note: The theoretical maximum for the maximum number of VFI is 65535 but the actual number of VFI supported is a sizing constant. Based on this, the maximum number of VFI ID accepted in the management interface is restricted. For example if 100 VFIs are supported, the maximum number of VFI supported will be restricted to a hundred added to the maximum number of VLANs. An error message is displayed for any value beyond this range. • **<interface-type>** - Configures OSPF for the specified type of interface. The interface can be: ▪ **fastethernet** – Officially referred to as 100BASE-T standard. This is a version of LAN standard architecture that supports data transfer upto 100 Megabits per second. ▪ **XL-ethernet** – A version of LAN standard architecture that supports data transfer upto 40 Gigabits per second.

- **extreme-ethernet** – A version of Ethernet that supports data transfer upto 10 Gigabits per second.
- **i-lan**– Internal LAN created on a bridge per IEEE 802.1ap.

- **<interface-id>** - Configures OSPF for the specified interface identifier. This is a unique value that represents the specific interface.This value is a combination of slot number and port number separated by a slash, for interface type other than i-lan and port-channel. For example: 0/1 represents that the slot number is 0 and port number is 1. Only i-lan ID is provided, for interface types i-lan. For example: 1 represents i-lan ID.

- **<IP-interface-type> -** Configures the specified L3 pseudowire interface in the system as passive interface.

- **<IP-interface-number> -** Configures the specified L3 pseudowire interface identifier as passive interface. This is a unique value that represents the specific interface. This value ranges from 1 to 65535 for pseudowire interface.

  Note: Maximum number of pseudowire interfaces supported in the system is 100.

Mode OSPF Router Configuration Mode

Package Enterprise and Metro_E

Note: This command executes only if OSPF router is enabled.

Example

```
SEFOS(config-router)# passive-interface extreme-ethernet 0/2
```

Related Command(s)

- **router ospf** – Enables OSPF routing process.
- **network** – Defines the interfaces on which OSPF runs and area ID for those interfaces.
- **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.

24.34 passive-interface default

Command Objective	This command suppresses routing updates on all interfaces and makes the passive interface to default. All the OSPF interfaces created after the execution of this command will be passive. This is useful in Internet Service Providers (ISPs) and large enterprise networks where many of the distribution routers have more than 200 interfaces. The no form of the command enables routing updates on all interfaces.
Syntax	**passive-interface default** **no passive-interface default**
Mode	OSPF Router Configuration Mode
Package	Enterprise and Metro_E
Example	**SEFOS(config-router)# passive-interface default**
Related Command(s)	• **router ospf** – Enables OSPF routing process. • **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.

24.35 ip ospf demand-circuit

Command Objective	This command configures OSPF to treat the interface as an OSPF demand circuit. On point-to-point interfaces, only one end of the demand circuit must be configured. This command allows the underlying data link layer to be closed when the topology is stable. 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 link-state advertisements (LSAs) do not flood the demand circuit. This command executes only if OSPF routing process is enabled. The no form of the command removes the demand circuit designation from the interface.
Syntax	**`ip ospf demand-circuit`** **`no ip ospf demand-circuit`**
Mode	Interface Configuration Mode (VLAN interface/Router port)
Package	Enterprise and Metro_E
Example	**`SEFOS(config-if)# ip ospf demand-circuit`**
Related Command(s)	• **`router ospf`** – Enables OSPF routing process. • **`show ip ospf interface`** – Displays OSPF interface information.

24.36 ip ospf retransmit-interval

Command Objective	This command specifies the time (in seconds) between link-state advertisement (LSA) retransmissions for adjacencies belonging to the interface. This value ranges from 1 to 3600. This value is also used while retransmitting database description and link-state request packets. The no form of the command uses the default time between link-state advertisement (LSA) retransmissions for adjacencies belonging to the interface.
Syntax	**`ip ospf retransmit-interval <seconds (1 - 3600)>`** **`no ip ospf retransmit-interval`**
Mode	Interface Configuration Mode (VLAN interface/Router port)
Package	Enterprise and Metro_E
Default	5
Example	**`SEFOS(config-if)# ip ospf retransmit-interval 300`**
Note:	This command executes only is the OSPF routing process is enabled.
Related Command(s)	• **`router ospf`** – Enables OSPF routing process. • **`show ip ospf interface`** – Displays OSPF interface information.

24.37 ip ospf transmit-delay

Command Objective	This command sets the estimated time (in seconds) required to transmit a link state update packet on the interface. This value ranges from 1 to 3600. Link-state advertisements (LSAs) in the update packet must have their ages incremented by the amount specified in the `seconds` argument before transmission. The no form of the command sets the default estimated time it takes to transmit a link state update packet on the interface.
Syntax	**`ip ospf transmit-delay <seconds (1 - 3600)>`** **`no ip ospf transmit-delay`**
Mode	Interface Configuration Mode (VLAN interface/Router port)
Package	Enterprise and Metro_E
Default	1
Note:	This command executes only is the OSPF routing process is enabled.
Example	**`SEFOS(config-if)# ip ospf transmit-delay 50`**
Related Command(s)	• **`router ospf`** – Enables OSPF routing process. • **`show ip ospf interface`** – Displays OSPF interface information.

24.38 ip ospf priority

Command Objective	This command sets the router priority which helps determine the designated router for this network. When two routers attached to a network both attempt to become the designated router, the one with the higher router priority takes precedence. The number value that specifies the priority of the router ranges from 0 to 255. 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 ID takes precedence. The no form of the command sets default value for router priority.
Syntax	**`ip ospf priority <value (0 - 255)>`** **`no ip ospf priority`**
Mode	Interface Configuration Mode (VLAN interface/Router port)
Package	Enterprise and Metro_E
Default	1
Note:	This command executes only if the OSPF routing process is enabled.
Example	**`SEFOS(config-if)# ip ospf priority 25`**
Related Command(s)	• **`router ospf`** – Enables OSPF routing process.

24.39 ip ospf hello-interval

Command Objective	This command specifies the interval (in seconds) between hello packets sent on the interface. This value is advertised in the hello packets. The smaller the hello interval, the faster topological changes will be detected. This value ranges from 1 to 65535. This value must be the same for all routers attached to a common network. The no form of the command sets default value for the interval between hello packets sent on the interface.
Syntax	**`ip ospf hello-interval <seconds (1 - 65535)>`** **`no ip ospf hello-interval`**
Mode	Interface Configuration Mode (VLAN interface/Router port)
Package	Enterprise and Metro_E
Default	10
Note:	This command executes only if the OSPF routing process is enabled.
Example	**`SEFOS(config-if)# ip ospf hello-interval 75`**
Related Command(s)	• **`router ospf`** – Enables OSPF routing process. • **`show ip ospf interface`** – Displays OSPF interface information.

24.40 ip ospf dead-interval

Command Objective	This command sets the interval (in seconds) at which hello packets must not be seen before neighbors declare the router down. The interval is advertised in router hello packets. This value ranges from 1 to 65535. 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. This value must be the same for all routers and access servers on a specific network.
Syntax	**`ip ospf dead-interval <seconds (1-65535)>`** **`no ip ospf dead-interval`**
Mode	Interface Configuration Mode (VLAN interface/Router port)
Package	Enterprise and Metro_E
Default	40
Note:	This command executes only if the OSPF routing process is enabled.
Example	**`SEFOS(config-if)# ip ospf dead-interval 1000`**
Related Command(s)	• **`router ospf`** – Enables OSPF routing process. • **`show ip ospf interface`** – Displays OSPF interface information.

24.41 ip ospf cost

Command Objective	This command explicitly specifies the cost of sending a packet on an interface. The link-state metric is advertised as the link cost in the router link advertisement. The no form of the command resets the path cost to the default value. In general, the path cost is calculated using the following formula: • `108 / bandwidth` Using this formula, the default path costs are calculated. For example: • 56 Kbit/sec serial link - Default cost is 1785 • Ethernet - Default cost is 10
Syntax	**`ip ospf cost <cost (1-65535)> [tos <tos value (0-30)>]`** **`no ip ospf cost [tos <tos value (0-30)>]`**
Parameter Description	• **`<cost (1-65535)>`** - Configures the Type 1 external metrics which are expressed in the same units as OSPF interface cost. That is, in terms of the OSPF link state metric. This value ranges from 1 to 65535. • **`tos <tos value (0-30)>`** - Configures the Type of Service of the route being configured. This value ranges from 0 to 30. This parameter can be configured only if the code is compiled with TOS Support
Mode	Interface Configuration Mode (VLAN interface/Router port)
Package	Enterprise and Metro_E
Default	0
Example	**`SEFOS(config-if)# ip ospf cost 10`**
Related Command(s)	• **`area-Default cost`**– Specifies a cost for the default summary route sent into a stub or NSSA. • **`show ip ospf interface`**– Displays OSPF interface information.

24.42 ip ospf network

Command Objective	This command configures the OSPF network type to a type other than the default for a given media and configures broadcast networks as NBMA networks. 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 56 Kbit serial line is an example of a point-to-point network. The no form of the command sets the OSPF network type to the default type.
Syntax	**ip ospf network {broadcast | non-broadcast | point-to-multipoint | point-to-point}** **no ip ospf network**
Parameter Description	• **broadcast** - Configures the broadcast networks supporting many (more than two) attached routers, along with with the capability to address a single physical message to all of the attached routers (broadcast) • **non-broadcast** - Configures the non-broadcast networks supporting many (more than two) routers, but having no broadcast capability. Sets the network type to non-broadcast multiaccess (NBMA). • **point-to-multipoint** - Sets the network type to point-to-multipoint and treats the non-broadcast network as a collection of point-to-point links. • **point-to-point** - Sets the network type to point-to-point that joins a single pair of routers.
Mode	Interface Configuration Mode (VLAN interface/Router port)
Package	Enterprise and Metro_E
Default	Broadcast
Example	**SEFOS(config-if)# ip ospf network broadcast**
Related Command(s)	• **neighbor**– Specifies a neighbor router and its priority. • **ip ospf priority** – Sets the router priority. • **show ip ospf interface** – Displays OSPF interface information.

24.43 ip ospf authentication-key

Command Objective	This command specifies a password to be used by neighboring routers that are using the OSPF simple password authentication. The password created by this command is used as a key that is inserted directly into the OSPF header when the routing protocol packets are originated. The size of the password is 8 bytes. The password string can contain 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. The no form of the command removes a previously assigned OSPF password.
Syntax	**`ip ospf authentication-key <password (8)>`** **`no ip ospf authentication-key`**
Mode	Interface Configuration Mode (VLAN interface/Router port)
Package	Enterprise and Metro_E
Note:	This command executes only if the OSPF routing process is enabled.
Example	**`SEFOS(config-if)# ip ospf authentication-key asdf123`**
Related Command(s)	• **`router ospf`** – Enables OSPF routing process. • **`ip ospf authentication`** – Specifies the authentication type for an interface. • **`show ip ospf interface`** – Displays OSPF interface information.

24.44 ip ospf message-digest-key

Command Objective	This command enables OSPF MD5 authentication. One key per interface is used to generate authentication information when sending packets and to authenticate incoming packets. The no form of the command removes an old MD5 key. • 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.
Syntax	**ip ospf message-digest-key <Key-ID (0-255)> [{ md5 | sha-1 | sha-224 | sha-256 | sha-384 | sha-512}] <Key (16)>** **no ip ospf message-digest-key <Key-ID (0-255)>**
Parameter Description	• **<Key-ID(0-255)>** - Configures the secret key, which is used to create the message digest appended to the OSPF packet. This value ranges from 0 to 255. • **md5** - Sets the authentication type as Message Digest 5 (MD5) authentication. • **sha-1** - Sets the authentication type as Secure Hash Algorithm 1 (SHA1) authentication. SHA1 generates Authentication digest of length 20 bytes. • **sha-224** - Sets the authentication type as Secure Hash Algorithm 224 (SHA224) authentication. SHA224 generates Authentication digest of length 28 bytes. • **sha-256** - Sets the authentication type as Secure Hash Algorithm 256 (SHA256) authentication. SHA256 generates Authentication digest of length 32 bytes. • **sha-384** - Sets the authentication type as Secure Hash Algorithm 384 (SHA384) authentication. SHA384 generates Authentication digest of length 48 bytes. • **sha-512** - Sets the authentication type as Secure Hash Algorithm 512 (SHA512) authentication. SHA512 generates Authentication digest of length 64 bytes.

	• **<key (16)>** - Configures the cryptographic key value which is used to create the message digest appended to the OSPF packet. All neighboring routers on the same network must have the same key identifier and key to route OSPF traffic. This is a string with maximum string size 16.
Mode	Interface Configuration Mode (VLAN interface/Router port)
Package	Enterprise and Metro_E
Note:	• This command executes only if the OSPF routing process is enabled. • The authentication type should be the same as set in the `ip ospf authentication` command.
Example	**SEFOS(config-if)# ip ospf message-digest-key 20 sha-256 abcd**
Related Command(s)	• **router ospf** – Enables OSPF routing process. • **ip ospf authentication** - Specifies the authentication type for an interface. • **show ip ospf interface** – Displays OSPF interface information.

24.45 ip ospf authentication

Command Objective	This command specifies the authentication type for an interface. The no form of the command removes the authentication type for an interface and sets it to NULL authentication.
Syntax	**ip ospf authentication {message-digest | sha-1 | sha-224 | sha-256 | sha-384 | sha-512 | null | simple}** **no ip ospf authentication**
Parameter Description	• **message-digest** - Sets the authentication type as message-digest authentication. • **sha-1** - Sets authentication type as Secure Hash Algorithm 1 (SHA1) authentication. SHA1 generates Authentication digest of length 20 bytes. • **sha-224** - Sets authentication type as Secure Hash Algorithm 224 (SHA224) authentication. SHA224 generates Authentication digest of length 28 bytes. • **sha-256** - Sets authentication type as Secure Hash Algorithm 256 (SHA256) authentication. SHA256 generates Authentication digest of length 32 bytes. • **sha-384** - Sets authentication type as Secure Hash Algorithm 384 (SHA384) authentication. SHA384 generates Authentication digest of length 48 bytes. • **sha-512** - Sets authentication type as Secure Hash Algorithm 512 (SHA512) authentication. SHA512 generates Authentication digest of length 64 bytes. • **null** - Sets the authentication type as null authentication which is used for overriding password or message-digest authentication if configured for an area • **simple** – Sets the authentication type as simple password authentication mechanism.
Mode	Interface Configuration Mode (VLAN interface/Router port)
Package	Enterprise and Metro_E
Default	null
Note:	This command executes only if:

	• OSPF routing process is enabled. • Message digest key is configured.
Example	**`SEFOS(config-if)# ip ospf authentication message-digest`**
Related Command(s)	• **`router ospf`** – Enables OSPF routing process. • **`ip ospf message-digest-key`** - Enables OSPF MD5 authentication. • **`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. • **`ip ospf message-digest-key`** - Enables OSPF MD5 authentication. • **`show ip ospf interface`** – Displays OSPF interface information.

24.46 debug ip ospf

Command Objective	This command sets the OSPF debug level. The no form of this command removes an old MD5 key.
Syntax	**debug ip ospf [vrf <name>] { pkt { hp | ddp | lrq | lsu | lsa } | module { adj_formation | ism | nsm | config | interface | restarting-router | helper | redundancy } }** **no debug ip ospf [vrf <name>] { pkt { hp | ddp | lrq | lsu | lsa } | module { adj_formation | ism | nsm | config | interface | restarting-router | helper | redundancy } | all }**
Parameter Description	• **vrf<name>** - Sets OSPF debug level for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string with maximum size 32. • **pkt** - Generates debug statements for Packet High Level Dump trace. ▪ **hp** - Generates debug statements for Hello packet traces. ▪ **ddp** - Generates debug statements for DDP packet traces. ▪ **lrq** - Generates debug statements for Link State Request Packet traces. ▪ **lsu** - Generates debug statements for Link State Update Packet traces. ▪ **lsa** - Generates debug statements for Link State Acknowledge Packet traces. • **module** - Generates debug statements for RTM Module traces ▪ **adj_formation** - Generates debug statements for Adjacency formation traces. ▪ **ism** - Generates debug statements for Interface State Machine traces. ▪ **nsm** - Generates debug statements for Neighbor State Machine traces. ▪ **config** - Generates debug statements for Configuration traces. ▪ **interface** - Generates debug statements for Interface. ▪ **restarting-router** - Generates debug statements for messages related to restarting router. ▪ **helper** - Generates debug statements for messages related to router in helper mode. ▪ **redundancy** - Generates debug statements for redundancy messages.

	• **all** - Generates debug statements for all messages.
Mode	Privileged EXEC Mode
Package	Enterprise and Metro_E
Example	**SEFOS# debug ip ospf pkt hp**
Related Command(s)	• **ip vrf** - Creates VRF instance. • **show debugging** – Displays the state of each debugging option.

24.47 show ip ospf

Command Objective	This command displays general information about the OSPF routing process.
Syntax	**show ip ospf [vrf <name>]**
Parameter Description	• **vrf <name>** - Displays the general information of OSPF for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string with maximum size 32.
Mode	Privileged EXEC Mode
Package	Enterprise and Metro_E
Example	**SEFOS# show ip ospf** OSPF Router with ID (0.0.0.0) (Vrf default) Supports only single TOS(TOS0) route Opaque LSA Support : Disabled ABR Type supported is Standard ABR Autonomous System Boundary Router : Disabled P-Bit setting for the default Type-7 LSA that needs to be generated by the ASBR(which is not ABR) is disabled Non-Stop Forwarding disabled Restart-interval limit: 120 Grace LSA Retransmission Count: 2 Helper Grace LSA ACK :Required Restart Reason is: Unknown Helper is Giving Support for: Unknown Software Restart Software Reload/Upgrade Switch To Redundant Helper Grace Time Limit: 0 Strict LSA checking State Is:Disabled Route calculation staggering is enabled Route calculation staggering interval is -1718520588 milliseconds

```
 Redistributing External Routes is disabled
 Default passive-interface  Disabled
 Rfc1583 compatibility is enabled
 Administrative Distance is 110
 Number of Areas in this router is 0
 Default information originate is disabled
BFD is disabled
```

Related Command(s)

- **router ospf** – Enables OSPF routing process.
- **router-id** – Sets the router-ID for the OSPF process.
- **area – nssa** - Configures an area as a not-so-stubby area (NSSA).
- **area - Stability interval** – Configures the stability interval for NSSA.
- **area - virtual-link** – Defines an OSPF virtual link and its related parameters.
- **nsf ietf restart-support** - Enables the graceful restart support.
- **nsf ietf restart-interval** - Configures the OSPF graceful restart timeout interval.
- **nsf ietf helper-support** - Enables the helper support.
- **nsf ietf helper gracetimelimit** - Configures the graceful restart interval limit in helper side.
- **nsf ietf helper strict-lsa-checking** - Enables the strict LSA check option in helper.
- **nsf ietf grace lsa ack required** - Enables Grace Ack Required state in restarter.
- **nsf ietf grlsa retrans count** - Configures the maximum number of retransmissions for unacknowledged GraceLSA.
- **nsf ietf restart-reason** - Configures the reason for graceful restart.
- **route-calculation staggering** - Enables OSPF route calculation staggering feature.
- **route-calculation staggering-interval** - Configures the OSPF route calculation staggering interval.
- **ip ospf authentication-key** – Specifies a password to be used by neighboring routers that are using the OSPF simple password

authentication.

- **ip ospf start-accept key** - Configures the time the router will start accepting packets that have been created with the specified key.
- **ip ospf stop-accept key** - Configures the time the router will stop accepting packets that have been created with the specified key.
- **ip ospf start-generate key** - Configures the time the router will start generating packets that have been created with the specified key.
- **ip ospf stop-generate key** - Configures the time the router will stop generating packets that have been created with the specified key.
- **enable bfd** - Enables BFD feature in OSPF.
- **disable bfd** - Disables BFD feature in OSPF.

24.48 show ip ospf - interface

Command Objective	This command displays the general information of OSPF routing processes for the specified interface.
Syntax	**show ip ospf [vrf <name>] interface [{ vlan <vlan-id/vfi-id> | <interface-type> <interface-id> | <IP-interface-type> <IP-interface-number>}]**
Parameter Description	• **vrf<name>** - Displays the interface general information of OSPF for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string with maximum size 32. • **vlan <vlan-id/vfi-id>** - Displays the interface general information of OSPF for the specified VLAN / VFI ID.This value ranges from 1 to 65535. ▪ **<vlan –id>** - VLAN ID is a unique value that represents the specific VLAN. This value ranges from 1 to 4094. ▪ **<vfi-id>** - VFI ID is a VLAN created in the system which contains pseudowires and attachment circuits as member ports. This creates a logical LAN for the VPLS service. This value ranges from 4096 to 65535. Note: The VLAN ID 4095 is reserved and may be used to indicate a wildcard match for the VID in management operations or filtering database entries. Note: VFI IDs 4096 and 4097 are reserved identifiers used in MPLS PW. Note: The theoretical maximum for the maximum number of VFI is 65535 but the actual number of VFI supported is a sizing constant. Based on this, the maximum number of VFI ID accepted in the management interface is restricted. For example if 100 VFIs are supported, the maximum number of VFI supported will be restricted to a hundred added to the maximum number of VLANs. An error message is displayed for any value beyond this range. • **<interface-type>** - Displays OSPF for the specified type of interface. The interface can be: ▪ **fastethernet** – Officially referred to as 100BASE-T standard. This is a version of LAN standard architecture that supports data transfer upto 100 Megabits per second. ▪ **XL-ethernet** – A version of LAN standard architecture that supports data transfer upto 40 Gigabits per second. ▪ **extreme-ethernet** – A version of Ethernet that supports data transfer upto 10 Gigabits per second. ▪ **i-lan**– Internal LAN created on a bridge per IEEE 802.1ap.

- **<interface-id>** - Displays OSPF for the specified interface identifier. This is a unique value that represents the specific interface. This value is a combination of slot number and port number separated by a slash, for interface type other than i-lan and port-channel. For example: 0/1 represents that the slot number is 0 and port number is 1. Only i-lan ID is provided, for interface types i-lan. For example: 1 represents i-lan ID.

- **<IP-interface-type> -** Displays OSPF configuration in the specified L3 pseudowire interface in the system.

- **<IP-interface-number> -** Displays OSPF configuration for the specified interface identifier. This is a unique value that represents the specific interface. This value ranges from 1 to 65535 for pseudowire interface.

  Note: Maximum number of pseudowire interfaces supported in the system is 100.

Mode Privileged EXEC Mode

Package Enterprise and Metro_E

Example

```
SEFOS# show ip ospf interface vlan 1
Vlan1 is line protocol is up
  Internet Address 13.0.0.1, Mask 255.0.0.0, Area 0.0.0.0
  AS 1, Router ID 12.0.0.2, Network Type BROADCAST, Cost 1
  demand circuit is disabled
  Transmit Delay is 1 sec, State 4, Priority 1
  Designated RouterId 12.0.0.2, Interface address 13.0.0.1
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40,
Retransmit 5
  Hello due in 1 sec
  Neighbor Count is 0, Adjacent neighbor count is 0
sha-1  authentication enabled
sha-1 authentication key is configured
 Youngest key id is 1
      Key Start Accept Time  is 26-Jun-2013,02:50

      Key Start Generate Time  is 26-Jun-2013,02:50

      Key Stop Generate Time  is 06-Feb-2136,06:28

      Key Stop Accept Time  is 06-Feb-2136,06:28
```

```
 Simple Authentication  Key is not Configured
 Connected to VRF   default
Bfd Enable
```

Related Command(s)

- **`area – nssa`** - Configures an area as a not-so-stubby area (NSSA)
- **`network`** – Defines the interfaces on which OSPF runs and defines 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.
- **`bfd`** – Enables BFD monitoring on all or specific OSPF interfaces.
- **`ip ospf bfd`** – Sets BFD support on the interface.
- **`ip ospf authentication`** – Specifies the authentication type for an interface.
- **`ip ospf message-digest-key`** - Enables OSPF MD5 authentication.

24.49 show ip ospf - neighbor

Command Objective	This command displays OSPF-related neighbor information list and observes the neighbor data structure.
Syntax	**show ip ospf [vrf <name>] neighbor [{ vlan <vlan-id/vfi-id> | <interface-type> <interface-id> | <IP-interface-type> <IP-interface-number>}] [Neighbor ID] [detail]**
Parameter Description	• **vrf<name>** - Displays OSPF-related neighbor information for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string with maximum size 32. • **vlan <vlan-id/vfi-id>** - Displays OSPF-related neighbor information for the specified VLAN / VFI ID.This value ranges from 1 to 65535. ▪ **<vlan –id>** - VLAN ID is a unique value that represents the specific VLAN. This value ranges from 1 to 4094. ▪ **<vfi-id>** - VFI ID is a VLAN created in the system which contains pseudowires and attachment circuits as member ports. This creates a logical LAN for the VPLS service. This value ranges from 4096 to 65535. Note: The VLAN ID 4095 is reserved and may be used to indicate a wildcard match for the VID in management operations or filtering database entries. Note: VFI IDs 4096 and 4097 are reserved identifiers used in MPLS PW. Note: The theoretical maximum for the maximum number of VFI is 65535 but the actual number of VFI supported is a sizing constant. Based on this, the maximum number of VFI ID accepted in the management interface is restricted. For example if 100 VFIs are supported, the maximum number of VFI supported will be restricted to a hundred added to the maximum number of VLANs. An error message is displayed for any value beyond this range. • **<interface-type>** - Displays OSPF-related neighbor information for the specified type of interface. The interface can be: ▪ **fastethernet** – Officially referred to as 100BASE-T standard. This is a version of LAN standard architecture that supports data transfer upto 100 Megabits per second. ▪ **XL-ethernet** – A version of LAN standard architecture that supports data transfer upto 40 Gigabits per second. ▪ **extreme-ethernet** – A version of Ethernet that supports data transfer upto 10 Gigabits per second. ▪ **i-lan**– Internal LAN created on a bridge per IEEE 802.1ap.

- **<interface-id>** - Displays OSPF-related neighbor information for the specified interface identifier. This is a unique value that represents the specific interface. This value is a combination of slot number and port number separated by a slash, for interface type other than i-lan and port-channel. For example: 0/1 represents that the slot number is 0 and port number is 1. Only i-lan or port-channel ID is provided, for interface types i-lan and port-channel. For example: 1 represents i-lan and port-channel ID.

- **<IP-interface-type> -** Displays OSPF-related neighbor information for the specified L3 pseudowire interface in the system.

- **<IP-interface-number> -** Displays OSPF-related neighbor information for the specified interface identifier. This is a unique value that represents the specific interface. This value ranges from 1 to 65535 for pseudowire interface.

  Note: Maximum number of pseudowire interfaces supported in the system is 100.

- **Neighbor ID** - Displays the neighbor router ID.

- **detail** - Displays the OSPF neighbor information in detail.

Mode

Privileged EXEC Mode

Package

Enterprise and Metro_E

Example

```
SEFOS# show ip ospf neighbor

Vrf  default

Neighbor-ID  Pri   State        DeadTime   Address
Interface Helper      HelperAge    HelperER   Bfd

-----------  ---   -----        --------   -------     ---
------ ---------   ------------ ---------  -----

12.0.0.1     1     FULL/BACKUP  30         20.0.0.1
vlan2     Not Helping 0             None       Enabled
```

Related Command(s)

- **router ospf** – Enables OSPF routing process.

- **neighbor** – Specifies a neighbor router and its priority.

- **enable bfd** - Enables BFD feature in OSPF.

- **disable bfd** – Disables BFD feature in OSPF.

- **router-id** – Sets the router-ID for the OSPF process.

- **network** – Defines the interfaces on which OSPF runs and area ID for those interfaces.

24.50 show ip ospf - request-list

Command Objective	This command displays OSPF Link state request list advertisements (LSAs) requested by a router and debugging OSPF routing operations.
Syntax	**show ip ospf [vrf <name>] request-list [<neighbor-id>] [{ vlan <vlan-id/vfi-id> | <interface-type> <interface-id> | <IP-interface-type> <IP-interface-number>}]**
Parameter Description	• **vrf<name>** - Displays OSPF for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string with maximum size 32. • **<neighbor-id>** - Displays OSPF request LSAs for the sepcified neighbor router ID. • **vlan <vlan-id/vfi-id>** - Displays OSPF request LSAs for the specified VLAN / VFI ID.This value ranges from 1 to 65535. ▪ **<vlan –id>** - VLAN ID is a unique value that represents the specific VLAN. This value ranges from 1 to 4094. ▪ **<vfi-id>** - VFI ID is a VLAN created in the system which contains pseudowires and attachment circuits as member ports. This creates a logical LAN for the VPLS service. This value ranges from 4096 to 65535. Note: The VLAN ID 4095 is reserved and may be used to indicate a wildcard match for the VID in management operations or filtering database entries. Note: VFI IDs 4096 and 4097 are reserved identifiers used in MPLS PW. Note: The theoretical maximum for the maximum number of VFI is 65535 but the actual number of VFI supported is a sizing constant. Based on this, the maximum number of VFI ID accepted in the management interface is restricted. For example if 100 VFIs are supported, the maximum number of VFI supported will be restricted to a hundred added to the maximum number of VLANs. An error message is displayed for any value beyond this range. • **<interface-type>** - Displays OSPF for the specified type of interface. The interface can be: ▪ **fastethernet** – Officially referred to as 100BASE-T standard. This is a version of LAN standard architecture that supports data transfer upto 100 Megabits per second. ▪ **XL-ethernet** – A version of LAN standard architecture that supports data transfer upto 40 Gigabits per second. **extreme-ethernet** – A version of Ethernet that supports data transfer

upto 10 Gigabits per second.

- **i-lan** – Internal LAN created on a bridge per IEEE 802.1ap.

- **<interface-id>** - Displays OSPF for the specified interface identifier. This is a unique value that represents the specific interface. This value is a combination of slot number and port number separated by a slash, for interface type other than i-lan. For example: 0/1 represents that the slot number is 0 and port number is 1. Only i-lan ID is provided, for interface types i-lan. For example: 1 represents i-lan ID.

- **<IP-interface-type> -** Displays OSPF configuration in the specified L3 pseudowire interface in the system.

- **<IP-interface-number> -** Displays OSPF configuration for the specified interface identifier. This is a unique value that represents the specific interface. This value ranges from 1 to 65535 for pseudowire interface.

  Note: Maximum number of pseudowire interfaces supported in the system is 100.

Mode Privileged EXEC Mode

Package Enterprise and Metro_E

Example

Single Instance:

```
SEFOS# show ip ospf request-list vlan 1
OSPF Router with ID (20.0.0.2)
Neighbor 10.0.0.1, interface vlan1 address 40.0.0.1
Type LS-ID     ADV-RTR     SeqNo      Age    Checksum
 ---- ----     -------     -----      ---    --------
Neighbor 20.0.0.2, interface vlan1 address 40.0.0.2
Type LS-ID   ADV-RTR      SeqNo       Age    Checksum
 ---- ----   -------      -----       ---    --------
```

Multiple Instance:

```
SEFOS# show ip ospf request-list
OSPF Router with ID (10.0.0.1) (Vrf  default )
Neighbor 10.0.0.2, interface - address 10.0.0.2
Type LS-ID    ADV-RTR     SeqNo     Age    Checksum
Neighbor 11.0.0.1, interface - address 11.0.0.1
Type LS-ID    ADV-RTR     SeqNo     Age    Checksum
Neighbor 13.0.0.3, interface - address 13.0.0.3
Type LS-ID    ADV-RTR     SeqNo     Age    Checksum
```

```
Neighbor 14.0.0.4, interface - address 14.0.0.4
Type LS-ID    ADV-RTR     SeqNo     Age    Checksum
```

Related Command(s)

- **`router ospf`** – Enables OSPF routing process.
- **`router-id`** – Sets the router-ID for the OSPF process.
- **`passive-interface vlan`** – Suppresses routing updates on an interface.
- **`passive-interface default`** – Suppresses routing updates on all interfaces.

24.51 show ip ospf - retransmission-list

Command Objective	This command displays a list of all OSPF Link state retransmission list information waiting to be resent. This value is also used while retransmitting database description and link-state request packets.
Syntax	**show ip ospf [vrf <name>] retransmission-list [<neighbor-id>] [{ vlan <vlan-id/vfi-id> | <interface-type> <interface-id> | <IP-interface-type> <IP-interface-number>}]**
Parameter Description	• **vrf<name>** - Displays OSPF for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string with maximum size 32. • **<neighbor-id>** - Configures the neighbor router ID • **vlan <vlan-id/vfi-id>** - Displays retransmission list information for the specified VLAN / VFI ID.This value ranges from 1 to 65535. ▪ **<vlan –id>** - VLAN ID is a unique value that represents the specific VLAN. This value ranges from 1 to 4094. ▪ **<vfi-id>** - VFI ID is a VLAN created in the system which contains pseudowires and attachment circuits as member ports. This creates a logical LAN for the VPLS service. This value ranges from 4096 to 65535. Note: The VLAN ID 4095 is reserved and may be used to indicate a wildcard match for the VID in management operations or filtering database entries. Note: VFI IDs 4096 and 4097 are reserved identifiers used in MPLS PW. Note: The theoretical maximum for the maximum number of VFI is 65535 but the actual number of VFI supported is a sizing constant. Based on this, the maximum number of VFI ID accepted in the management interface is restricted. For example if 100 VFIs are supported, the maximum number of VFI supported will be restricted to a hundred added to the maximum number of VLANs. An error message is displayed for any value beyond this range. • **<interface-type>** - Displays OSPF for the specified type of interface. The interface can be: ▪ **fastethernet** – Officially referred to as 100BASE-T standard. This is a version of LAN standard architecture that supports data transfer upto 100 Megabits per second. ▪ **XL-ethernet** – A version of LAN standard architecture that supports data transfer upto 40 Gigabits per second.

- **extreme-ethernet** – A version of Ethernet that supports data transfer upto 10 Gigabits per second.
- **i-lan**– Internal LAN created on a bridge per IEEE 802.1ap.

- **<interface-id>** - Displays OSPF for the specified interface identifier. This is a unique value that represents the specific interface. This value is a combination of slot number and port number separated by a slash, for interface type other than i-lan and port-channel. For example: 0/1 represents that the slot number is 0 and port number is 1. Only i-lan ID is provided, for interface types i-lan. For example: 1 represents i-lan ID.

- **<IP-interface-type> -** Displays OSPF configuration in the specified L3 pseudowire interface in the system.

- **<IP-interface-number> -** Displays OSPF configuration for the specified interface identifier. This is a unique value that represents the specific interface. This value ranges from 1 to 65535 for pseudowire interface.

  Note: Maximum number of pseudowire interfaces supported in the system is 100.

Mode Privileged EXEC Mode

Package Enterprise and Metro_E

Example

Single Instance:

```
SEFOS# show ip ospf retransmission-list vlan 1
OSPF Router with ID (20.0.0.2)
Neighbor 10.0.0.1, interface vlan1 address 10.0.0.2
Queue length 3
Type  LS-ID   ADV-RTR   SeqNo   Age  Checksum
1     20.0.0.2 20.0.0.2  0x80000006 0 0x522f
```

Multiple Instance:

```
SEFOS# show ip ospf retransmission-list vlan 1
OSPF Router with ID (11.0.0.1) (Vrf  default )
Neighbor 10.0.0.1, interface vlan1 address 10.0.0.2
Link State Retransmission due in 30 ticks, Queue length 3
Type  LS-ID   ADV-RTR   SeqNo   Age  Checksum
```

Related Command(s)

- **router ospf** – Enables OSPF routing process.
- **router-id** – Sets the router-ID for the OSPF process.
- **ip ospf retransmit-interval** – Specifies the time between link-state advertisement (LSA) retransmissions for adjacencies belonging to

the interface.

24.52 show ip ospf - virtual-links

Command Objective	This command displays parameters and the current state of OSPF virtual links.
Syntax	**show ip ospf [vrf <name>] virtual-links**
Parameter Description	• **vrf<name>** - Displays OSPF for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string with maximum size 32.
Mode	Privileged EXEC Mode
Package	Enterprise and Metro_E
Example	**Single Instance:** **SEFOS# show ip ospf virtual-links** Virtual Link to router 10.0.0.1, Interface State is DOWN Transit Area 33.0.0.12 Transmit Delay is 1 sec, Neighbor State DOWN Timer intervals configured, Hello 10, Dead 60, Retransmit 5 **Multiple Instance:** **SEFOS# show ip ospf virtual-links** Vrf default Virtual Link to router 11.0.0.1, Interface State is DOWN Transit Area 1.1.1.1 Transmit Delay is 1 sec, Neighbor State DOWN Timer intervals configured, Hello 10, Dead 60, Retransmit 5 Virtual Link to router 16.0.0.6, Interface State is DOWN Transit Area 5.5.5.5 Transmit Delay is 1 sec, Neighbor State DOWN Timer intervals configured, Hello 10, Dead 60, Retransmit 5
Related Command(s)	• **area - virtual-link** – Defines an OSPF virtual link and its related parameters.

24.53 show ip ospf - border-routers

Command Objective	This command displays the internal OSPF routing table entries to an Area Border Router and Autonomous System Boundary Router.
Syntax	**show ip ospf [vrf <name>] border-routers**
Parameter Description	• **vrf<name>** - Displays OSPF for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string with maximum size 32.
Mode	Privileged EXEC Mode
Package	Enterprise and Metro_E
Example	**SEFOS# show ip ospf border-routers** Vrf default OSPF Process Border Router Information Destination TOS Type NextHop Cost Rt.Type Area ----------- --- ---- ------- ---- ------- --- 12.0.0.2 0 ASBR 12.0.0.2 1 intraArea 0.0.0.0
Related Command(s)	• **abr-type** – Sets the Alternative ABR type. • **ASBR Router** – Specifies this router as ASBR.

24.54 show ip ospf - summary address

Command Objective	This command displays OSPF summary-address redistribution information configured under an OSPF process.
Syntax	**show ip ospf [vrf <name>] {area-range | summary-address}**
Parameter Description	• **vrf<name>** - Displays OSPF for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string with maximum size 32. • **area-range** - Displays the area associated with the OSPF address range. • **summary-address** - Displays the aggregate addresses for OSPF.
Mode	Privileged EXEC Mode
Package	Enterprise and Metro_E
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 **Multiple Instance:** **SEFOS# show ip ospf summary-address**

```
Display of Summary addresses for Type5 and Type7 from
redistributed routes

 Vrf  default

OSPF External Summary Address Configuration Information

-------------------------------------------------------

Network    Mask      Area        Effect   TranslationState

-------- ------     ------      -------   ----------------

11.0.0.9    255.0.0.0   0.0.0.0      AllowAll     enabled

16.0.0.1    255.0.0.0   0.0.0.0      AllowAll     enabled
```

Related Command(s)

- **`area - range`** – Consolidates and summarizes routes at an area boundary.
- **`summary-address`** – Creates aggregate addresses for OSPF.

24.55 show ip ospf - route

Command Objective	This command displays routes learned by OSPF process.
Syntax	**show ip ospf [vrf <name>] route**
Parameter Description	• **vrf<name>** - Displays OSPF for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string with a maximum size of 32.
Mode	Privileged EXEC Mode
Package	Enterprise and Metro_E
Example	**SEFOS# show ip ospf route** OSPF Routing Table Vrf default Dest/Mask TOS NextHop/Interface Cost Rt.Type Area --- --- -------/--------- ---- ------- --- 12.0.0.0/255.0.0.0 0 0.0.0.0/vlan1 1 IntraArea 0.0.0.0 20.0.0.0/255.0.0.0 0 12.0.0.2/vlan1 10 Type2Ext 0.0.0.0
Related Command(s)	• **router ospf** – Enables OSPF routing process. • **router-id** – Sets the router-ID for the OSPF process.

24.56 show ip ospf - database

Command Objective	This command displays OSPF LSA Database summary.
Syntax	**show ip ospf [vrf <name>] [area-id] database [{database-summary | self-originate | adv-router <ip-address>}]**
Parameter Description	• **vrf<name>** - Displays OSPF for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string with maximum size 32. • **area-id** - Displays the area associated with the OSPF address range. It is specified as an IP address. • **database-summary** - Displays total number of each type of LSA for each area in the database, and the total number of LSA types. • **self-originate** - Displays only self-originated LSAs (from the local router). • **adv-router<ip-address>** - 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 Mode
Package	Enterprise and Metro_E
Example	**SEFOS# show ip ospf database database-summary** OSPF Router with ID (12.0.0.1) (Vrf default) Router Link States (Area 0.0.0.0) Link ID ADV Router Age Seq# Checksum Link count 12.0.0.1 12.0.0.1 48 0x80000002 0xd129 1 12.0.0.2 12.0.0.2 50 0x80000002 0xcf28 1 Network Link States (Area 0.0.0.0) Link ID ADV Router Age Seq# Checksum 12.0.0.2 12.0.0.2 49 0x80000001 0x629f

```
OSPF Router with ID (14.0.0.1) (Vrf  vr1)

SEFOS# show ip ospf vrf default database

OSPF Router with ID (12.0.0.1) (Vrf  default)

              Router Link States (Area 0.0.0.0)

                  ---------------------------------------

Link ID    ADV Router   Age    Seq#       Checksum  Link
count
-------    ----------   ---    ----       --------  -------
---
12.0.0.1   12.0.0.1     62     0x80000002  0xd129    1
12.0.0.2   12.0.0.2     64     0x80000002  0xcf28    1

                 Network Link States (Area 0.0.0.0)

                  ---------------------------------------

Link ID      ADV Router     Age        Seq#
Checksum
-------      ----------     ---        ----          -----
---
12.0.0.2      12.0.0.2       63         0x80000001
0x629f
```

Related Command(s)

- **router ospf** – Enables OSPF routing process.
- **router-id** – Sets the router-ID for the OSPF process.
- **summary-address** – Creates aggregate addresses for OSPF.

24.57 show ip ospf – database summary

Command Objective	This command displays OSPF Database summary for the LSA type.
Syntax	**show ip ospf [vrf <name>] [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}]**
Parameter Description	• **vrf<name>** - Displays OSPF for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string with maximum size 32. • **area-id** - Displays the area associated with the OSPF address range. It is specified as an IP address • **asbr-summary** - Displays information only about the Autonomous System Boundary Router (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** - Displays the 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 <ip-address>** - 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 Mode

Package	Enterprise and Metro_E
Example	**Single Instance:**

```
SEFOS# show ip ospf database external
OSPF Router with ID (10.0.0.1)
      Summary Link States (Area 33.0.0.12)
     ---------------------------------------
LS age             : 300
Options            : (No ToS Capability, DC)
LS Type            : Summary Links(Network)
Link State ID      : 10.0.0.0
Advertising Router : 10.0.0.1
LS Seq Number      : 0x80000002
Checksum           : 0xae77
Length             : 28
```

```
SEFOS# show ip ospf database network
OSPF Router with ID (20.0.0.2)
          Network Link States (Area 33.0.0.12)
        ---------------------------------------
LS age             : 900
Options            : (No ToS Capability, DC)
LS Type            : Network Links
Link State ID      : 40.0.0.2
Advertising Router : 20.0.0.2
LS Seq Number      : 0x80000001
Checksum           : 0xce09
Length             : 32
```

Multiple Instance:

```
SEFOS# show ip ospf database
OSPF Router with ID (10.0.0.1) (Vrf  default)
              Router Link States (Area 0.0.0.0)
                  ---------------------------------------
Link ID   ADV Router    Age     Seq#   Checksum  Link
count
-------   ----------    ---     ---     --------  -------
---
10.0.0.1   10.0.0.1       900     0x80000009    0xde6
```

```
1
14.0.0.4   14.0.0.4       900     0x80000008    0x8f33
2

                 Network Link States (Area 0.0.0.0)
                 ----------------------------------

Link ID      ADV Router     Age     Seq#
Checksum
-------     ----------     ---      ----          -------
-
14.0.0.1     10.0.0.1       1200    0x80000003    0x8e71
                 Summary Link States (Area 0.0.0.0)
                 ----------------------------------

Link ID       ADV Router       Age     Seq#
Checksum
-------      ----------       ---       ----      -------
-
13.0.0.0     10.0.0.1         300      0x80000003
0x859c
11.0.0.9     10.0.0.1         900      0x80000016
0x1fe8
20.10.10.10  10.0.0.1         900      0x80000001
0x3db8
10.0.0.0     10.0.0.1         300      0x80000002
0xae77
16.0.0.1     10.0.0.1         900      0x80000016
0x2edc
17.0.0.0     10.0.0.1         900      0x80000001
0x55ca
21.0.0.0     10.0.0.1         900      0x80000001
0x21fa
15.0.0.4     14.0.0.4         900      0x8000000d
0xf812
             ASBR Summary Link States (Area 0.0.0.0)
            ----------------------------------------

Link ID       ADV Router     Age        Seq#
Checksum
-------      ----------       ---       ----       ------
--
11.0.0.1    10.0.0.1        1200       0x80000001
0x8b98
              Router Link States (Area 1.1.1.1)
              ---------------------------------

Link ID   ADV Router    Age       Seq#   Checksum  Link
```

```
count
-------   ----------     --     ----    --------  --------
---
10.0.0.1   0.0.0.1      1200     0x80000007  0x4ba8    1
11.0.0.1   11.0.0.1     1200     0x80000007  0xc139    1
             Network Link States (Area 1.1.1.1)
            ---------------------------------------
Link ID    ADV Router       Age        Seq#
Checksum
-------   ----------        ---        ----      --------
11.0.0.1   11.0.0.1         1200       0x80000003
0x5daa
                 Summary Link States (Area 1.1.1.1)
                 ---------------------------------------
Link ID      ADV Router     Age        Seq#
Checksum
-------     ----------       ---       ----        ------
--
13.0.0.0     10.0.0.1       300        0x80000003
0x859c
20.10.10.10  10.0.0.1       900        0x80000002
0x3bb9
10.0.0.0     10.0.0.1       300        0x80000002
0xae77
16.0.0.1     10.0.0.1       900        0x80000016
0x2edc
17.0.0.0     10.0.0.1       900        0x80000001
0x55ca
14.0.0.0     10.0.0.1       300        0x80000003
0x78a8
21.0.0.0     10.0.0.1       900        0x80000001
0x21fa
18.0.0.0     10.0.0.1       900        0x80000001
0x52cb
15.0.0.0     10.0.0.1       1200       0x80000001
0x79a7
           NSSA External Link States (Area 4.4.4.4)
          -----------------------------------------
Link ID       ADV Router       Age    Seq#       Checksum
-------    ----------      ---        ---         -------
-
19.0.0.0     10.0.0.1         300    0x80000002    0x89f4
```

```
16.0.0.0        10.0.0.1        300     0x80000002      0xb0d0
13.0.0.0        10.0.0.1        300     0x80000002      0xd7ac
10.0.0.0        10.0.0.1        300     0x80000002      0xfe88
```

Related Command(s)

- **`summary-address`** – Defines the interfaces on which OSPF runs and defines the area ID for those interfaces.
- **`router ospf`** – Enables OSPF routing process.

24.58 show ip ospf redundancy

Command Objective	This command displays OSPFv2 redundancy information.
Syntax	**show ip ospf redundancy**
Mode	Privileged EXEC Mode
Package	Enterprise and Metro_E
Example	**SEFOS# show ip ospf redundancy** Redundancy Summary ------------------ Hotstandby admin status : Enabled Hotstandby state : Active and Standby Up Hotstandby bulk update status : Completed Number of hello PDUs synced : 0 Number of LSAs synced : 0
Related Command(s)	• **router ospf** – Enables OSPF routing process.

24.59 ip ospf key start-accept

Command Objective	This command configures the time the router will start accepting packets that have been created with the specified key.
Syntax	**ip ospf key <Key-ID (0-255)> start-accept <DD-MON-YEAR,HH:MM>**
Parameter Description	• **key <Key-ID (0-255)>** - Identifies the secret key used to create the message digest appended to the OSPF packet. This value ranges from 0 to 255. • **start-accept <DD-MON-YEAR,HH:MM>** - Configures the time the router will start accepting packets that have been created with this key. The value shown will be the sum of configured time and the system time at which the start-accept value is configured. Time is configured in 24 hours format. Note: System reuses the old MIB objects which operate in integer format and thereby, the CLI user-defined format is converted by the system to be compatible to MIB format. This may reflect mismatch in default values of the MIB and system.
Mode	Interface Configuration Mode (VLAN interface/Router port)
Package	Enterprise and Metro_E
Note:	This command executes only if, • OSPF routing process is enabled. • Authentication key for Simple Password Authentication is removed. • OSPF Message Digest authentitication is enabled and authentication type is specified for the interface.
Example	**SEFOS(config-if)# ip ospf key 20 start-accept 13-May-2014,19:18**
Related Command(s)	• **router ospf** – Enables OSPF routing process. • **network** - Defines the interfaces on which OSPF runs and the area ID. • **no ip ospf authentication key** – Removes a previously assigned OSPF password. • **ip ospf message-digest-key** – Enables OSPF MD5 authentication.

- **`ip ospf authentication message-digest`** - Specifies the authentication type for an interface.
- **`show ip ospf`** – Displays general information about OSPF routing process.
- **`show ip ospf interface –`** Displays OSPF interface information.

24.60 ip ospf key start-generate

Command Objective	This command configures the time when the switch will start generating OSPF packets with same key ID on the interface.
Syntax	**ip ospf key <Key-ID (0-255)> start-generate <DD-MON-YEAR,HH:MM>**
Parameter Description	• **key <Key-ID (0-255)>** - Identifies the secret key used to create the message digest appended to the OSPF packet. This value ranges from 0 to 255. • **start-generate<DD-MON-YEAR,HH:MM>** - Configures the time when the switch will start generating OSPF packets with same key ID. The value shown will be the sum of configured time and the system time at which the start-generate value is configured. Time will be configured in 24 hours format. Default value is current system time. Note: System reuses the old MIB objects which operate in integer format and thereby, the CLI user-defined format is converted by the system to be compatible to MIB format. This may reflect mismatch in default values of the MIB and system.
Mode	Interface Configuration Mode (VLAN interface/Router port)
Package	Enterprise and Metro_E
Note:	This command executes only if, • OSPF routing process is enabled. • Authentication key for Simple Password Authentication is removed. • OSPF Message Digest authentitication is enabled and authentication type is specified for the interface.
Example	**SEFOS(config-if)# ip ospf key 20 start-generate 13-May-2014,19:18**
Related Command(s)	• **router ospf** - Enables OSPF routing process. • **network** - Defines the interfaces on which OSPF runs and the area ID. • **no ip ospf authentication key** – Removes a previously assigned OSPF password. • **ip ospf message-digest-key** – Enables OSPF MD5 authentication.

- **`ip ospf authentication message-digest`** - Specifies the authentication type for an interface.
- **`show ip ospf –`** Displays general information about OSPF routing process.
- **`show ip ospf interface`** - Displays OSPF interface information.

24.61 ip ospf key stop-generate

Command Objective	This command configures the time when the router will stop using the configured key for packet generation.
Syntax	**ip ospf key <Key-ID (0-255)> stop-generate <DD-MON-YEAR,HH:MM>**
Parameter Description	• **key <Key-ID (0-255)>** - Identifies the secret key used to create the message digest appended to the OSPF packet. This value ranges from 0 to 255. • **stop-generate<DD-MON-YEAR,HH:MM>** - Configures the time when the switch will stop generating OSPF packets with same key ID. Time will be configured in 24 hours format. Default value is current system time. Note: System reuses the old MIB objects which operate in integer format and thereby, the CLI user-defined format is converted by the system to be compatible to MIB format. This may reflect mismatch in default values of the MIB and system.
Mode	Interface Configuration Mode (VLAN interface/Router port)
Package	Enterprise and Metro_E
Note:	This command executes only if, • OSPF routing process is enabled. • Authentication key for Simple Password Authentication is removed. • OSPF Message Digest authentitication is enabled and authentication type is specified for the interface.
Example	**SEFOS(config-if)# ip ospf key 20 stop-generate 13-May-2014,19:18**
Related Command(s)	• **router ospf** - Enables OSPF routing process. • **network** - Defines the interfaces on which OSPF runs and the area ID. • **no ip ospf authentication key** – Removes a previously assigned OSPF password. • **ip ospf message-digest-key** – Enables OSPF MD5 authentication. • **ip ospf authentication message-digest** - Specifies the

authentication type for an interface.

- **`show ip ospf`** – Displays general information about OSPF routing process.
- **`show ip ospf interface`** - Displays OSPF interface information.

24.62 ip ospf key stop-accept

Command Objective	This command configures the time when the router will stop accepting OSPF packets created by using the configured key.
Syntax	**ip ospf key <Key-ID (0-255)> stop-accept <DD-MON-YEAR,HH:MM>**
Parameter Description	• **key <Key-ID (0-255)>** - Identifies the secret key to create the message digest appended to the OSPF packet. This value ranges from 0 to 255. • **stop-accept<DD-MON-YEAR,HH:MM>** - Configures the time when the switch will stop accepting OSPF packets with same key ID. Time will be configured in 24 hours format. Note: System reuses the old MIB objects which operate in integer format and thereby, the CLI user-defined format is converted by the system to be compatible to MIB format. This may reflect mismatch in default values of the MIB and system.
Mode	Interface Configuration Mode (VLAN interface/Router port)
Package	Enterprise and Metro_E
Note:	This command executes only if, • OSPF routing process is enabled. • Authentication key for Simple Password Authentication is removed. • OSPF Message Digest authentitication is enabled and authentication type is specified for the interface.
Example	**SEFOS(config-if)# ip ospf key 20 stop-accept 13-May-2014,19:18**
Related Command(s)	• **router ospf** - Enables OSPF routing process. • **network** - Defines the interfaces on which OSPF runs and the area ID. • **no ip ospf authentication key** – Removes a previously assigned OSPF password. • **ip ospf message-digest-key** – Enables OSPF MD5 authentication. • **ip ospf authentication message-digest** - Specifies the

authentication type for an interface.

- **`show ip ospf`** – Displays general information about OSPF routing process.
- **`show ip ospf interface`** - Displays OSPF interface information.

24.63 timers spf

Command Objective	This command configures delay time and hold time between two consecutive SPF calculations. The no form of the command resets the `spf-delay` and `spf-holdtime` to its default value.
Syntax	**`timers spf <spf-delay(0-65535)> <spf-holdtime(0-65535)>`** **`no timers spf`**
Parameter Description	• **`<spf-delay(0-65535)>`** - Configures the interval by which SPF calculation is delayed after a topology change reception. This value ranges from 0 to 65535 seconds. • **`<spf-holdtime(0-65535)>`** - Configures the minimum time between two consecutive SPF calculations. This value ranges from 0 to 65535 seconds.
Mode	OSPF Router Configuration Mode
Package	Enterprise and Metro_E
Default	• spf-delay - 5 seconds • spf-holdtime - 10 seconds
Example	**`SEFOS(config-router)# timers spf 10 20`**
Related Command(s)	• **`router ospf`** - Enables the OSPF routing protocol. • **`show ip ospf`**– Displays general information about the OSPFv3 routing process.

24.64 area - virtual-link key start-accept

Command Objective	This command configures the time the router starts accepting packets that is created with the configured key ID.
Syntax	**area <area-id> virtual-link <router-id> key <Key-ID (0-255)> start-accept <DD-MON-YEAR,HH:MM>**
Parameter Description	• **<area-id>** - Specifies the area ID assigned to the transit area for the virtual link. The transit area is where the virtual link traverses. The area ID value is either a decimal value or a valid IP address. • **<router-id>** - Specifies the router ID of the virtual neighbor. • **key <Key-ID (0-255)>** - Configures the secret key used to create the message digest appended to the OSPF packet. This value ranges from 0 to 255. • **start-accept <DD-MON-YEAR,HH:MM>** - Configures the time when the router will start accepting packets that have been created with the configured key-ID. This value is the sum of configured time and the system time, at which the start-accept value is configured, and is configured in 24 hours format. Note: For example, Tuesday May 26, 2013 at 1:30 PM should be configured as, 26-May-2013,13:30.
Mode	OSPF Router Configuration Mode
Package	Enterprise and Metro_E
Note:	This command executes only if, • Area is defined using the `network` command. • Authentication key for Message Digest Authentication is configured for the specified area.
Example	**SEFOS(config-router)# area 1.1 virtual-link 0.0.0.1 key 20 start-accept 23-Jun-2014,19:18**
Related Command(s)	• **router ospf –** Enables OSPF routing process. • **network** - Defines the interfaces on which OSPF runs and the area ID. • **area - virtual-link** – Defines an OSPF virtual link and its related parameters.

- **`show ip ospf`** – Displays general information about OSPF routing process.

- **`show ip ospf – virtual –links`** - Displays parameters and the current state of OSPF virtual links.

24.65 area - virtual-link key start-generate

Command Objective	This command configures the time when the switch starts generating OSPF packets with configured key ID on the switch.
Syntax	**area <area-id> virtual-link <router-id> key <Key-ID (0-255)> start-generate <DD-MON-YEAR,HH:MM>**
Parameter Description	• **<area-id>** - Specifies the area ID assigned to the transit area for the virtual link. The transit area is where the virtual link traverses. This value is either a decimal value or a valid IP address. • **<router-id>** - Specifies the router ID of the virtual neighbor. • **key <Key-ID (0-255)>** - Specifies the secret key used to create the message digest appended to the OSPF packet. This value ranges from 0 to 255. • **start-generate<DD-MON-YEAR,HH:MM>** - Configures the time when the switch will start generating OSPF packets with the configured key ID. This value is the sum of the configured time and the system time at which the start-generate value is configured. Start Generate Time value is configured in 24 hours format. Default value is set as current system time. Note: For example, Tuesday May 26, 2013 at 1:30 PM should be configured as, 26-May-2013,13:30.
Mode	OSPF Router Configuration Mode
Package	Enterprise and Metro_E
Note:	This command executes only if, • Area is defined using the `network` command. • Authentication key for Message Digest Authentication is configured for the specified area.
Example	**SEFOS(config-router)# area 1.1 virtual-link 0.0.0.1 key 20 start-generate 23-Jun-2014,19:18**
Related Command(s)	• **router ospf –** Enables OSPF routing process. • **network** - Defines the interfaces on which OSPF runs and the area ID. • **area - virtual-link** – Defines an OSPF virtual link and its related parameters.

- **`show ip ospf –`** Displays general information about OSPF routing process.
- **`show ip ospf – virtual –links`** - Displays parameters and the current state of OSPF virtual links.

24.66 area - virtual-link key stop-generate

Command Objective	This command configures the time when the router stops generating packets with the configured key-ID for packet generation in the switch.
Syntax	**area <area-id> virtual-link <router-id> key <Key-ID (0-255)> stop-generate <DD-MON-YEAR,HH:MM>**
Parameter Description	• **<area-id>** - Specifies the area ID assigned to the transit area for the virtual link. The transit area is where the virtual link traverses. The area ID value is either a decimal value or a valid IP address. • **<router-id>** - Specifies the router ID of the virtual neighbor. • **key <Key-ID (0-255)>** - Specifies the secret key used to create the message digest appended to the OSPF packet. This value ranges from 0 to 255. • **stop-generate<DD-MON-YEAR,HH:MM>** - Configures the time when the switch will stop generating OSPF packets with the configured key ID. Stop Generate value is configured in 24 hours format. Default value is set to the current system time. Note: For example, Tuesday May 26, 2013 at 1:30 PM should be configured as, 26-May-2013,13:30.
Mode	OSPF Router Configuration Mode
Package	Enterprise and Metro_E
Note:	This command executes only if, • Area is defined using the `network` command. • Authentication key for Message Digest Authentication is configured for the specified area.
Example	**SEFOS(config-router)# area 1.1 virtual-link 0.0.0.1 key 20 stop-generate 26-Jun-2014,19:18**
Related Command(s)	• **router ospf -** Enables OSPF routing process. • **network** - Defines the interfaces on which OSPF runs and the area ID. • **area - virtual-link** – Defines an OSPF virtual link and its related parameters. • **show ip ospf** – Displays general information about OSPF routing

process.

- **`show ip ospf – virtual –links`** - Displays parameters and the current state of OSPF virtual links.

24.67 area - virtual-link key stop-accept

Command Objective	This command configures the time when the router stops accepting OSPF packets created by using the configured key-ID.
Syntax	**area <area-id> virtual-link <router-id> key <Key-ID (0-255)> stop-accept <DD-MON-YEAR,HH:MM>**
Parameter Description	• **<area-id>** - Specifies the area ID assigned to the transit area for the virtual link. The transit area is where the virtual link traverses. The area ID value is either a decimal value or a valid IP address. • **<router-id>** - Specifies the router ID of the virtual neighbor. • **key <Key-ID (0-255)>** - Specifies the secret key to create the message digest appended to the OSPF packet. This value ranges from 0 to 255. • **stop-accept<DD-MON-YEAR,HH:MM>** - Configures the time when the switch will stop accepting OSPF packets with specified key ID. Stop Accept value is configured in 24 hours format. Note: For example, Tuesday May 26, 2013 at 1:30 PM should be configured as, 26-May-2013,13:30.
Mode	OSPF Router Configuration Mode
Package	Enterprise and Metro_E
Note:	This command executes only if, • Area is defined using the `network` command. • Authentication key for Message Digest Authentication is configured for the specified area.
Example	**SEFOS(config-router)# area 1.1 virtual-link 0.0.0.1 key 20 stop-accept 26-Jun-2014,19:18**
Related Command(s)	• **router ospf –** Enables OSPF routing process. • **network** - Defines the interfaces on which OSPF runs and the area ID. • **area - virtual-link** – Defines an OSPF virtual link and its related parameters. • **show ip ospf** – Displays general information about OSPF routing process.

- **`show ip ospf – virtual –links`** - Displays parameters and the current state of OSPF virtual links.

24.68 enable bfd

Command Objective	This command enables BFD feature in OSPF. This registers OSPF with BFD for neighbor IP path monitoring.
Syntax	**enable bfd**
Mode	OSPF Router Configuration Mode
Package	Enterprise and Metro_E
Default	BFD feature is disabled.
Example	**SEFOS(config-router)# enable bfd**
Related Command(s)	• **router ospf** – Enables OSPF routing process. • **disable bfd** – Disables BFD feature in OSPF. • **bfd** – Enables BFD monitoring on all or specific OSPF interfaces. • **ip ospf bfd** – Sets BFD support on the interface. • **show ip ospf** – Displays general information about OSPF routing process. • **show ip ospf neighbor** - Displays OSPF neighbor information list.

24.69 disable bfd

Command Objective	This command disables BFD feature in OSPF. If it is disabled, OSPF will not register with BFD for neighbor IP path monitoring.
Syntax	**disable bfd**
Mode	OSPF Router Configuration Mode
Package	Enterprise and Metro_E
Default	disable
Example	**SEFOS(config-router)# disable bfd**
Related Command(s)	• **router ospf** – Enables OSPF routing process. • **enable bfd** - Enables BFD feature in OSPF. • **show ip ospf** – Displays general information about OSPF routing process. • **show ip ospf neighbor** - Displays OSPF neighbor information list.

24.70 bfd

Command Objective	This command enables BFD monitoring on all or specific OSPF interfaces. The no form of the command disables BFD monitoring on all or specific OSPF interfaces.
Syntax	**bfd { all-interface | <interface-type> <interface-id> | vlan <vlan-id (1-4094)> }** **no bfd { all-interface | < interface-type > < interface-id > | vlan <vlan-id (1-4094)> }**
Parameter Description	• **all-interface –** Enables BFD monitoring on all OSPF interfaces. • **<interface-type>** - Enables BFD monitoring on any of the below mentioned OSPF Interfaces. The interface can be: ▪ **fastethernet** – Officially referred to as 100 BASE-T standard. This is a version of LAN standard architecture that supports data transfer upto 100 Megabits per second. ▪ **XL-ethernet** – A version of LAN standard architecture that supports data transfer upto 40 Gigabits per second. ▪ **extreme-ethernet** – A version of Ethernet that supports data transfer upto 10 Gigabits per second. ▪ **i-lan**– Internal LAN created on a bridge per IEEE 802.1ap. • **<interface-id>** - Enables BFD monitoring on the specified interface identifier. This is a unique value that represents the specific interface.This value is a combination of slot number and port number separated by a slash, for interface type other than i-lan and port-channel. For example: 0/1 represents that the slot number is 0 and port number is 1. Only i-lan ID is provided, for interface types i-lan. For example: 1 represents i-lan ID. • **vlan <vlan- id (1-4094>** - Enables BFD monitoring on the specified VLAN ID.This value ranges from 1 to 4094.
Mode	OSPF Router Configuration Mode
Package	Enterprise and Metro_E
Default	BFD is disabled for all the interfaces
Note:	This command can be configured only if BFD is enabled and OSPF is started on the interface.
Example	**SEFOS(config-router)# bfd all-interface**

Related Command(s)	• **`router ospf`** – Enables OSPF routing process. • **`network`** - Defines the interfaces on which OSPF runs and the area ID. • **`enable bfd`** - Enables BFD feature in OSPF. • **`disable bfd`** – Disables BFD feature in OSPF. • **`ip ospf bfd`** – Sets BFD support on the interface. • **`show ip ospf`** – Displays general information about OSPF routing process. • **`show ip ospf neighbor`** - Displays OSPF neighbor information list. • **`show ip ospf interface –`** Displays OSPF interface information.

24.71 ip ospf bfd

Command Objective	This command enables or disables BFD support on the interface. If this is enabled, OSPF will register with BFD for monitoring the neighbor IP path, for the neighbors associated with this OSPF interface.
Note:	BFD disabled for a specific interface using this command will be internally enabled on the execution of `bfd all-interface` command.
Syntax	**`ip ospf bfd [disable]`**
Parameter Description	**`disable`** - Disables BFD support on the interface. When disabled, it will de-register from BFD for all the neighbors associated with this interface and no longer allows registration with BFD for the neighbors associated with this interface.
Mode	Interface Configuration mode (Router / VLAN)
Package	Enterprise and Metro_E
Note:	• This command can be configured only if BFD is enabled and OSPF is started on the interface. • BFD disabled for a specific interface using this command will be internally enabled on the execution of `bfd all-interface` command.
Default	Disable
Example	**`SEFOS(config-if)# ip ospf bfd disable`**
Related Command(s)	• **`router ospf`** – Enables OSPF routing process. • **`network`** - Defines the interfaces on which OSPF runs and the area ID. • **`enable bfd`** - Enables BFD feature in OSPF. • **`disable bfd`** – Disables BFD feature in OSPF. • **`show ip ospf interface`** – Displays OSPF interface information.

CHAPTER 25

OSPFv3

Open Shortest Path First (OSPF) is a link-state, hierarchical Interior Gateway Protocol (IGP) routing algorithm.

OSPFv3 is the modified form of OSPF to support version 6 of the Internet Protocol. The fundamental mechanisms of OSPF (flooding, DR election, area support, SPF calculations, and so on) remain unchanged. However, some changes have been necessary, either due to changes in protocol semantics between IPv4 and IPv6, or simply to handle the increased address size of IPv6.

25.1 ipv6 router ospf

Command Objective	This command enables the OSPFv3 routing protocol, if the VRF instance name is not specified. This command creates the OSPF instance, if the VRF instance name is specified. The no form of the command disables the OSPFv3 routing protocol, if the VRF instance name is not specified. The no form of the command deletes the OSPF instance, if the VRF instance name is specified.
Syntax	**ipv6 router ospf [vrf <contextname>]** **no ipv6 router ospf [vrf <contextname>]**
Parameter Description	• **vrf <contextname>** - Configures OSPFv3 routing protocol for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32.
Mode	Global Configuration Mode
Package	Enterprise and Metro_E
Default	OSPFv3 routing protocol is disabled
Example	**SEFOS(config)# ipv6 router ospf** **SEFOS(config-router)#**
Related Command(s)	• **router-id** – Sets a fixed router ID. • **ip vrf** - Creates VRF instance. • **redistribute** - Configures the protocol from which the routes have to be redistributed into OSPFv3. • **distribute-list route-map in** - Enables inbound filtering for routes. • **route-calculation staggering** - Enables OSPFv3 route calculation staggering. • **route-calculation staggering-interval** - Configures the OSPFv3 route calculation staggering interval. • **distance** - Enables the administrative distance of the routing protocol and sets the administrative distance value. • **nsf ietf restart-interval** - Enables the graceful restart support

and configures grace interval.

- **nsf ietf helper disable** - Disables the helper support.
- **nsf ietf helper gracetimelimit** - Configures the helper grace time limit.
- **nsf ietf helper strict-lsa-checking** - Enables the strict LSA check option in helper.
- **nsf ietf grace lsa ack required** - Enables Grace Ack Required state in restarter.
- **nsf ietf grace lsa retransmit-count** - Configures the maximum number of retransmissions for unacknowledged GraceLSA.
- **nsf ietf restart-reason** - Configures the reason for restart.
- **ipv6 ospf area** – Enables OSPFv3 for IPv6 on an interface.
- **debug ipv6 ospf - pkt** – Sets the trace levels.
- **show ipv6 ospf - request/retrans-list** - Displays the list of all link state advertisements (LSAs) in request-list or in retransmission-list
- **ipv6 ospf linkLSASuppress** – Configures the interface to suppress Link LSA origination.
- **enable bfd** - Enables BFD feature in OSPFv3 protocol.
- **disable bfd** - Disables BFD feature in OSPFv3 protocol.
- **bfd** – Enables BFD monitoring on all or specific OSPFv3 interfaces.
- **ipv6 ospf bfd** – Sets BFD support on the interface.
- **show ipv6 ospf** – Displays general information about OSPFv3 routing process.

25.2 router-id

Command Objective	This command configures router ID which is a unique 32-bit number of the router in the AS. If a router OSPF Router ID is changed, it results in disabling the OSPFv3 protocol, updating the Router ID, and then enabling the OSPFv3 protocol.
Syntax	**router-id <IPv4-Address>**
Mode	Router Configuration Mode
Package	Enterprise and Metro_E
Example	**SEFOS(config-router)# router-id 12.0.0.1**
Related Command(s)	• **ipv6 router ospf** - Enables the OSPFv3 routing protocol. • **ipv6 ospf area** - Enables OSPFv3 for IPv6 on an interface. • **export ospf** – Enables redistribution of OSPF area or external routes to the protocol. • **show ipv6 ospf** - **General Information** – Displays general information about the OSPFv3 routing process.

25.3 area - stub/nssa

Command Objective	This command defines an area as a stub area or an NSSA (Not So Stubby Area).
Syntax	**area <area-id> {{ stub | nssa } [no-summary]}**
Parameter Description	• **<area-id>** - Configures a 32-bit integer area ID where the host belongs. If the area ID is not configured, the host is associated to the backbone area . • **stub** - Configures a stub area which stores the router LSA, network LSA, Inter Area Prefix LSA, Intra Area Prefix LSA, and the Link LSA in the database. • **nssa** - Configures Not So Stubby Area which is a proprietary extension of the existing stub area feature that allows the injection of external routes in a limited fashion into the stub area. • **no-summary** - Allows an area to be stubby/not-so-stubby but does not allow it to have summary routes injected into it.
Mode	Router Configuration Mode
Package	Enterprise and Metro_E
Note:	• 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/NSSA. It relies entirely on its default route. The no-summary option can be specified only in the Area Border Routers. By default, it is set to send summary. • If the no-summary option is not specified, the router summarizes and propagates summary LSAs.
Example	**SEFOS(config-router)# area 1.1.1.1 nssa no-summary**
Related Command(s)	• **ipv6 router ospf** - Enables the OSPFv3 routing protocol. • **area - translation-role** - Configures the translation role for NSSA. • **area - default-metric** - Sets the default metric value for an area of type NSS. • **area - default-metric type** - Sets the default metric type for an

area type of NSS.

- **area – range** - Creates the Internal Aggregation Address Range.
- **area - summary-prefix** - Enables route aggregation or filtering while importing routes in the OSPFv3 domain.
- **host – metric/area-id** - Configures a host entry area-ID.
- **show ipv6 ospf areas** – Displays the Area Table.

25.4 area - stability-interval

Command Objective	This command 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.
Syntax	**area <area-id> stability-interval <interval-value (1-65535)>** **no area <area-id> stability-interval**
Parameter Description	• **<area-id>** - Configures a 32-bit integer area ID where the host belongs. If the area ID is not configured, the host is associated to the backbone area. • **stability-interval<interval-value>** - Configures 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. This value ranges from 1 to 65535.
Mode	Router Configuration Mode
Package	Enterprise and Metro_E
Example	**SEFOS(config-router)# area 0.0.0.1 stability-interval 50**
Related Command(s)	• **ipv6 router ospf** - Enables the OSPFv3 routing protocol. • **show ipv6 ospf areas** – Displays the Area Table.

25.5 area - translation-role

Command Objective	This command configures the translation role for NSSA. The no form of the command configures the default translation role for the NSSA.
Syntax	**area <area-id> translation-role { always | candidate }** **no area <area-id> translation-role**
Parameter Description	• **<area-id>** - Configures a 32-bit integer area ID where the host belongs. If the area ID is not configured, the host is associated to the backbone area. • **translation-role** - Configures an NSSA Border router's ability to perform NSSA Translation of Type-7 LSAs to Type-5 LSAs. The options are: ▪ **always** – When the translator role is set to `always`, the Type-7 LSAs are always translated into Type-5 LSAs. ▪ **candidate** - When translator role is set to `candidate`, an NSSA border router participates in the translator election process.
Mode	Router Configuration Mode
Package	Enterprise and Metro_E
Default	translation-role - candidate
Note:	This command executes only if the area is set as NSSA.
Example	**SEFOS(config-router)# area 1.1.1.1 translation-role always**
Related Command(s)	• **ipv6 router ospf** - Enables the OSPFv3 routing protocol. • **area – stub/nssa** - Defines an area as NSSA. • **show ipv6 ospf areas** – Displays the Area Table.

25.6 timers spf

Command Objective	This command configures the delay time and the hold time between two consecutive SPF calculations. Delay time is the time interval when OSPFv3 receives a topology change and when it starts a Shortest Path First (SPF) calculation. The no form of the command sets the default values for `spf-delay` and `spf-holdtime`.
Syntax	**`timers spf <spf-delay> <spf-holdtime>`** **`no timers spf`**
Parameter Description	• **`<spf-delay>`** - Configures the interval by which SPF calculation is delayed after a topology change reception. This value ranges from 0 to 65535. • **`<spf-holdtime>`** - Configures the delay between two consecutive SPF calculations. This value ranges from 0 to 65535.
Mode	Router Configuration Mode
Package	Enterprise and Metro_E
Default	• spf-delay - 5 seconds • spf-holdtime - 10 seconds
Example	**`SEFOS(config-router)# timers spf 10 20`**
Related Command(s)	• **`ipv6 router ospf`** - Enables the OSPFv3 routing protocol. • **`show ipv6 ospf`** - **`General Information`** – Displays general information about the OSPFv3 routing process.

25.7 abr-type

Command Objective	This command sets the ABR (Area Border Router) type. The no form of the command sets the default ABR type.
Syntax	**abr-type { standard | cisco | ibm }** **no abr-type**
Parameter Description	• **standard** - Sets the ABR (Area Border Router) type as standard ABR type. • **cisco** - Sets the ABR (Area Border Router) type as CISCO ABR type. • **ibm** - Sets the ABR (Area Border Router) type as IBM ABR type.
Mode	Router Configuration Mode
Package	Enterprise and Metro_E
Default	standard
Example	**SEFOS(config-router)# abr-type cisco**
Related Command(s)	• **ipv6 router ospf** - Enables the OSPFv3 routing protocol. • **show ipv6 ospf** - **General Information** – Displays general information about the OSPFv3 routing process.

25.8 area - default-metric value

Command Objective	This command sets the default metric value for an area of type NSS or stub only.
Syntax	**`area <area-id> default-metric <metric>`**
Parameter Description	• **`<area-id>`** - Configures a 32-bit integer area ID where the host belongs. If the area ID is not configured, the host is associated to the backbone area. • **`default-metric <metric>`** - Configures the cost metric for the redistributed routes. This value ranges from 1 to 16777214. This command does not apply to directly connected routes. Use a route map to set the default metric for directly connected routes.
Mode	Router Configuration Mode
Package	Enterprise and Metro_E
Default	metric - 1
Note:	• Default metric can be defined only for a valid area. • This command executes only if the area is set as NSSA.
Example	**`SEFOS(config-router)# area 1.1.1.1 default-metric 20`**
Related Command(s)	• **`ipv6 router ospf`** - Enables the OSPFv3 routing protocol. • **`area – stub/nssa`** - Defines an area as NSSA.

25.9 area - default-metric type

Command Objective	This command sets the default metric type for an area type of NSS or stub only.
Syntax	**area <area-id> default-metric type <metricType>**
Parameter Description	• **<area-id>** - Configures a 32-bit integer area ID where the host belongs. If the area ID is not configured, the host is associated to the backbone area. • **default-metric type<metricType>** - Configures the type of metric.
Mode	Router Configuration Mode
Package	Enterprise and Metro_E
Default	metricType - 1
Note:	• Default metric can be defined only for a valid area. • This command executes only if the area is set as NSSA.
Example	**SEFOS(config-router)# area 1.1.1.1 default-metric type 2**
Related Command(s)	• **ipv6 router ospf** - Enables the OSPFv3 routing protocol. • **area – stub/nssa** - Defines an area as NSSA. • **area - stub/nssa** – Defines an area as a stub area or an NSSA (Not So Stubby Area).

25.10 area - virtual-link

Command Objective	This command 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.
Syntax	**area <area-id> virtual-link <router-id> <if-index> [hello-interval <seconds>] [retransmit-interval <seconds>] [transmit-delay <seconds>] [dead-interval <seconds>]**
Parameter Description	• **<area-id>** - Configures a 32-bit integer area ID where the host belongs. If the area ID is not configured, the host is associated to the backbone area. • **<router-id>** - Configures the router ID of the virtual neighbor. • **<if-index>** - Configures the interface Index assigned to the OSPFv3 virtual interface.This value ranges from 1 to 214783647. • **hello-interval<seconds>** - Configures the interval between hello packets on the OSPFv3 virtual link interface. This value ranges from 1 to 65535 seconds. • **retransmit-interval<seconds>** - Configures the time between link-state advertisement (LSA) retransmissions for adjacencies belonging to the OSPFv3 virtual link interface. This value ranges from 1 to 1800 seconds. • **transmit-delay<seconds>** - Configures the estimated time it takes to transmit a link state update packet over this interface. This value ranges from 1 to 1800 seconds. • **dead-interval<seconds>** - Configures the interval at which hello packets must not be seen before its neighbors declare the router down. This value ranges from 1 to 65535 seconds.
Mode	Router Configuration Mode
Package	Enterprise and Metro_E

Default		• hello-interval - 10 • retransmit-interval - 20 • transmit-delay - 1 • dead-interval - 60
	Note:	• 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.
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`**
Related Command(s)		• **`ipv6 router ospf`** - Enables the OSPFv3 routing protocol. • **`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.

25.11 ASBR Router

Command Objective	This command configures the router as an ASBR. The no form of the command disables the ASBR status of the router.
Syntax	**ASBR Router** **no ASBR Router**
Mode	Router Configuration Mode
Package	Enterprise and Metro_E
Note:	Only when ASBR (Autonomous System Border Router) status is configured to `enable`, routes from other protocols are redistributed into OSPFv3 domain.
Example	**SEFOS(config-router)# ASBR Router**
Related Command(s)	• **ipv6 router ospf** - Enables the OSPFv3 routing protocol. • **redistribute** - Configures the protocol from which the routes have to be redistributed into OSPFv3. • **redist-config** - Configures the information to be applied to routes learned from RTM. • **show ipv6 ospf - General Information** – Displays general information about the OSPFv3 routing process.

25.12 area - range

Command Objective	This command creates the Internal Aggregation Address Range. The Internal Address Range is of two types: • Type-3 Aggregation • Type 7 Translation Aggregation
Syntax	**area <Area-ID> range <IPv6-Prefix> <Prefix-Length> [{ advertise | not-advertise }] {summary | Type7} [tag <tag-value>]**
Parameter Description	• **<Area-ID>** - Configures a 32-bit integer area ID where the host belongs. If the area ID is not configured, the host is associated to the backbone area. • **<IPv6-Prefix>** - Configures the IPv6 address prefix of the range. • **<Prefix-Length>** - Configures the prefix length of the address range. This value ranges from 0 to 128. • **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** - Sets the type as Summary LSA. • **Type7** - Sets the type as Type-7 LSA. • **tag<tag-value>** - Sets the tag value for the aggregated route.
Mode	Router Configuration Mode
Package	Enterprise and Metro_E
Default	• tag - 0
Note:	• This command executes only if the area is set as NSSA. • 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.
Example	**SEFOS(config-router)# area 0.0.0.0 range 3ffe:5000:481d::580 advertise Type7 tag 20**
Related Command(s)	• **ipv6 router ospf** - Enables the OSPFv3 routing protocol. • **area – stub/nssa** - Defines an area as NSSA. • **show ipv6 ospf - area-range / summary-prefix** – Displays either the list of all area address ranges information or all external summary address configuration information.

25.13 area – summary-prefix

Command Objective	This command 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.
Syntax	**area <AreaID> summary-prefix <IPv6-Prefix> <Prefix-Length> [{ allowAll | denyAll | advertise | not-advertise}] [Translation { enabled | disabled }]**
Parameter Description	• **<AreaID>** - Configures a 32-bit integer area ID where the host belongs. If the area ID is not configured, the host is associated to the backbone area. • **<IPv6-Prefix> –** Configures the IPv6 address prefix of the range. • **<Prefix-Length>** - Configures the prefix length of the address range. This value ranges from 1 to 128. • **allowAll** - Generates aggregated Type-5 LSAs for the specified range when set to `allowAll` and the associated `areaId` is 0.0.0.0. In addition, aggregated Type-7 LSAs are generated in all the attached NSSAs for the specified range. • **denyAll** - Generates neither Type-5 LSA nor Type-7 LSAs for the specified range. • **advertise** - Generates aggregated Type-5 LSAs when the associated `areaId` is 0.0.0.0. Otherwise, if the associated `areaId` 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** - Does not generate Type-5 LSA for the specified range when the associated `areaId` is 0.0.0.0, while all the NSSA LSAs within this range are flushed out and aggregated Type-7 LSA is generated in all attached NSSAs. If associated `areaId` 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** - Sets translation of Type-5 or Type-7 messages in the specified range. The options are: ▪ **enabled** - Sets the P-Bit in the generated Type-7 LSA. ▪ **disabled** – Clears the P-Bit in the generated Type-7 LSA for the range.
Mode	Router Configuration Mode
Package	Enterprise and Metro_E

Default	• Translation-enabled • advertise
Note:	• This command executes only if the area is set as NSSA. • The value `allowAll`/`denyall` is not valid for `AreaId` other than 0.0.0.0.
Example	**`SEFOS(config-router)# area 0.0.0.0 summary-prefix 1111::2222 128 advertise Translation enabled`**
Related Command(s)	• **`ipv6 router ospf`** - Enables the OSPFv3 routing protocol. • **`area – stub/nssa`** - Defines an area as NSSA. • **`show ipv6 ospf - area-range / summary-prefix`** – Displays either the list of all area address ranges information or all external summary address configuration information.

25.14 redistribute

Command Objective	This command 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.
Syntax	**redistribute {static | connected | ripng | bgp | isis [{level-1 | level-2 | level-1-2}]} [route-map <string(20)>]** **no redistribute {static | connected | ripng | bgp | isis [{level-1 | level-2 | level-1-2}] } [route-map <string(20)>]**
Parameter Description	• **static** - Redistributes routes configured statically in the OSPFv3 routing process. • **connected** - Redistributes directly connected network routes into OSPFv3 routing process. • **ripng** - Redistributes routes that are learned by the RIP process into OSPFv3 routing process. • **bgp** - Redistributes routes that are learned by the BGP process into OSPFv3 routing process. • **isis** - Redistributes routes learned by ISIS in the OSPFv3 routing process. ▪ **level-1** - Imports routes learned by ISIS level-1 in the OSPFv3 routing process. ▪ **level-2** - Imports routes learned by ISIS level-2 in the OSPFv3 routing process. ▪ **level-1-2** - Imports all routes learned by ISIS in the OSPFv3 routing process. • **route-map<string(20)>** - Specifies the specified route map in the list of route maps. Specifies the name of the route map to be applied during redistribution of routes to OSPFv3. This value is a string of size 20.
Mode	Router Configuration Mode
Package	Enterprise and Metro_E
Note:	• This command executes only if the router is configured as ASBR.

	• OSPFv3 routing protocol should be enabled before executing this command. • To configure redistribution of routes from other protocols, the following steps must be performed: ▪ Configure the router as ASBR. ▪ Configure redistribution of routes from particular protocol. • The above order must be maintained and ASBR setting must be done before enabling redistribution.
Example	**`SEFOS(config-router)# redistribute static`**
Related Command(s)	• **`ipv6 router ospf`** - Enables the OSPFv3 routing protocol. • **`ASBR Router`** – Configures the router as an ASBR. • **`show ipv6 ospf - General Information`** – Displays general information about the OSPFv3 routing process.

25.15 distribute-list route-map in

Command Objective	This command enables inbound filtering for routes specified by the route map name. This value is a string whose maximum size is 20. The no form of the command disables inbound filtering for the routes.
Syntax	**distribute-list route-map <name(1-20)> in** **no distribute-list route-map <name(1-20)> in**
Mode	Router Configuration Mode
Package	Enterprise and Metro_E
Note:	• OSPFv3 routing protocol should be enabled before executing this command. • Only one route map can be set for inbound routes. Another route map can be assigned only if the already assigned route map is disabled.
Example	**SEFOS(config-router)# distribute-list route-map rmap-test in**
Related Command(s)	• **ipv6 router ospf** - Enables the OSPFv3 routing protocol. • **show running-config ospf3** - Displays the current operating configuration in the system.

25.16 passive-interface

Command Objective	This command sets the global default passive interface status. All the interfaces created only after executing this command become passive interfaces. The no form of the command resets the global default passive interface status. All the interfaces created only after executing this command become non-passive interfaces.
Syntax	**passive-interface** **no passive-interface**
Mode	Router Configuration Mode
Package	Enterprise and Metro_E
Default	Disabled
Example	**SEFOS(config-router)# passive-interface**
Related Command(s)	• **ipv6 router ospf -** Enables the OSPFv3 routing protocol. • **show ipv6 ospf - General Information** – Displays general information about the OSPFv3 routing process.

25.17 route-calculation staggering

Command Objective	This command enables OSPFv3 route calculation staggering and also sets the staggering interval to the last configured value. This feature staggers the OSPFv3 route calculation at regular intervals for processing neighbor keep alive and other OSPFv3 operations. The no form of the command disables OSPFv3 route calculation staggering and removes the staggering interval.
Syntax	**`route-calculation staggering`** **`no route-calculation staggering`**
Mode	Router Configuration Mode
Package	Enterprise and Metro_E
Default	OSPFv3 route calculation staggering is enabled.
Example	**`SEFOS(config-router)# route-calculation staggering`**
Related Command(s)	• **`ipv6 router ospf`** - Enables the OSPFv3 routing protocol. • **`route-calculation staggering-interval`** - Configures the OSPFv3 route calculation staggering interval. • **`show ipv6 ospf - General Information`** – Displays general information about the OSPFv3 routing process.

25.18 route-calculation staggering-interval

Command Objective	This command configures the OSPFv3 route calculation staggering interval (in milliseconds). This value represents the time after which the route calculation is suspended for doing other OSPFv3 operations. This value ranges from 1000 to 214783647.
Syntax	**route-calculation staggering-interval <milli-seconds (1000-**2147483647**)>**
Mode	Router Configuration Mode
Package	Enterprise and Metro_E
Default	10000 milliseconds (OSPF route calculation staggering interval is equal to hello interval)
Note:	This command executes only if OSPFv3 routing protocol and OSPv3 route calculation staggering are enabled.
Example	**SEFOS(config-router)# route-calculation staggering-interval 2000**
Related Command(s)	• **ipv6 router ospf** - Enables the OSPFv3 routing protocol. • **route-calculation staggering** - Enables OSPFv3 route calculation staggering. • **show ipv6 ospf - General Information** – Displays general information about the OSPFv3 routing process. • **show running-config ospf** - Displays the current operating configuration in the system.

25.19 distance

Command Objective	This command enables the administrative distance (that is, the metric to reach the destination) of the routing protocol and sets the administrative distance value. The distance value ranges between 1 and 255. This distance value will not be used for distribute list. The administrative distance can be enabled for only one route map. The distance should be disabled for the already assigned route map if distance needs to be enabled for another route map. The no form of the command disables the administrative distance.
Syntax	**`distance <1-255> [route-map <name(1-20)>]`** **`no distance [route-map <name(1-20)>]`**
Parameter Description	• **`name-map <name(1-20)>`** - Configures the name of the route map for which the distance value should be enabled and set. This value is a string of size 20.
Mode	Router Configuration Mode
Package	Enterprise and Metro_E
Default	110 (Represents OSPF route)
Note:	OSPFv3 routing protocol should be enabled before executing this command.
Example	**`SEFOS(config-router)# distance 10 route-map rmap-test`**
Related Command(s)	• **`ipv6 router ospf`** - Enables the OSPFv3 routing protocol. • **`show running-config ospf3`** - Displays the current operating configuration in the system.

25.20 host - metric/area-id

Command Objective	This command configures a host entry with metric or area-ID or both. The no form of the command deletes a host entry.
Syntax	**host <IPv6-Address> metric <cost> [area-id {<AreaID>}]** **no host <IPv6-Address>**
Parameter Description	• **<IPv6-Address>** - Configures the host entry with metric or area-ID, or both, for the specified IPV6 address prefix. • **metric <cost>** - Configures a metric value to be advertised. • **area-id<AreaID>** - Configures a 32-bit integer area ID where the host belongs. If the area ID is not configured, the host is associated to the backbone area.
Mode	Router Configuration Mode
Package	Enterprise and Metro_E
Note:	To configure a host entry with area ID the area should be configured as NSSA.
Example	**SEFOS(config-router)# host 3ffe:481d::5 metric 10 area-id 0.0.0.1**
Related Command(s)	• **ipv6 router ospf** - Enables the OSPFv3 routing protocol. • **area – stub/nssa** - Defines an area as NSSA. • **show ipv6 ospf host** – Displays the host table information.

25.21 no area

Command Objective	This command deletes an area and does any one of the following based on the optional parameter: • Coverts stub or NSSA to normal area • Deletes virtual link • Deletes stub cost • Deletes area-range or summary-prefix.
Syntax	**`no area <area-id> [ { stub | nssa | virtual-link <router-id> | default-metric | {range {summary | Type7} | summary-prefix} <IPv6-Prefix> <Prefix-Length>} ]`**
Parameter Description	• **`<area-id>`** - Configures a 32-bit integer area ID where the host belongs. If the area ID is not configured, the host is associated to the backbone area. • **`stub`** - Configures a stub area which stores the router LSA, network LSA, Inter Area Prefix LSA, Intra Area Prefix LSA and the link LSA in the database. • **`nssa`** - Configures Not So Stubby Area which is a proprietary extension of the existing stub area feature that allows the injection of external routes in a limited fashion into the stub area. • **`virtual-link <router-id>`** - Configures the router ID of the virtual neighbor. • **`Default-metric`** - Sets the cost for the default summary route in a stub or NSSA • **`range`** - Sets the range. The options are: ▪ **`summary`** - Sets the range for summary. ▪ **`Type7`**- Sets the range for Type7. • **`summary-prefix`** - Configures the summary prefix. • **`<IPv6-Prefix>`** - Configures the IPv6 address prefix of the range. • **`<Prefix-Length>`** - Configures the prefix length of the address range.
Mode	Router Configuration Mode

Package	Enterprise and Metro_E
Note:	Before deleting an area, it is necessary to delete all the interfaces attached to that area.
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**
Related Command(s)	• **ipv6 router ospf** - Enables the OSPFv3 routing protocol. • **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.

25.22 nssaAsbrDfRtTrans

Command Objective	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.
Syntax	**`nssaAsbrDfRtTrans`** **`no nssaAsbrDfRtTrans`**
Mode	Router Configuration Mode
Package	Enterprise and Metro_E
Default	Disabled
Example	**`SEFOS(config-router)# nssaAsbrDfRtTrans`**
Related Command(s)	• **`ipv6 router ospf`** - Enables the OSPFv3 routing protocol. • **`show ipv6 ospf - General Information`** – Displays general information about the OSPFv3 routing process.

25.23 redist-config

Command Objective	This command 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.
Syntax	**redist-config <IPv6-Prefix> <Prefix-Length> [metric-value <metric>] [metric-type {asExttype1 | asExttype2}] [tag <tag-value>]** **no redist-config <IPv6-Prefix> <Prefix-Length>**
Parameter Description	• **<IPv6-Prefix>** - Sets the IPv6 address prefix. • **<Prefix-Length>** - Sets the prefix length of the address. • **metric-value <metric>** - Sets the metric value applied to the route before it is advertised into the OSPFv3 domain. • **metric-type** - Sets the metric type applied to the route before it is advertised into the OSPFv3 domain. ▪ **asExttype1** - Denotes that the metric is advertised as AS-External type 1. ▪ **asExttype2** - Denotes that the metric is advertised as AS-External type 2. • **tag <tag-value>** - Sets the tag type which describes whether tags will be automatically generated or will be manually configured.
Mode	Router Configuration Mode
Package	Enterprise and Metro_E
Note:	This command executes only if Tag – ASBR Router is configured.
Example	**SEFOS(config-router)# redist-config 3ffe:5000:481d::5 80 metric-value 30 metric-type asExttype1 tag 12**
Related Command(s)	• **ipv6 router ospf** - Enables the OSPFv3 routing protocol. • **ASBR Router** - Configures the router as an ASBR. • **show ipv6 ospf redist-config** – Displays the configuration information to be applied to the routes learned from the RTM.

25.24 as-external lsdb-limit

Command Objective	This command sets the maximum number of non-Default AS-external-LSA entries that can be stored in the link-state database. This value ranges from -1 to 2147483647. If the value is -1, then there is no limit.
Syntax	**`as-external lsdb-limit <lsdb-limit (-1 -`** `2147483647` **`)>`**
Mode	Router Configuration Mode
Package	Enterprise and Metro_E
Default	lsdb-limit - -1
Note:	• 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 or any regular OSPFv3 area, or both (That is, OSPFv3 stub areas and NSSAs are excluded).
Example	**`SEFOS(config-router)# as-external lsdb-limit 10`**
Related Command(s)	• **`ipv6 router ospf`** - Enables the OSPFv3 routing protocol. • **`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.

25.25 exit-overflow-interval

Command Objective	This command sets the number of seconds after which a router will attempt to leave the Overflow State. This value ranges from 0 to 4199999999.
Syntax	**`exit-overflow-interval <interval>`**
Mode	Router Configuration Mode
Package	Enterprise and Metro_E
Default	interval - 0
Example	**`SEFOS(config-router)# exit-overflow-interval 10`**
Related Command(s)	• **`ipv6 router ospf`** – Enables the OSPFv3 routing protocol. • **`show ipv6 ospf - General Information`** – Displays general information about the OSPFv3 routing process.

25.26 demand-extensions

Command Objective	This command enables routing support for demand routing. The no form of the command disables routing support for demand routing.
Syntax	**demand-extensions** **no demand-extensions**
Mode	Router Configuration Mode
Package	Enterprise and Metro_E
Default	Enabled
Example	**SEFOS(config-router)# demand-extensions**
Related Command(s)	• **ipv6 router ospf** - Enables the OSPFv3 routing protocol. • **show ipv6 ospf - General Information** – Displays general information about the OSPFv3 routing process

25.27 reference-bandwidth

Command Objective	This command sets the reference bandwidth in kilobits per second for calculating the default interface metrics. This value ranges from 0 to 4199999999.
Syntax	**`reference-bandwidth <ref-bw>`**
Mode	Router Configuration Mode
Package	Enterprise and Metro_E
Default	ref-bw - 100,000 Kbits per second
Example	**`SEFOS(config-router)# reference-bandwidth 1000000`**
Related Command(s)	• **`ipv6 router ospf`** - Enables the OSPFv3 routing protocol. • **`show ipv6 ospf - General Information`** – Displays general information about the OSPFv3 routing process

25.28 nsf ietf restart-interval

Command Objective	This command enables the graceful restart support and configures the grace interval. The no form of the command disables the graceful restart support and resets the grace interval to default value.
Syntax	**nsf ietf [restart-interval <grace period (1-1800)>] [plannedOnly]** **no nsf ietf [restart-interval <integer (1-1800)>]**
Parameter Description	• **restart-interval <grace period (1-1800)>** - Sets an interval during which the router can re-acquire OSPFv3 neighbors that are fully operational prior to the restart. This value ranges from 1 to 1800 seconds. This interval is provided as an intimation of the restart period to the neighbors that do not support graceful restart or that are connected using multipoint interfaces. • **plannedOnly** - Supports only the planned restarts (such as restarting a control plane after a planned downtime).
Mode	Router Configuration Mode
Package	Enterprise and Metro_E
Default	• Graceful restart support is disabled. • restart-interval - 120
Note:	• OSPFv3 routing protocol should be enabled, before executing this command. • The entity should save any change made using this command in a non-volatile storage, as the configuration set using this command is persistent.
Example	**SEFOS(config-router)# nsf ietf restart-interval 300 plannedOnly**
Related Command(s)	• **ipv6 router ospf** - Enables the OSPFv3 routing protocol. • **show ipv6 ospf - General Information** – Displays general information about the OSPFv3 routing process.

25.29 nsf ietf helper disable

Command Objective	This command disables the helper support. The no form of the command enables the helper support.
Syntax	**nsf ietf helper disable [unknown] [softwareRestart] [swReloadUpgrade] [switchToRedundant]** **no nsf ietf helper disable [unknown] [softwareRestart] [swReloadUpgrade] [switchToRedundant]**
Parameter Description	• **unknown** - Enables or disables helper support to restart the system due to unplanned events (such as restarting after a crash). • **softwareRestart** - Enables or disables helper support to restart the system due to restart of software. • **swReloadUpgrade** - Enables or disables helper support to restart the system due to reload or upgrade of software. • **switchToRedundant** - Enables or disables helper support to restart the system due to switchover to a redundant support processor.
Mode	Router Configuration Mode
Package	Enterprise and Metro_E
Default	Helper support is enabled.
Note:	OSPFv3 routing protocol should be enabled before executing this command.
Example	**SEFOS(config-router)# nsf ietf helper disable**
Related Command(s)	• **ipv6 router ospf –** Enables the OSPFv3 routing protocol. • **nsf ietf helper gracetimelimit** - Configures the helper grace time limit. • **show ipv6 ospf – General Information** – Displays general information about the OSPFv3 routing process.

25.30 nsf ietf helper gracetimelimit

Command Objective	This command configures the grace period till which the router acts as helper. During this period, the router advertises that the restarting router is active and is in FULL state. This value ranges from 1 to 1800 seconds. The value is provided as an intimation of the restart period to the neighbors that do not support graceful restart or that are connected using multipoint interfaces. The no form of the command configures the helper grace time limit as zero.
Syntax	**`nsf ietf helper gracetimelimit <gracelimit period(1-1800)>`** **`no nsf ietf helper gracetimelimit`**
Mode	Router Configuration Mode
Package	Enterprise and Metro_E
Default	0
Note:	OSPFv3 routing protocol and OSPFv3 helper support should be enabled before configuring the helper grace time limit.
Example	**`SEFOS(config-router)# nsf ietf helper gracetimelimit 150`**
Related Command(s)	• **`ipv6 router ospf`** - Enables the OSPFv3 routing protocol. • **`no nsf ietf helper disable`** - Enables the helper support. • **`show ipv6 ospf neighbor`** – Displays OSPFv3 neighbors information.

25.31 nsf ietf helper strict-lsa-checking

Command Objective	This command enables the strict LSA check option in helper. The strict LSA check option allows the helper to terminate the helper mode, once topology change is detected during the graceful restart process. The no form of the command disables the strict LSA check option in helper.
Syntax	**`nsf ietf helper strict-lsa-checking`** **`no nsf ietf helper strict-lsa-checking`**
Mode	Router Configuration Mode
Package	Enterprise and Metro_E
Default	Strict LSA check option is disabled in helper.
Note:	OSPFv3 routing protocol and OSPFv3 helper support should be enabled before enabling the strict LSA check option in the helper.
Example	**`SEFOS(config-router)# nsf ietf helper strict-lsa-checking`**
Related Command(s)	• **`ipv6 router ospf`** - Enables the OSPFv3 routing protocol. • **`no nsf ietf helper disable`** - Enables the helper support. • **`show ipv6 ospf - General Information`** – Displays general information about the OSPFv3 routing process.

25.32 nsf ietf grace lsa ack required

Command Objective	This command enables Grace Ack Required state in restarter. The GraceLSAs sent by the router are expected to be acknowledged by peers, if the Grace Ack Required state is enabled. The no form of the command disables the Grace Ack Required state in restarter.
Syntax	**`nsf ietf grace lsa ack required`** **`no nsf ietf grace lsa ack required`**
Mode	Router Configuration Mode
Package	Enterprise and Metro_E
Default	Grace Ack Required state is enabled in restarter.
Note:	• OSPFv3 routing protocol should be enabled before executing this command. • The entity should save any change made using this command in a non-volatile storage, as the configuration set using this command is persistent.
Example	**`SEFOS(config-router)# no nsf ietf grace lsa ack required`**
Related Command(s)	• **`ipv6 router ospf`** - Enables the OSPFv3 routing protocol.

25.33 nsf ietf grace lsa retransmit-count

Command Objective	This command configures the maximum number of retransmissions for unacknowledged GraceLSAs. This value specifies the number of retransmissions of unacknowledged GraceLSAs. This value ranges from 0 to 180. The no form of the command resets the GraceLSA retransmission count to default value.
Syntax	**nsf ietf grace lsa retransmit-count <retransmit-count (0-180)>** **no nsf ietf grace lsa retransmit-count**
Mode	Router Configuration Mode
Package	Enterprise and Metro_E
Default	0
Note:	OSPFv3 routing protocol should be enabled before executing this command.
Example	**SEFOS(config-router)# nsf ietf grace lsa retransmit-count 100**
Related Command(s)	• **ipv6 router ospf** - Enables the OSPFv3 routing protocol.

25.34 nsf ietf restart-reason

Command Objective	This command configures the reason for restart.
Syntax	**nsf ietf restart-reason {unknown | softwareRestart | swReloadUpgrade | switchToRedundant}**
Parameter Description	• **unknown** - Sets the system to restart due to unplanned events (such as restarting after a crash). • **softwareRestart** - Sets the system to restart due to restart of software. • **swReloadUpgrade** - Sets the system to restart due to reload or upgrade of software. • **switchToRedundant** - Sets the system to restart due to switchover to a redundant support processor.
Mode	Router Configuration Mode
Package	Enterprise and Metro_E
Default	unknown
Note:	• OSPFv3 routing protocol should be enabled before executing this command. • The entity should save any change made using this command in a non-volatile storage, as the configuration set using this command is persistent.
Example	**SEFOS(config-router)# nsf ietf restart-reason softwareRestart**
Related Command(s)	• **ipv6 router ospf** - Enables the OSPFv3 routing protocol.

25.35 ipv6 ospf area

Command Objective	This command enables OSPFv3 for IPv6 on an interface. The no form of the command disables OSPFv3 routing protocol on the interface. 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.
Syntax	**ipv6 ospf area <IPv4-Address> [instance <instance-id>]** **no ipv6 ospf**
Parameter Description	• **<IPv4-Address>** - Configures an IPv4 address to enable the OSPFv3. • **instance <instance-id>** - Configures an ID of the OSPFv3 instance to be run over a link. This ID has local link significance only.
Mode	Interface Configuration Mode (VLAN interface/Router port)
Package	Enterprise and Metro_E
Default	OSPv3 routing protocol is disabled. instance-id - 0
Note:	This command executes only if • OSPFv3 is enabled. • Router ID is set for the router.
Example	**SEFOS(config-if)# ipv6 ospf area 0.0.0.0**
Related Command(s)	• **ipv6 router ospf** - Enables the OSPFv3 routing protocol. • **router-id**– Sets the router-ID for the router. • **show ipv6 ospf - General Information** – Displays general information about the OSPFv3 routing process. • **show ipv6 ospf interface** – Displays the OSPFv3-related interface information. • **show ipv6 ospf - request/retrans-list** - Displays the list of all

link state advertisements (LSAs) in request-list or in retransmission-list.

- **bfd** – Enables BFD monitoring on all or specific OSPFv3 interfaces.
- **ipv6 ospf bfd** – Sets BFD support on the interface.

25.36 ipv6 ospf demand-circuit

Command Objective	This command configures OSPFv3 to treat the interface as an OSPFv3 demand circuit. It 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.
Syntax	**`ipv6 ospf demand-circuit`** **`no ipv6 ospf demand-circuit`**
Mode	Interface Configuration Mode (VLAN interface/Router port)
Package	Enterprise and Metro_E
Default	Enabled
Note:	• This command executes only if OSPFv3 is enabled. • The routing support for demand routing must have been enabled (using the `demand-extensions` command) prior to the execution of this command.
Example	**`SEFOS(config-if)# ipv6 ospf demand-circuit`**
Related Command(s)	• **`ipv6 router ospf`** - Enables the OSPFv3 routing protocol. • **`ipv6 ospf neighbor probing`** - Enables neighbor probing on demand-circuit enabled interface. • **`demand-extensions`** – Enables routing support for demand routing. • **`show ipv6 ospf interface`** – Displays the OSPFv3-related interface information.

25.37 ipv6 ospf retransmit-interval

Command Objective	This command sets the time between LSA retransmissions for adjacencies belonging to interface. This value ranges from 1 to 1800. 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. The no form of the command resets the retransmit interval for an interface to its default value.
Syntax	**`ipv6 ospf retransmit-interval <interval>`** **`no ipv6 ospf retransmit-interval`**
Mode	Interface Configuration Mode (VLAN interface/Router port)
Package	Enterprise and Metro_E
Default	interval - 5
Note:	This command executes only if OSPFv3 is enabled.
Example	**`SEFOS(config-if)# ipv6 ospf retransmit-interval 10`**
Related Command(s)	• **`ipv6 router ospf`** - Enables the OSPFv3 routing protocol. • **`show ipv6 ospf interface`** – Displays the OSPFv3-related interface information.

25.38 ipv6 ospf transmit-delay

Command Objective	This command sets the estimated time taken to transmit LS update packet over a particular interface. This delay value ranges between 1 and 1800. The no form of the command sets the default transmit delay for an interface.
Syntax	**ipv6 ospf transmit-delay <delay>** **no ipv6 ospf transmit-delay**
Mode	Interface Configuration Mode (VLAN interface/Router port)
Package	Enterprise and Metro_E
Default	delay - 1
Note:	This command executes only if OSPFv3 is enabled.
Example	**SEFOS(config-if)# ipv6 ospf transmit-delay 10**
Related Command(s)	• **ipv6 router ospf** - Enables the OSPFv3 routing protocol. • **show ipv6 ospf interface** – Displays the OSPFv3-related interface information.

25.39 ipv6 ospf priority

Command Objective	This command sets the router priority, which helps to determine the Designated Router for this network. This value ranges from 1 to 255. The no form of the command sets the default router priority for an interface.
Syntax	**ipv6 ospf priority < priority (1-255)>** **no ipv6 ospf priority**
Mode	Interface Configuration Mode (VLAN interface/Router port)
Package	Enterprise and Metro_E
Default	priority - 1
Note:	This command executes only if OSPFv3 is enabled.
Example	**SEFOS(config-if)# ipv6 ospf priority 7**
Related Command(s)	• **ipv6 router ospf** - Enables the OSPFv3 routing protocol. • **show ipv6 ospf interface** – Displays the OSPFv3-related interface information.

25.40 ipv6 ospf hello-interval

Command Objective	This command 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.
Syntax	**`ipv6 ospf hello-interval <1-65535>`** **`no ipv6 ospf hello-interval`**
Mode	Interface Configuration Mode (VLAN interface/Router port)
Package	Enterprise and Metro_E
Default	interval - 10
Note:	• This command executes only if OSPFv3 is enabled. • The hello interval value must be same for all routers attached to a common link.
Example	**`SEFOS(config-if)# ipv6 ospf hello-interval 20`**
Related Command(s)	• **`ipv6 router ospf`** - Enables the OSPFv3 routing protocol. • **`show ipv6 ospf interface`** – Displays the OSPFv3-related interface information.

25.41 ipv6 ospf dead-interval

Command Objective	This command configures the router dead interval. It is configured in seconds and indicates the time period for which the router waits for a hello packet from the neighbor before declaring this neighbor down. The no form of the command sets the interface dead interval to default value.
Syntax	**ipv6 ospf dead-interval <1-65535>** **no ipv6 ospf dead-interval**
Mode	Interface Configuration Mode (VLAN interface/Router port)
Package	Enterprise and Metro_E
Default	interval-40
Note:	• This command executes only if OSPFv3 is enabled. • This value must be a multiple of the hello interval and must be same for all routers attached to a common link.
Example	**SEFOS(config-if)# ipv6 ospf dead-interval 50**
Related Command(s)	• **ipv6 router ospf** - Enables the OSPFv3 routing protocol. • **show ipv6 ospf interface** – Displays the OSPFv3-related interface information.

25.42 ipv6 ospf poll-interval

Command Objective	This command 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.
Syntax	**`ipv6 ospf poll-interval <interval>`** **`no ipv6 ospf poll-interval`**
Mode	Interface Configuration Mode (VLAN interface/Router port)
Package	Enterprise and Metro_E
Default	interval - 120
Note:	This command executes only if OSPFv3 is enabled.
Example	**`SEFOS(config-if)# ipv6 ospf poll-interval 30`**
Related Command(s)	• **`ipv6 router ospf`** - Enables the OSPFv3 routing protocol. • **`show ipv6 ospf interface`** – Displays the OSPFv3-related interface information.

25.43 ipv6 ospf metric

Command Objective	This command explicitly specifies the metric value for sending a packet on an interface. This value ranges from 1 to 65535. The no form of the command sets the default value for the interface metric.
Syntax	**ipv6 ospf metric <metric>** **no ipv6 ospf metric**
Mode	Interface Configuration Mode (VLAN interface/Router port)
Package	Enterprise and Metro_E
Default	metric - 10
Note:	This command executes only if OSPFv3 is enabled.
Example	**SEFOS(config-if)# ipv6 ospf metric 20**
Related Command(s)	• **ipv6 router ospf** - Enables the OSPFv3 routing protocol. • **show ipv6 ospf interface** – Displays the OSPFv3-related interface information.

25.44 ipv6 ospf network

Command Objective	This command sets the network type for an interface. The no form of the command sets the default value for the network type.
Syntax	**ipv6 ospf network { broadcast | non-broadcast | point-to-multipoint | point-to-point }** **no ipv6 ospf network**
Parameter Description	• **broadcast** - Configures a network that supports many (more than two) attached routers, along with with the capability to address a single physical message to all of the attached routers (broadcast). • **non-broadcast** - Configures a network that supports many (more than two) routers, but has no broadcast capability. • **point-to-multipoint** - Treats the non-broadcast network as a collection of point-to-point links. • **point-to-point** - Configures a network that joins a single pair of routers.
Mode	Interface Configuration Mode (VLAN interface/Router port)
Package	Enterprise and Metro_E
Default	broadcast
Note:	• This command executes only if OSPFv3 is enabled. • If the Interface Network type is NBMA or Point-to-Multipoint, the neighbor must be configured. • When there are few configured neighbors on the interface, then the command to change network type and the no form of the command do not succeed.
Example	**SEFOS(config-if)# ipv6 ospf network non-broadcast**
Related Command(s)	• **ipv6 router ospf** - Enables the OSPFv3 routing protocol. • **ipv6 ospf neighbor** – Configures a neighbor on non-broadcast networks. • **show ipv6 ospf interface** – Displays the OSPFv3-related interface

information.

- **`ipv6 ospf linkLSASuppress`** – Configures the interface to suppress Link LSA origination.

25.45 ipv6 ospf neighbor

Command Objective	This command 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).
Syntax	**ipv6 ospf neighbor <IPv6-Address> [priority <1-255>]** **no ipv6 ospf neighbor <IPv6-Address> [priority]**
Parameter Description	• **<IPv6-Address>** - IPv6 Address Prefix • **priority <1-255>** - A number that specifies the router priority
Mode	Interface Configuration Mode (VLAN interface/Router port)
Package	Enterprise and Metro_E
Default	priority - 1
Note:	• This command executes only if OSPFv3 is enabled. • 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.
Example	**SEFOS(config-if)# ipv6 ospf neighbor fe80::220:35ff:fe43:6020 priority 2**
Related Command(s)	• **ipv6 router ospf** - Enables the OSPFv3 routing protocol. • **show ipv6 ospf interface** – Displays the OSPFv3-related interface information. • **show ipv6 ospf neighbor** – Displays OSPFv3 neighbors information.

25.46 ipv6 ospf passive-interface

Command Objective	This command 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.
Syntax	**`ipv6 ospf passive-interface`** **`no ipv6 ospf passive-interface`**
Mode	Interface Configuration Mode (VLAN interface/Router port)
Package	Enterprise and Metro_E
Default	Disabled
Note:	This command executes only if OSPFv3 is enabled.
Example	**`SEFOS(config-if)# ipv6 ospf passive-interface`**
Related Command(s)	• **`ipv6 router ospf`** - Enables the OSPFv3 routing protocol. • **`show ipv6 ospf interface`** – Displays the OSPFv3-related interface information.

25.47 ipv6 ospf neighbor probing

Command Objective	This command enables neighbor probing on demand-circuit enabled interface. The no form of the command disables neighbor probing on demand-circuit enabled interface.
Syntax	**`ipv6 ospf neighbor probing`** **`no ipv6 ospf neighbor probing`**
Mode	Interface Configuration Mode (VLAN interface/Router port)
Package	Enterprise and Metro_E
Default	Disabled
Note:	This command executes only if, • OSPFv3 is enabled. • Demand Extension feature is enabled.
Example	**`SEFOS(config-if)# ipv6 ospf neighbor probing`**
Related Command(s)	• **`show ipv6 ospf interface`** – Displays the OSPFv3-related interface information. • **`ipv6 router ospf`** - Enables the OSPFv3 routing protocol. • **`ipv6 ospf demand-circuit`** - Configures OSPFv3 to treat the interface as an OSPFv3 demand circuit.

25.48 ipv6 ospf neighbor-probe retransmit-limit

Command Objective	This command sets the number of consecutive LSA retransmissions before the neighbor is deemed inactive. This value ranges from 0 to 999999999. The no form of the command sets the default neighbor probe retransmission limit.
Syntax	**ipv6 ospf neighbor-probe retransmit-limit <retrans-limit>** **no ipv6 ospf neighbor-probe retransmit-limit**
Mode	Interface Configuration Mode (VLAN interface/Router port)
Package	Enterprise and Metro_E
Default	retrans-limit - 10
Note:	This command executes only if, • OSPFv3 is enabled. • Demand Extension feature is enabled,
Example	**SEFOS(config-if)# ipv6 ospf neighbor-probe retransmit-limit 30**
Related Command(s)	• **show ipv6 ospf interface** – Displays the OSPFv3-related interface information. • **ipv6 router ospf** - Enables the OSPFv3 routing protocol. • **ipv6 ospf demand-circuit** - Configures OSPFv3 to treat the interface as an OSPFv3 demand circuit.

25.49 ipv6 ospf neighbor-probe interval

Command Objective	This command sets the number of seconds, that indicates how often the neighbor will be probed. The no form of the command sets the default neighbor probe interval. This value ranges from 0 to 999999999.
Syntax	**`ipv6 ospf neighbor-probe interval <interval>`** **`no ipv6 ospf neighbor-probe interval`**
Mode	Interface Configuration Mode (VLAN interface/Router port)
Package	Enterprise and Metro_E
Default	interval - 120
Note:	This command executes only if, • OSPFv3 is enabled. • Demand Extension feature is enabled.
Example	**`SEFOS(config-if)# ipv6 ospf neighbor-probe interval 200`**
Related Command(s)	• **`show ipv6 ospf interface`** – Displays the OSPFv3-related interface information. • **`ipv6 router ospf`** - Enables the OSPFv3 routing protocol. • **`ipv6 ospf demand-circuit`** - Configures OSPFv3 to treat the interface as an OSPFv3 demand circuit.

25.50 debug ipv6 ospf

Command Objective

This command sets the trace levels.

The no form of the command resets the trace levels.

Syntax

```
debug ipv6 ospf [vrf <contextname>] [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]
[restarting-router] [helper] [redundancy])]

no debug ipv6 ospf [vrf <contextname>] [ 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] [restarting-router] [helper]
[redundancy]) ]
```

Parameter Description

- **vrf<contextname>** - Sets the OSPFv3 trace level for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32.
- **pkt** - Sets the trace level of packet High Level Dump debug messages.
  - **high** - Packet High Level Dump Trace.
  - **low** - Packet Low Level Dump Trace.
  - **hex** - Packet Hex Dump Trace.
- **hp** - Generates debug statements for hello packet traces.
- **ddp** - Generates debug statements for DDP packet traces.
- **lrq** - Generates debug statements for Link State Request Packet traces
- **lsu** - Generates debug statements for Link State Update Packet traces.
- **lsa** - Generates debug statements for Link State Acknowledge Packet traces.
- **level** - Generates debug statements for the following:
  - **fn_entry** - Function Entry trace.
  - **fn_exit** - Function Exit trace.
  - **critical** - Generates debug statements for OSPFv3 critical traces. These traces are used for cases such as failure of RBTree addition,

	failure to program the hardware, and so on. ▪ **mem_alloc_succ** - Memory Allocation Success trace. ▪ **mem_alloc_fail** - Memory Allocation Failure trace. • **module** - Generates debug messages for the following OSPFv3 modules. ▪ **ppp** - Protocol Packet Processing Trace. ▪ **rtm** - RTM Module Trace. ▪ **nssa** - NSSA Trace. ▪ **rt_aggrg** - Route Aggregation Trace. ▪ **adj_formation** - Adjacency Formation Trace. ▪ **lsdb** - Link State Database Trace. ▪ **ism** - Interface State Machine Trace. ▪ **nsm** - Neighbor State Machine Trace. ▪ **rt_calc** - Routing Table Calculation Trace. ▪ **interface** - Interface Trace. ▪ **config** - Configuration Trace. ▪ **restarting-router** - Debug messages related to restarting router. ▪ **helper** - Debug messages related to router in helper mode. ▪ **redundancy** - High Redundancy Trace.
Mode	Privileged EXEC Mode
Package	Enterprise and Metro_E
Default	Debugging is disabled.
Example	**SEFOS# debug ipv6 ospf pkt high hp level fn_entry module ppp**
Related Command(s)	• **ip vrf** - Creates VRF instance. • **ipv6 router ospf** - Enables the OSPFv3 routing protocol. • **show ipv6 ospf – General Information** – Displays general information about the OSPFv3 routing process. • **show debugging** - Displays the state of each debugging option.

25.51 show ipv6 ospf - interface

Command Objective	This command displays the general configured information of OSPFv3 for the specified interface.
Syntax	**show ipv6 ospf [vrf <contextname>] interface [vlan <vlan-id(1-4094)>]**
Parameter Description	• **vrf<context name>** - Displays OSPFv3 information for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string of size 32. • **vlan<vlan-id(1-4094)>** - Displays OSPFv3 information for the specified VLAN ID. This is a unique value that represents the specific VLAN created. This value ranges from 1 to 4094.
Mode	Privileged EXEC Mode
Package	Enterprise and Metro_E
Example	**SEFOS# show ipv6 ospf interface** Ospfv3 Interface Information Interface Name: vlan1 Interface Id: 73 Area Id: 12.0.0.2 Local Address: fe80::202:2ff:fe03:401 Router Id: 12.0.0.1 Network Type: BROADCAST Cost: 1 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 Link Lsa Suppression: Enable Nbr Probe Retrans Limit: 10 Nbr Probe Interval: 120 Hello due in 6 sec Neighbor Count is: 0Bfd: Disabled

Related Command(s)

- **`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.
- **`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.
- **`ipv6 ospf linkLSASuppress`** – Configures the interface to suppress Link LSA origination.
- **`bfd`** – Enables BFD monitoring on all or specific OSPFv3 interfaces.

- **`ipv6 ospf bfd`** – Sets BFD support on the interface.

25.52 show ipv6 ospf - neighbor

Command Objective	This command displays OSPFv3 neighbor information.
Syntax	**show ipv6 ospf [vrf <contextname>] neighbor [<Neighbor-RouterID>]**
Parameter Description	• **vrf <contextname>** - Displays OSPFv3 neighbor information for the specified VRF instance. This value represents unique name of the VRF instance. • **<Neighbor-RouterID>** - Displays the OSPFv3 information for the specified router ID.
Mode	Privileged EXEC Mode
Package	Enterprise and Metro_E
Example	**SEFOS# show ipv6 ospf neighbor** Vrf default ID Pri State DeadTime Address Helper HelperAge HelperExitReason Bfd 2.0.0.2 1 FULL/DR_OTHER 32 fe80::202:2ff:fe03:401 Not Helping 0 None enabled
Related Command(s)	• **ipv6 ospf neighbor** – Configures a neighbor on non-broadcast networks and sets the priority value for the neighbor if specified. • **nsf ietf helper gracetimelimit** - Configures the helper grace time limit. • **enable bfd** - Enables BFD feature in OSPFv3 protocol. • **disable bfd** - Disables BFD feature in OSPFv3 protocol. • **bfd** – Enables BFD monitoring on all or specific OSPFv3 interfaces • **ipv6 ospf bfd** – Sets BFD support on the interface.

25.53 show ipv6 ospf - request/retrans-list

Command Objective	This command displays the list of all link state advertisements (LSAs) in request-list or in retransmission-list.
Syntax	**show ipv6 ospf [vrf <contextname>] { request-list | retrans-list } [<Neighbor-RouterID>]**
Parameter Description	• **vrf <contextname>** - Displays the LSAs in request-list or in retransmission-list for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32. • **request-list** - Displays the list of Link State Advertisements for which the neighbor has more up-to-date instances. • **retrans-list –** Displays the list of Link State Advertisements that have been sent but not acknowledged. • **<Neighbor-RouterID>** - Displays the list of all link state advertisements (LSAs) in request-list or in retransmission-list for the specified neighbor router ID.
Mode	User/Privileged EXEC Mode
Package	Enterprise and Metro_E
Example	**SEFOS# show ipv6 ospf retrans-list 1.0.0.1** Vrf switch1 NeighborId: 11.0.0.2 Nbr Address: fe80::211:22ff:fe33:4422 Type LsId AdvRtr SeqNo Age Checksum 0x2009 11.0.0.1 11.0.0.1 0x3000080 0 0xc7f5 Vrf switch2 NeighborId: 11.0.0.1 Nbr Address: fe80::211:22ff:fe33:4421 Type LsId AdvRtr SeqNo Age Checksum 0x2001 11.0.0.2 11.0.0.2 0x2000080 0 0xebf3
Related Command(s)	• **ipv6 router ospf** - Enables the OSPFv3 routing protocol.

- **`router-id`** – Sets the router-ID for the router.
- **`ipv6 ospf area`** – Enables OSPFv3 for IPv6 on an interface.

25.54 show ipv6 ospf virtual-links

Command Objective	This command displays the parameters and the current state of OSPFv3 virtual links.
Syntax	**show ipv6 ospf [vrf <contextname>] virtual-links**
Parameter Description	• **vrf<contextname>** - Displays the parameters and the current state of OSPFv3 virtual links for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32.
Mode	User/Privileged EXEC Mode
Package	Enterprise and Metro_E
Example	**SEFOS# show ipv6 ospf virtual-links** Vrf switch3 Interface State: DOWN, Neighbor State: DOWN Transit Area: 0.0.0.2, Virtual Neighbor: 11.0.0.8 Intervals Configured for the Virtual Interface: Hello: 10, Dead: 60, Transit: 1, Retransmit : 5
Related Command(s)	• **area - virtual-link** – Sets the Virtual Link between areas.

25.55 show ipv6 ospf border-routers

Command Objective	This command displays the internal OSPFv3 routing table entries to an ABR or ASBR.
Syntax	**show ipv6 ospf [vrf <contextname>] border-routers**
Parameter Description	• **vrf <contextname>** - Displays the internal OSPFv3 routing table entries for the specified VRF instance. This value represents the unique name of the VRF instance. This value is a string of maximum size 32.
Mode	Privileged EXEC Mode
Package	Enterprise and Metro_E
Example	**SEFOS# show ipv6 ospf border-routers** Vrf switch1 Destination Type NextHop CostRt Type Area Id 11.0.0.2 ABR fe80::211:22ff:fe33:4422 2 intraArea 0.0.0.1 11.0.0.2 ASBR fe80::211:22ff:fe33:4422 2 intraArea 0.0.0.1 Vrf switch10 Destination Type NextHop CostRt Type Area Id 11.0.0.11 ABR fe80::211:22ff:fe33:443c 5 intraArea 0.0.0.2 11.0.0.11 ASBR fe80::211:22ff:fe33:443c 5 intraArea 0.0.0.2 Vrf switch11 Destination Type NextHop CostRt Type Area Id 11.0.0.10 ABR fe80::211:22ff:fe33:442c 6 intraArea 0.0.0.2 11.0.0.10 ASBR fe80::211:22ff:fe33:442c 6 intraArea 0.0.0.2
Related Command(s)	• **abr-type** – Sets the ABR (Area Border Router) type. • **ASBR Router** – Configures the router as an ASBR.

25.56 show ipv6 ospf - area-range / summary-prefix

Command Objective	This command displays either the list of all area address ranges information or all external summary address configuration information.
Syntax	**show ipv6 ospf [vrf <contextname>] { area-range | summary-prefix }**
Parameter Description	• **vrf <contextname>** - Displays the area address ranges for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32. • **area-range** - Displays the area associated with the OSPFv3 address range. • **summary-prefix** - Displays the aggregate addresses for OSPFv3.
Mode	User/Privileged EXEC Mode
Package	Enterprise and Metro_E
Example	**SEFOS# show ipv6 ospf area-range** Ospfv3 Summary Address Configuration Information Vrf switch8 Network PfxLength LSA Type Area Effect Tag 3ffe:801:481d:: 48 Summary 0.0.0.0 advertise 0 **SEFOS# show ipv6 ospf summary-prefix** Ospfv3 External Summary AddressConfiguration Information Vrf switch3 Prefix PfxLength AreaId Effect TranslationState 3ffe::172:100:0:0 88 0.0.0.1 advertise enabled 3ffe::172:200:0:0 88 0.0.0.4 advertise enabled
Related Command(s)	• **area - range** – Creates the Internal Aggregation Address Range. • **area – summary-prefix** – Enables route aggregation or filtering while importing routes in the OSPFv3 domain • **no area** - Deletes an area.

25.57 show ipv6 ospf - General Information

Command Objective	This command displays general information about OSPFv3 routing process.
Syntax	**show ipv6 ospf [vrf <contextname>]**
Parameter Description	• **vrf <contextname>** - Displays general information about OSPFv3 routing process for the specified VRF instance. This value represents unique name of the VRF instance. This value is a string of maximum size 32.
Mode	Privileged EXEC Mode
Package	Enterprise and Metro_E
Example	**SEFOS# show ipv6 ospf** Router Id: 20.0.0.2 ABR Type: Standard ABR SPF schedule delay: 5 secs Hold time between two SPFs: 10 secs Exit Overflow Interval: 0 Ref BW: 100000 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 1 Route calculation staggering is enabled Route calculation staggering interval is 10 seconds IETF Non-Stop Forwarding enabled Restart-interval limit: 100 sec Restart exit reason: none IETF NSF helper support enabled IETF NSF Helper support enabled for Unknown S/W Restart S/W Upgrade Switch to Redundant IETF NSF Helper Strict Lsa Check: Disabled

```
 BFD: Disabled

            Area      0.0.0.0

Number of interfaces in this area is  1

Number of Area Scope Lsa: 4  Checksum Sum: 0x257bb

Number of Indication Lsa: 0  SPF algorithm executed: 2
times
```

Related Command(s)

- **router-id** - IPv4-Address – Sets a fixed router ID.
- **timers spf** – Configures the delay time and the hold time between two consecutive SPF calculations.
- **abr-type** – Sets the ABR (Area Border Router) type.
- **ASBR Router** – Configures the router as an ASBR.
- **passive-interface** – Sets the global default passive interface status.
- **route-calculation staggering** - Enables OSPFv3 route calculation staggering.
- **route-calculation staggering-interval** - Configures the OSPFv3 route calculation staggering interval.
- **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** – Sets the reference bandwidth in kilobits per second for calculating the default interface metrics.
- **nsf ietf restart-interval** - Enables the graceful restart support and configures grace interval.
- **nsf ietf helper disable** - Disables the helper support.
- **nsf ietf helper strict-lsa-checking** - Enables the strict LSA check option in helper.
- **ipv6 ospf area** – Enables OSPFv3 for IPv6 on an interface.
- **debug ipv6 ospf** - pkt – Sets the trace levels.

- **`enable bfd`** - Enables BFD feature in OSPFv3 protocol.
- **`disable bfd`** - Disables BFD feature in OSPFv3 protocol.

25.58 show ipv6 ospf - LSA Database

Command Objective	This command displays the LSA information.
Syntax	**show ipv6 ospf [vrf <contextname>] [area <AreaID>] database [{router|network|as-external|inter-prefix|inter-router|intra-prefix|link|nssa}] [{detail|HEX}]**
Parameter Description	• **vrf<contextname>** - Displays the LSA information for the specified VRF instance. This value represents unique name of the VRF instance. • **area<AreaID>** - Displays the LSA information for the specified area. • **database** - Displays the number of each type of LSA for each area in the database. • **router** - Displays the LSA information for the specified Router LSAs. • **network** - Displays the LSA information for the specified Network LSAs. • **as-external** - Displays the LSA information for the specified AS-External LSAs. • **inter-prefix** - Displays the LSA information for the specified Inter-prefix LSAs. • **inter-router** - Displays the LSA information for the specified Inter-router LSAs. • **intra-prefix** - Displays the LSA information for the specified Intra-prefix LSAs. • **link** - Displays the LSA information for the specified Link State LSAs. • **nssa** - Displays the LSA information for the specified NSSA LSAs. • **detail** - Displays the LSA information in detail. • **HEX** - Displays the LSA information in hexadecimal format.
Mode	Privileged EXEC Mode
Package	Enterprise and Metro_E
Example	**SEFOS# show ipv6 ospf database** Vrf switch1 AreaId RtrId LsaType Age Seq#

```
Checksum
0.0.0.1   11.0.0.1         0x0008    0    0x80000002
0xe9d0
0.0.0.1   11.0.0.2         0x0008    8    0x80000002
0xe5d0
0.0.0.1   11.0.0.1         0x2001    0    0x80000001
0x23bc
0.0.0.1   11.0.0.2         0x2001    8    0x80000003
0x4d6

  Vrf  switch2

AreaId       RtrId      LsaType   Age   Seq#
Checksum
0.0.0.1   11.0.0.1         0x0008    9    0x80000002
0xe9d0
0.0.0.1   11.0.0.2         0x0008    0    0x80000002
0xe5d0
3.3.3.3   11.0.0.2         0x0008    0    0x80000002
0x613e
0.0.0.1   11.0.0.1         0x2001    3    0x80000001
0x23bc
0.0.0.1   11.0.0.2         0x2001    0    0x80000003
0x4d6
3.3.3.3   11.0.0.2         0x2001    0    0x80000001
0xac4f
3.3.3.3   11.0.0.2         0x2007    0    0x80000002
0x428

  Vrf  switch3

AreaId   RtrId         LsaType   Age   Seq#
Checksum
3.3.3.3  11.0.0.3         0x0008    0    0x80000002
0x6a6
3.3.3.3  11.0.0.3         0x0008    0    0x80000002
0x5d3e
3.3.3.3  11.0.0.3         0x0008    0    0x80000002
0xb4d5
3.3.3.3  11.0.0.7         0x0008    8    0x80000002
0x5e15
3.3.3.3  11.0.0.3         0x0008    0    0x80000002
0xc6d
3.3.3.3  11.0.0.7         0x0008    8    0x80000002
0xb5ac
3.3.3.3  11.0.0.3         0x2001    0    0x80000002
0xf07c
3.3.3.3  11.0.0.7         0x2001    3    0x80000002
```

```
                        0x6f02
```

25.59 show ipv6 ospf - route

Command Objective	This command displays routes learned by the OSPFv3 process.
Syntax	**show ipv6 ospf [vrf <contextname>] route**
Parameter Description	• **vrf<contextname>** - Displays the routes learned by the OSPFv3 process for the specified VRF instance. This value represents unique name of the VRF instance.
Mode	Privileged EXEC Mode
Package	Enterprise and Metro_E
Example	**SEFOS# show ipv6 ospf route** OSPFV3 Process Routing Table Vrf switch3 Dest/Prefix-Length NextHop/IfIndex Cost Rt.Type Area :: /0 fe80::211:22ff:fe33:4432 /Slot0/6 3 type1Ext 3.3.3.3 Vrf switch7 Dest/Prefix-Length NextHop/IfIndex Cost Rt.Type Area :: /0 fe80::211:22ff:fe33:4443 /Slot0/23 7 type1Ext 3.3.3.3 Vrf switch8 Dest/Prefix-Length NextHop/IfIndex Cost Rt.Type Area :: /0 fe80::211:22ff:fe33:4426 /Slot0/26 9 type1Ext 3.3.3.3
Related Command(s)	• **ipv6 router ospf** – Enables the OSPFv3 routing protocol. • **router-id** - IPv4-Address – Sets a fixed router ID

25.60 show ipv6 ospf - areas

Command Objective	This command displays the area table.
Syntax	**show ipv6 ospf [vrf <contextname>] areas**
Parameter Description	• **vrf<contextname>** - Displays area table information for the specified VRF instance. This value represents unique name of the VRF instance.
Mode	Privileged EXEC Mode
Package	Enterprise and Metro_E
Example	**SEFOS# show ipv6 ospf areas** Vrf switch1 AreaId: 0.0.0.0 Area Type: NORMAL AREA Spf Calculation: 0 (times) Area Bdr Rtr Count: 0 As Bdr Rtr Count: 0 Area Summary: Send Summary Vrf switch1 AreaId: 0.0.0.1 Area Type: NORMAL AREA Spf Calculation: 2 (times) Area Bdr Rtr Count: 1 As Bdr Rtr Count: 1 Area Summary: Send Summary Vrf switch2 AreaId: 0.0.0.0 Area Type: NORMAL AREA Spf Calculation: 0 (times) Area Bdr Rtr Count: 0 As Bdr Rtr Count: 0 Area Summary: Send Summary Vrf switch2 AreaId: 0.0.0.1 Area Type: NORMAL AREA Spf Calculation: 2 (times) Area Bdr Rtr Count: 0 As Bdr Rtr Count: 0 Area Summary: Send Summary Vrf switch2 AreaId: 3.3.3.3 Area Type: NSS AREA Spf Calculation: 2 (times) Area Bdr Rtr Count: 0 As Bdr Rtr Count: 0 Area Summary: Send Summary Stub Metric: 0x1 Stub Metric Type: 2 Translator Role: Candidate Translator State: Elected/Enabled Nssa Stability Interval: 40

Related Command(s)	• **area - stub/nssa** – Defines an area as a stub area or an NSSA (Not So Stubby Area). • **area** - **stability-interval** – Configures the stability interval (in seconds) for the NSSA. • **area** - **translation-role** – Configures the translation role for NSSA. • **no area** – Deletes an area.

25.61 show ipv6 ospf - host

Command Objective	This command displays the host table information.
Syntax	**show ipv6 ospf [vrf <contextname>] host**
Parameter Description	• **vrf<contextname>** - Displays host table information for the specified VRF instance. This value represents unique name of the VRF instance.
Mode	Privileged EXEC Mode
Package	Enterprise and Metro_E
Example	**SEFOS# show ipv6 ospf host** OSPFV3 HOST CONFIGURATION Information Address AreaId StubMetric Vrf switch1 3ffe:501:481d:f001::1 0.0.0.1 10 Vrf switch1 3ffe:601:481d:f001::1 0.0.0.1 10 Vrf switch5 3ffe:501:481d:f004::5 0.0.0.0 10 Vrf switch6 3ffe:501:481d:f004::6 0.0.0.0 10
Related Command(s)	• **host - metric/area-id** – Configures a host entry with metric or area-ID or both.

25.62 show ipv6 ospf - redist-config

Command Objective	This command displays the configuration information to be applied to the routes learned from the RTM.
Syntax	**show ipv6 ospf [vrf <contextname>] redist-config**
Parameter Description	• **vrf<contextname>** - Displays the information for the specified VRF instance. This value represents unique name of the VRF instance.
Mode	Privileged EXEC Mode
Package	Enterprise and Metro_E
Example	**SEFOS# show ipv6 ospf redist-config** Ospfv3 External Summary AddressConfiguration Information Vrf switch3 Address Prefix PfxLength MetricType Metric TagType TagValue 3ffe::100:100:0:0 88 asExtType1 10 manual 0 3ffe::100:200:0:0 88 asExtType1 20 manual 0 3ffe::100:300:0:0 88 asExtType1 30 manual 0
Related Command(s)	• **redist-config** – Configures the information to be applied to routes learned from RTM.

25.63 show ipv6 ospf redundancy

Command Objective	This command displays OSPFv3 redundancy information.
Syntax	**show ipv6 ospf redundancy**
Mode	Privileged EXEC Mode
Package	Enterprise and Metro_E
Example	**SEFOS# show ipv6 ospf redundancy** OSPFv3 Hot Standby Admin Status : Enabled OSPFv3 Hot Standby State : Active - Standby Up OSPFv3 Hot Standby Dynamic Bulk Update Status : Completed OSPFv3 Hot Standby Hello Sync count : 0 OSPFv3 Hot Standby LSA Sync count : 0

25.64 ipv6 ospf linkLSASuppress

Command Objective	This command suppresses the origination of link-LSA for the specified link and flushes the link LSA from the database of other routers attached to this link. The link-LSAs are used to provide information about link-local addresses and a list of IPv6 addresses on the link. The other routers on the link should ascertain the router's next-hop address through the IPv6 source address in the neighbor's hello packet. The no form of the command allows generation of link-LSA for the specified link.
Syntax	**`ipv6 ospf linkLSASuppress`** **`no ipv6 ospf linkLSASuppress`**
Mode	Interface Configuration Mode (VLAN interface/Router port)
Package	Enterprise and Metro_E
Example	**`SEFOS(config-if)# ipv6 ospf linkLSASuppress`**
Note:	This command executes only if, • OSPFv3 module is enabled. • OSPF network type is set as either point-to-point or point-to-multipoint.
Default	Link-LSA suppression is disabled.
Related Command(s)	• **`ipv6 router ospf`** - Enables the OSPFv3 routing protocol. • **`ipv6 ospf network –`** Configures the network type for an interface. • **`show ipv6 ospf interface`** - Displays the OSPFv3-related interface information.

25.65 enable bfd

Command Objective	This command enables BFD feature in OSPFv3 protocol. This registers OSPFv3 with BFD for neighbor IP path monitoring.
Syntax	**`enable bfd`**
Mode	OSPFv3 Router Configuration Mode
Package	Enterprise and Metro_E
Default	BFD feature is disabled.
Example	**`SEFOS(config-router)# enable bfd`**
Related Command(s)	• **`ipv6 router ospf`** - Enables the OSPFv3 routing protocol. • **`disable bfd`** – Disables BFD feature in OSPFv3. • **`bfd`** – Enables BFD monitoring on all or specific OSPFv3 interfaces. • **`ipv6 ospf bfd`** – Sets BFD support on the interface. • **`show ipv6 ospf`** – Displays general information about OSPFv3 routing process. • **`show ipv6 ospf neighbor`** - Displays OSPFv3 neighbor information list.

25.66 disable bfd

Command Objective	This command disables BFD feature in OSPFv3 protocol. If it is disabled, OSPFv3 does not register with BFD for neighbor IP path monitoring.
Syntax	**disable bfd**
Mode	OSPFv3 Router Configuration Mode
Package	Enterprise and Metro_E
Default	disable
Example	**SEFOS(config-router)# disable bfd**
Related Command(s)	• **ipv6 router ospf** - Enables the OSPFv3 routing protocol. • **enable bfd** - Enables BFD feature in OSPFv3. • **bfd** – Enables BFD monitoring on all or specific OSPFv3 interfaces. • **ipv6 ospf bfd** – Sets BFD support on the interface. • **show ipv6 ospf** – Displays general information about OSPFv3 routing process. • **show ipv6 ospf neighbor** - Displays OSPFv3 neighbor information.

25.67 bfd

Command Objective	This command enables BFD monitoring on all or the specified OSPFv3 interfaces. The no form of this command disables BFD monitoring on all or the specified OSPFv3 interfaces.
Syntax	**bfd { all-interface | <interface-type> <interface-id> | vlan <vlan-id (1-4094)> [switch <switch-name>] }** **no bfd { all-interface | < interface-type > < interface-id > | vlan <vlan-id (1-4094)> [switch <switch-name>] }**
Mode	OSPFv3 Router Configuration Mode
Package	Enterprise and Metro_E
Default	BFD is disabled for all the interfaces.
Note:	This command executes only if BFD is enabled and OSPFv3 is enabled on the interface.
Example	**SEFOS(config-router)# bfd all-interface** **SEFOS (config-router)# bfd vlan 1 switch default**
Related Command(s)	• **ipv6 router ospf** - Enables the OSPFv3 routing protocol. • **ipv6 ospf area –** Enables OSPFv3 for IPv6 on an interface. • **enable bfd** - Enables BFD feature in OSPFv3. • **disable bfd** – Disables BFD feature in OSPFv3. • **ipv6 ospf bfd** – Sets BFD support on the interface. • **show ipv6 ospf** – Displays general information about OSPFv3 routing process. • **show ipv6 ospf neighbor** - Displays OSPFv3 neighbor information list. • **show ipv6 ospf interface –** Displays OSPFv3 interface information.

25.68 ipv6 ospf bfd

Command Objective	This command enables or disables BFD support on the interface. If this is enabled, OSPFv3 registers with BFD for monitoring the neighbor IP path, for the neighbors associated with this OSPF interface.
Syntax	**`ipv6 ospf bfd [disable]`**
Mode	Interface Configuration Mode (VLAN interface/Router port)
Package	Enterprise and Metro_E
Default	Disable
Example	**`SEFOS(config-if)# ipv6 ospf bfd disable`**
Note:	• This command can be configured only if BFD is enabled and OSPF is started on the interface. • BFD disabled for a specific interface using this command will be internally enabled on the execution of `bfd all-interface` command.
Related Command(s)	• **`ipv6 router ospf`** - Enables the OSPFv3 routing protocol. • **`ipv6 ospf area -`** Enables OSPFv3 for IPv6 on an interface. • **`enable bfd`** - Enables BFD feature in OSPFv3. • **`disable bfd`** – Disables BFD feature in OSPFv3. • **`bfd`** – Enables BFD monitoring on all or specific OSPFv3 interfaces. • **`show ipv6 ospf`** – Displays general information about OSPFv3 routing process. • **`show ipv6 ospf neighbor`** - Displays OSPFv3 neighbor information list. • **`show ipv6 ospf interface -`** Displays OSPFv3 interface information.

CHAPTER 26

RRD

RRD (Route Redistribution) allows different routing protocols to exchange routing information. Using a routing protocol to advertise routes that are learned by other means, such as another routing protocol, static routes, or directly connected routes, is called redistribution. While running a single routing protocol throughout an entire IP internetwork is desirable, multi-protocol routing is widespread for a number of reasons, for example, company mergers, multiple departments managed by multiple network administrators, and multi-vendor environments. If a single routing protocol cannot be used, route redistribution is the only solution. Running different routing protocols is often part of a network design. In any case, having a multiple protocol environment makes redistribution a necessity.

Each routing protocol on a network is separated into an autonomous system (AS). All routers in the same autonomous system (running the same routing protocol) have complete knowledge of the entire AS. A router that connects two (or more) autonomous systems is known as a border router. A border router advertises routing information from one AS to the other AS(s). It is only possible to redistribute routing information for similarly routed protocols. Different routing protocols have different and often incompatible algorithms and metrics.

26.1 as-num

Command Objective	This command configures the AS (Autonomous System) number for the router.
Syntax	**as-num <value(1-65535)> [vrf <vrf-name>]**
Parameter Description	• **<value(1-65535)>** - Configures the Autonomous System number in which RTM Virtual context is running. This value ranges from 1 to 65535. • **vrf<vrf-name>** - Configures the name of the VRF instance. This value is a string of maximum size 32. This parameter is specific to multiple instance.
Mode	Global Configuration Mode
Package	Enterprise and Metro_E
Default	value - 0
Note:	The RRD Module must be enabled before any routing protocol module is configured.
Example	**SEFOS (config)# as-num 5**
Related Command(s)	• **ip vrf** - Creates VRF instance. • **show redistribute information** – Displays RTM RRD status for registered protocols.

26.2 router-id

Command Objective	This command configures the router ID's address for the router.
Syntax	**router-id <addr> [vrf <vrf-name>]**
Parameter Description	• **<addr>** - Configures IP address for the router. • **vrf<vrf-name>** - Configures the name of the VRF instance. This value is a string of maximum size 32. This parameter is specific to multiple instance.
Mode	Global Configuration Mode
Package	Enterprise and Metro_E
Note:	This command executes only if • IP addresses of the IP interface are configured. • AS number for the router is configured. • The router-ID must be one of the IP addresses of the IP interfaces configured in the switch.
Example	**SEFOS (config)# router-id 12.0.0.1**
Related Command(s)	• **as-num** - Configures the AS (Autonomous System) number for the router. • **ip address** - Configures IP address for an interface. • **ip vrf** - Creates VRF instance. • **show ipv6 ospf – request/retrans-list** - Displays the list of all link state advertisements (LSAs) in request-list or in retransmission-list. • **show redistribute information** – Displays RTM RRD status for registered protocols.

26.3 export ospf

Command Objective	This command enables redistribution of OSPF (Open Shortest Path First) area or external routes to the protocol. The no form of the command disables redistribution of OSPF area or external routes to the protocol.
Syntax	**`export ospf [vrf <vrf-name>] {area-route|external-route} {rip|bgp}`** **`no export ospf [vrf <vrf-name>] {area-route|external-route} {rip|bgp}`**
Parameter Description	• **`vrf<vrf-name>`** - Configures the name of the VRF instance. This value is a string of maximum size 32. This parameter is specific to multiple instance. • **`area-route`** - Configures redistribution of all OSPF inter-area and intra-area addresses or mask pairs to be exported into the routing protocol. • **`external-route`** - Configures redistribution of all OSPF Type 1 and Type 2 external addresses or mask pairs to be exported into the routing protocol. • **`rip`** - Redistributes route information for both internal and external Routing Information Protocol. • **`bgp`** - Redistributes route information for both internal and external Border Gateway Protocol.
Mode	Global Configuration Mode
Package	Enterprise and Metro_E
Default	Redistribution of RIP module is enabled.
Note:	This command executes only if, • Router ID is set for the OSPF. • RIP is enabled.
Example	**`SEFOS (config)# export ospf  area-route rip`**
Related Command(s)	• **`ip vrf`** - Creates VRF instance. • **`router-id – ipv4-Address`** – Sets a fixed router ID.

- **`router rip`** - Enables RIP for a default VRF instance or a specific VRF instance and enters the router configuration mode.

- **`show ip protocols`** – Displays information about the active routing protocol process.

26.4 redistribute-policy

Command Objective	This command adds the permit/deny Redistribution Policy. The no form of the command removes the permit/deny Redistribution Policy. The addresses learned within the specified range through the specified routing protocol will be redistributed to other routing protocols, if permit is used, and will not be redistributed to other routing protocols, if deny is used.
Syntax	**redistribute-policy [vrf <vrf-name>] {permit|deny} <DestIp> <DestRange> {connected|static|rip|ospf|bgp} {rip|bgp|ospf|all}** **no redistribute-policy [vrf <vrf-name>] <DestIp> <DestRange>**
Parameter Description	• **vrf<vrf-name>** - Configures the name of the VRF instance. This value is a string of maximum size 32. This parameter is specific to multiple instance. • **permit** - Permits Redistribution Policy for all prefixes. • **deny** - Denies Redistribution Policy for all prefixes. • **<DestIp>** - Configures destination IP address for which permit/deny Redistribution Policy is to be applied. • **<DestRange>** - Configures range of destination IP address for which permit/deny Redistribution Policy is to be applied. • **connected** - Sets permit/deny Redistribution Policy to connected routes. • **static** - Sets permit/deny Redistribution Policy to Static routes. • **rip** - Sets permit/deny Redistribution Policy to Routing Information Protocol. • **ospf** - Sets permit/deny Redistribution Policy to Open Shortest Path First protocol. • **bgp** - Sets permit/deny Redistribution Policy to Border Gateway Protocol. • **all** - Sets permit/deny Redistribution Policy to all protocols.
Mode	Global Configuration Mode

Package	Enterprise and Metro_E
Default	• permit all • DestIp - 0.0.0.0 • DestRange - 255.255.255.255
Example	**SEFOS (config)# redistribute-policy permit 10.0.0.0 0.0.0.255 connected ospf**
Related Command(s)	• **ip vrf** - Creates VRF instance. • **show redistribute-policy** – Displays route redistribution filters.

26.5 default redistribute-policy

Command Objective	This command configures the default Redistribution Policy Mode.
Syntax	**default redistribute-policy [vrf <vrf-name>] {permit | deny}**
Parameter Description	• **vrf<vrf-name>** - Configures the name of the VRF instance. This value is a string of maximum size 32. This parameter is specific to multiple instance. • **permit** - Permits default rule for all prefixes. • **deny** - Denies default rule for all prefixes.
Mode	Global Configuration Mode
Package	Enterprise and Metro_E
Default	permit
Example	**SEFOS (config)# default redistribute-policy permit**
Related Command(s)	• **ip vrf –** Creates VRF instance. • **show redistribute-policy** – Displays route redistribution filters.

26.6 ipv4 route throttle limit

Command Objective	This command configures the throttle limit value. This value is the maximum number of routes processed for every route redistribution processing performed for the RTM routes populated by the routing protocols. This value ranges from 1 to 4294967295.
Syntax	**`ipv4 route throttle limit <value>`**
Mode	Global Configuration Mode
Package	Enterprise and Metro_E
Default	1000
Example	**`SEFOS (config)# ipv4 route throttle limit 100`**
Related Command(s)	• **`show redistribute information`** – Displays RTM RRD status for registered protocols.

26.7 show ip protocols

Command Objective	This command displays information about the active routing protocol process. The information displayed by this command is useful in debugging routing operations.
Syntax	**show ip protocols [vrf <vrf-name>]**
Parameter Description	• **vrf<vrf-name>** - Displays the name of the VRF instance. This value is a string of maximum size 32. This parameter is specific to multiple instance.
Mode	Privileged EXEC Mode
Package	Enterprise and Metro_E
Example	**SEFOS # show ip protocols** Routing Protocol is rip Vrf default RIP2 security level is Maximum Redistributing : rip Output Delay is disabled Retransmission timeout interval is 5 seconds Number of retransmission retries is 36 default metric is 3 Auto-Summarisation of routes is enabled Routing for Networks : Routing Information Sources : Interface Specific Address Summarization : Trusted Neighors : Routing Protocol is "ospf" Routing Protocol is "ospf" Vrf default Router ID 12.0.0.1 Number of areas in this router is 0 . 0 normal 0 stub 0 nssa Routing for Networks:

```
  Passive Interface(s):
Routing Information Sources:
    Gateway         Distance      Last Update(secs)
 Distance: (Default is 121)
Routing Protocol is "ospf"
Vrf  vr1
Router ID 14.0.0.1
Number of areas in this router is 0 . 0 normal 0 stub 0
nssa
Routing for Networks:
  Passive Interface(s):
Routing Information Sources:
    Gateway         Distance      Last Update(secs)
 Distance: (Default is 121)
Routing Protocol is "bgp 0"
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Neighbor(s):
Address
Routing Information sources:
Gateway  Last Update
SEFOS # show ip protocols vrf vr1
Vrf  vr1
 RIP2 security level is Minimum
 Redistributing : rip, bgp, ospf
 Output Delay is enabled
 Retransmission timeout interval is 1 seconds
 Number of retransmission retries is 1
 default metric is 1
 Auto-Summarisation of routes is enabled
 Routing for Networks :
 Routing Information Sources :
 Interface Specific Address Summarization :
Routing Protocol is "ospf"
Vrf  vr1
Router ID 14.0.0.1
Number of areas in this router is 0 . 0 normal 0 stub 0
```

```
nssa
Routing for Networks:
  Passive Interface(s):
Routing Information Sources:
    Gateway         Distance      Last Update(secs)
 Distance: (Default is 121)
Routing Protocol is "bgp 0"
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Neighbor(s):
Address
Routing Information sources:
Gateway  Last Update
```

Related Command(s)

- **`export ospf`** – Enables redistribution of OSPF area or external routes to protocol.

26.8 show redistribute-policy

Command Objective	This command displays route redistribution filters.
Syntax	**show redistribute-policy [vrf <vrf-name>]**
Parameter Description	• **vrf<vrf-name>** - Displays the name of the VRF instance. This value is a string of maximum size 32. This parameter is specific to multiple instance.
Mode	Privileged EXEC Mode
Package	Enterprise and Metro_E
Example	**SEFOS # show redistribute-policy** VRF Name: default Destination Range SrcProto DestProto Flag ----------- ----- -------- ----------- ---- 0.0.0.0 255.255.255.255 none others Allow VRF Name: vr1 Destination Range SrcProto DestProto Flag ----------- ----- -------- ----------- ---- 0.0.0.0 255.255.255.255 none others Allow **SEFOS # show redistribute-policy vrf default** VRF Name: default Destination Range SrcProto DestProto Flag ----------- ----- -------- ----------- ---- 0.0.0.0 255.255.255.255 none others Allow
Related Command(s)	• **redistribute-policy** – Adds the permit/deny Redistribution Policy. • **Default redistribute-policy** – Sets the default behavior of RRD Control Table.

26.9 show redistribute information

Command Objective	This command displays RTM (Route Table Manager) RRD status for registered protocols.
Syntax	**show redistribute information [vrf <vrf-name>]**
Parameter Description	• **vrf** - Displays the name of the VRF instance. This value is a string of maximum size 32. This parameter is specific to multiple instance.
Mode	Privileged EXEC Mode
Package	Enterprise and Metro_E
Example	**SEFOS # show redistribute information** Current Throttle Limit: 1000 VRF Name: default Router ID is 0.0.0.0 AS Number is 0 Current State is disabled ProtoName OspfAreaRoutes OspfExtRoutes --------- ------------ ------------ local Disable Disable static Disable Disable rip Enable Enable bgp Enable Enable VRF Name: vr1 Router ID is 0.0.0.0 AS Number is 0 Current State is disabled ProtoName OspfAreaRoutes OspfExtRoutes --------- ------------ ------------ local Disable Disable static Disable Disable **SEFOS # show redistribute information vrf vr1** Current Throttle Limit: 1000 VRF Name: vr1 Router ID is 0.0.0.0

```
AS Number is 0
Current State is disabled
ProtoName    OspfAreaRoutes    OspfExtRoutes
---------    --------------    -------------
other        Disable           Disable
local        Disable           Disable
static       Disable           Disable
```

Related Command(s)

- **`as-num`** – Sets the AS (Autonomous System) number for the router.
- **`router-id`** – Sets the router-ID for the router.
- **`ipv4 route throttle limit`** - Configures the maximum number of routes processed for every route redistribution processing performed for the RTM routes populated by the routing protocols.

26.10 force enable

Command Objective	This command forcefully enables the access to rewrite `as-num` and `router-id`.
Syntax	**`force enable [vrf <vrf-name>]`**
Parameter Description	• **`vrf <vrf-name>`** - Forcefully enables the access to rewrite `as-num` and `router-id` for the specified VRF instance. This value is a string of maximum size 32. This parameter is specific to multiple instance.
Mode	Global Configuration Mode
Package	Enterprise and Metro_E
Note:	This command executes only if the following are configured, • Autonomous System for the router. • Router ID address is configured.
Example	**`SEFOS (config)# force enable`**
Related Command(s)	• **`as-num -`** Configures the AS (Autonomous System) number for the router. • **`router-id -`** Configures the router ID address for the router. • **`show redistribute information`** – Displays RTM RRD status for registered protocols.

CHAPTER 27

RRD6

RRD6 (Route Redistribution) allows different routing protocols to exchange IPv6 routing information.

27.1 export ospfv3

Command Objective	This command 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.
Syntax	**export ospfv3 [vrf <vrf-name>] {area-route|external-route} {rip}** **no export ospfv3 [vrf <vrf-name>] {area-route|external-route} {rip}**
Parameter Description	• **vrf<vrf-name>** - Configures the name of the VRF instance. This value is a string of maximum size 32. This parameter is specific to multiple instance. • **area-route** - Configures redistribution of all OSPFv3 inter-area and intra-area addresses or mask pairs to be exported into the routing protocol. • **external-route** - Configures redistribution of all OSPFv3 Type 1 and Type 2 External addresses or mask pairs to be exported into the routing protocol. • **rip** - Redistributes route information for both internal and external Routing Information Protocol.
Mode	Global Configuration Mode
Package	Enterprise and Metro_E
Note:	• Router ID must be set for the OSPFv3 before executing this command. • VRF instance should be created before executing this command to configure the OSPF routes redistribution for the context.
Example	**SEFOS (config)# export ospfv3 area-route rip**
Related Command(s)	• **ip vrf –** Creates VRF instance. • **show redistribute information ipv6** – Displays the RTM6 RRD status for registered protocols.

27.2 redistribute-policy – IPv6

Command Objective	This command adds the IPv6 permit/deny Redistribution Policy. The no form of the command removes the IPv6 permit/deny Redistribution Policy. The addresses learned 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
Syntax	**redistribute-policy [vrf <vrf-name>] {ipv6} {permit|deny} <DestIp> <DestRange> {static|local|rip|ospf} {rip|ospf|all}** **no redistribute-policy [vrf <vrf-name>] {ipv6} <DestIp> <DestRange>**
Parameter Description	• **vrf<vrf-name>** - Configures the name of the VRF instance. This value is a string of maximum size 32. This parameter is specific to multiple instance. • **ipv6** - Configures IPv6 Protocol to which permit/deny Redistribution Policy is to be applied. • **permit** - Permits IPv6 Redistribution Policy for all prefixes. • **deny** - Denies IPv6 Redistribution Policy for all prefixes. • **<DestIp>** - Configures destination IP address for which IPv6 permit/deny Redistribution Policy is to be applied. • **<DestRange**> - Configures range of destination IP address for which IPv6 permit/deny Redistribution Policy is to be applied. • **static** - Sets IPv6 permit/deny Redistribution Policy to Static routes. • **local** - Sets IPv6 permit/deny Redistribution Policy to local Protocol. • **rip** - Sets IPv6 permit/deny Redistribution Policy to Routing Information Protocol. • **ospf** - Sets IPv6 permit/deny Redistribution Policy to Open Shortest Path First Protocol. • **all** - Sets IPv6 permit/deny Redistribution Policy to all protocols.

Mode	Global Configuration Mode
Package	Enterprise and Metro_E
Default	• permit all • DestIp -- 0.0.0.0 • DestRange - 255.255.255.255
Example	**SEFOS (config)# redistribute-policy ipv6 permit 4444::1111 64 static ospf**
Related Command(s)	• **ip vrf** - Creates VRF instance. • **show redistribute-policy ipv6** – Displays route redistribution filters.

27.3 default redistribute-policy – IPv6

Command Objective	This command sets the default behavior of the RRD6 Control Table.
Syntax	**default redistribute-policy [vrf <vrf-name>] {ipv6} {permit | deny}**
Parameter Description	• **vrf<vrf-name>** - Configures the name of the VRF instance. This value is a string of maximum size 32. This parameter is specific to multiple instance. • **ipv6** - Configures IPv6 Protocol to which default Redistribution Policy is to be applied. • **permit** - Permits default Redistribution Policy for all prefixes. • **deny** - Denies default rule for all prefixes.
Mode	Global Configuration Mode
Package	Enterprise and Metro_E
Example	**SEFOS(config)# default redistribute-policy ipv6 permit**
Related Command(s)	• **ip vrf** - Creates VRF instance. • **show redistribute-policy ipv6** – Displays route redistribution filters.

27.4 throt

Command Objective	This command configures throt value which is the maximum number of routes processed for every iteration. This value ranges from 1 to 4294967295.
Syntax	**throt <value>**
Mode	Global Configuration Mode
Package	Enterprise and Metro_E
Default	1000
Example	**SEFOS(config)# throt 100**
Related Command(s)	• **show redistribute information ipv6** – Displays the RTM6 RRD status for registered protocols.

27.5 show redistribute-policy ipv6

Command Objective	This command displays IPv6 route redistribution filters.
Syntax	**show redistribute-policy ipv6 [vrf <vrf-name>]**
Parameter Description	• **vrf<vrf-name>** - Displays the name of the VRF instance. This value is a string of maximum size 32. This parameter is specific to multiple instance.
Mode	Privileged EXEC Mode
Package	Enterprise and Metro_E
Example	**SEFOS# show redistribute-policy ipv6** VRF Name: default Destination Range SrcProto DestProto Flag ----------- ----- -------- ----------- ---- :: 128 all others Allow VRF Name: vr1 Destination Range SrcProto DestProto Flag ----------- ----- -------- ----------- ---- :: 128 all others Allow **SEFOS # show redistribute-policy ipv6 vrf default** VRF Name: default Destination Range SrcProto DestProto Flag ----------- ----- -------- ----------- ---- :: 128 all others Allow
Related Command(s)	• **redistribute-policy-IPv6** – Adds the IPv6 permit/deny Redistribution Policy. • **default redistribute-policy ipv6** – Sets the default behavior of the RRD6 Control Table.

27.6 show redistribute information ipv6

Command Objective	This command displays the RTM6 RRD status for registered protocols.
Syntax	**show redistribute information ipv6 [vrf <vrf-name>]**
Parameter Description	• **vrf<vrf-name>** - Displays the name of the VRF instance. This value is a string of maximum size 32. This parameter is specific to multiple instance.
Mode	Privileged EXEC Mode
Package	Enterprise and Metro_E
Example	**SEFOS# show redistribute information ipv6** Current Throttle Limit: 1000 VRF Name: default Current State is disabled ProtoName OspfAreaRoutes OspfExtRoutes --------- -------------- ------------- local Disable Disable static Disable Disable rip Enable Enable VRF Name: vr1 Current State is disabled ProtoName OspfAreaRoutes OspfExtRoutes --------- -------------- ------------- local Disable Disable static Disable Disable **SEFOS# show redistribute information ipv6 vrf default** Current Throttle Limit: 1000 VRF Name: default Current State is disabled ProtoName OspfAreaRoutes OspfExtRoutes --------- -------------- ------------- local Disable Disable static Disable Disable rip Enable Enable

Related Command(s)	• **throt** - Configures throt value which is the maximum number of routes processed for every iteration. • **export ospfv3** – Enables redistribution of OSPF area or external routes to the protocol.

CHAPTER 28

Route Map

Route Map provides a set of rules which should be satisfied for a route to be redistributed from one routing domain to another. When a route is to be redistributed from a routing domain to another, it is checked against a set of match conditions. If the match conditions are satisfied, access control of Permit/Deny is provided to the route. Route Map permits modification of route information during redistribution. Route Map permits setting conditions using the match clause and setting actions using the set clause.

28.1 route-map

Command Objective	This command creates a route-map with name, sequence number, and associated access type, and enters the Routemap Configuration Mode. Route-maps can be used in policy based routing and route redistribution. The no form of the command removes the specified sequence number from route-map. If the sequence number is not specified, the complete route map is deleted.
Syntax	**route-map <name(1-20)> [{permit | deny }] [<seqnum(1-10)>]** **no route-map <name (1-20)> [<seqnum (1-10)>]**
Parameter Description	• **<name(1-20)>** - Configures the route-map name which identifies the route-map in the list of route-maps. This value is a string with maximum length as 20. Route-map name specified will be taken as the configuration mode. • **permit** - Sets the access type associated with sequence number in a route-map as Permit. This allows the route entry that matches the match entry rules. • **deny** - Sets the access type associated with sequence number in a route-map as Deny. This denies the route entry that matches the match entry rules. • **<seqnum(1-10)>** - Configures the route map sequence number which specifies the position of a new route map in the list of route maps already configured with the same name. This value ranges from 1 to 10.
Mode	Global Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Default	• permit / deny - permit • seqnum – 1
Example	**SEFOS(config)# route-map rtest permit 1** **SEFOS (config-rmap-rtest)#**
Related Command(s)	• **match destination ip** – Matches the route that has a destination network address against the permitted range of addresses. • **match destination ipv6** – Matches the route that has a destination

network address against the permitted range of addresses.

- **match source ip** - Matches the route that has a source network address against the permitted range of addresses.
- **match source ipv6** – Matches the route that has a source network address against the permitted range of addresses.
- **match next-hop ip** - Matches the routes having the specified next-hop address.
- **match next-hop ipv6** - Matches the routes having the specified nexthop IPv6 address.
- **match interface** - Matches nexthop interface of the route out of the specified interface.
- **match metric** - Matches the configured metric with the metric specified in the route-map.
- **match tag** - Matches the given tag with the tag specified in the route-map.
- **match metric-type** - Matches the metric type of a given route with the specified metric type.
- **match route-type** - Matches the specified route-type with the entries in route-map.
- **match as-path tag** - Matches the AS path tag of the route with the existing AS-path in BGP.
- **match community**- Matches the BGP communities attribute in the route with the specified community.
- **match local-preference**- Matches a preference value for the autonomous system path.
- **match origin** - Matches the origin of the route in BGP with the specified origin.
- **set next-hop ip**- Sets the next hop IP address and sets the address for a route.
- **set next-hop ipv6**- Sets the next hop IPv6 address of the route.
- **set interface**- Sets the next hop interface of the route.
- **set metric**- Sets the metric value in the route.
- **set tag**- Sets the tag value for BGP, OSPF, or RIP routing protocols.

- **set route-type**- Sets the route-type.
- **set as-path tag** - Sets the tag to the existing AS-path in BGP.
- **set community** - Sets the BGP communities attribute in the route.
- **set local-preference** - Specifies a preference value for the autonomous system path in the route.
- **set origin** - Sets the origin of the route in BGP.
- **set weight** - Sets the weight value.
- **set auto-tag** - Sets automatic tag generation.
- **set level**- Sets the level of the route.
- **set metric type** - Sets the value of metric type in the route.
- **show route-map** – Displays the configured route maps.
- **set extcommunity cost** - Sets the Extended community attributes for the route-map.

28.2 match destination ip

Command Objective	This command matches the destination IP address with the permitted range of addresses. The no form of the command removes the matched IP address entry from the match entry list.
Syntax	**match destination ip <Ip address> <Net Mask>** **no match destination ip <Ip address> <Net Mask>**
Parameter Description	• **<Ip address>** - Specifies the destination network IP address. The destination IP address provides the range of addresses that will get to pass the route-map, when logical and operation is performed with the mask. • **<Net Mask>** - Specifies the mask that provides the range of the network addresses.
Mode	Route Map Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Example	**SEFOS(config-rmap-rtest)# match destination ip 25.0.0.0 255.0.0.0**
Related Command(s)	• **route-map** - Creates a route-map with name, sequence number, and associated access type. • **show route-map** – Displays the configured route maps.

28.3 match destination ipv6

Command Objective	This command matches destination network address against the permitted range of addresses. The no form of the command removes the matched destination network address against the permitted range of addresses.
Syntax	**match destination ipv6 <IPv6 address> <Prefix Length>** **no match destination ipv6 <IPv6 address> <Prefix Length>**
Parameter Description	• **<IPv6 address>** - Specifies the destination network number address. • **<Prefix Length>** - Specifies the prefix length of IP address of destination network. This value ranges from 0 to 128.
Mode	Route Map Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Example	**SEFOS(config-rmap-rtest)# match destination ipv6 1111::2222 1**
Related Command(s)	• **route-map** - Creates a route-map with name, sequence number, and associated access type. • **show route-map** – Displays the configured route maps.

28.4 match source ip

Command Objective	This command matches source IP address against the permitted range of addresses. The no form of the command removes the matched source IP address entry in the match entry list.
Syntax	**match source ip <Ip address> <Net Mask>** **no match source ip <Ip address> <Net Mask>**
Parameter Description	• **<Ip address>** - Specifies the source network IP address. • **<Net Mask>** - Specifies the mask that provides the range of the network addresses.
Mode	Route Map Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Example	**SEFOS(config-rmap-rtest)# match source ip 25.0.0.0 255.0.0.0**
Related Command(s)	• **route-map** - Creates a route-map with name, sequence number, and associated access type. • **show route-map** – Displays the configured route maps.

28.5 match source ipv6

Command Objective	This command matches routes that have a source network address against the permitted range of addresses. The no form of the command removes the match source IPv6 entry from match entry list.
Syntax	**match source ipv6 <IPv6 address> <Prefix Length>** **no match source ipv6 <IPv6 address> <Prefix Length>**
Parameter Description	• **<Ipv6 address>** - Specifies the source network IPv6 address. • **<Prefix Length>** - Specifies the prefix length of InetAddress of source network. This value ranges from 0 to 128.
Mode	Route Map Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Example	**SEFOS(config-rmap-rtest)# match source ipv6 1111::2222 6**
Related Command(s)	• **route-map** - Creates a route-map with name, sequence number, and associated access type. • **show route-map** – Displays the configured route maps.

28.6 match next-hop ip

Command Objective	This command matches the routes having the specified next-hop address. The no form of the command removes the matched IP next-hop entry from the match entry list.
Syntax	**match next-hop ip < next-hop Ip address>** **no match next-hop ip <next-hop ip address >**
Mode	Route Map Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Example	**SEFOS(config-rmap-rtest)# match next-hop ip 12.0.0.10**
Related Command(s)	• **route-map** - Creates a route-map with name, sequence number, and associated access type • **show route-map** – Displays the configured route maps

28.7 match next-hop ipv6

Command Objective	This command matches the routes having the specified nexthop IPv6 address. The no form of the command removes the match next-hop IPv6 entry from match entry list.
Syntax	**match next-hop ipv6 <next hop IPv6 address>** **no match next-hop ipv6 <next-hop IPv6 address>**
Mode	Route Map Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Example	**SEFOS(config-rmap-rtest)# match next-hop ipv6 1111::2222**
Related Command(s)	• **route-map** - Creates a route-map with name, sequence number, and associated access type • **show route-map** – Displays the configured route maps

28.8 match interface

Command Objective	This command matches nexthop interface of the route for the specified interface. This identifies the local interface through which the next hop can be reached. The no form of the command removes the match interface entry from the match entry list.
Syntax	**match interface { Vlan < vlan-id(1-4094)> | <interface-type> < interface-id> }** **no match interface { Vlan <vlan-id (1-4094)> | <interface-type> <interface-id> }**
Parameter Description	• **Vlan < vlan-id(1-4094)>** - Matches nexthop interface of the route for the specified VLAN ID. This is a unique value that represents the specific VLAN created or to be created. This value ranges from 1 to 4094.. • **<interface-type>** - Matches nexthop interface of the route for the specified . The interface type can be: ▪ **fastethernet** – Officially referred to as 100BASE-T standard. This is a version of LAN standard architecture that supports data transfer upto 100 Megabits per second. ▪ **XL-ethernet** – A version of LAN standard architecture that supports data transfer upto 40 Gigabits per second. ▪ **extreme-ethernet** – A version of Ethernet that supports data transfer upto 10 Gigabits per second. ▪ **i-lan** – Internal LAN created on a bridge per IEEE 802.1ap. • **<interface-id>** - Matches next-hop interface for the specified interface identifier. This is a unique value that represents the specific interface. This value is a combination of slot number and port number separated by a slash, for interface type other than i-lan and port-channel. For example: 0/1 represents that the slot number is 0 and port number is 1. Only i-lan is provided, for interface type i-lan. For example: 1 represents i-lan.
Mode	Route Map Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Example	**SEFOS(config-rmap-rtest)# match interface vlan 1**
Related Command(s)	• **route-map** - Creates a route-map with name, sequence number, and associated access type. • **show route-map** – Displays the configured route maps.

28.9 match metric

Command Objective	This command matches the configured metric with the metric specified in the route-map. This value ranges from 1 to 0x7fffffff (214783647). The no form of the command removes the matched metric entry from the match entry list.
Syntax	**match metric <value(1-0x7fffffff)>** **no match metric <value(1-0x7fffffff)>**
Mode	Route Map Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Example	**SEFOS(config-rmap-rtest)# match metric 2000**
Related Command(s)	• **route-map** - Creates a route-map with name, sequence number, and associated access type. • **show route-map** – Displays the configured route maps.

28.10 match tag

Command Objective	This command matches the given tag with the tag specified in the route-map. The no form of the command removes the match tag entry from the match entry list.
Syntax	**match tag <integer>** **no match tag <value>**
Mode	Route Map Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Example	**SEFOS(config-rmap-rtest)# match tag 2020**
Related Command(s)	• **route-map**. - Creates a route-map with name, sequence number, and associated access type. • **show route-map** – Displays the configured route maps.

28.11 match metric-type

Command Objective	This command matches the metric type of a given route with the specified metric type. This matches types of paths in OSPF routing table. The no form of the command removes match metric-type entry from match entry list.
Syntax	**match metric-type { inter-area | intra-area | type-1-external | type-2-external }** **no match metric-type { inter-area | intra-area | type-1-external | type-2-external }**
Parameter Description	• **inter-area** - Matches the OSPF routes with metric type as OSPF inter area route metric. • **intra-area** - Matches the OSPF routes with metric type as OSPF intra area route metric. • **type-1-external** - Matches the OSPF routes with metric type as external type 1 routes. If the option external type-1 is specified as the route-type, Cost from the Router to Autonomous Border System Router (ASBR) and Cost from ASBR to Destination are included when route calculation is done for a destination. • **type-2-external** - Matches the OSPF routes with metric type as external type 2 routes. If the option external type-2 is specified as the route-type, only the Cost from the Router to Autonomous Border System Router (ASBR) is included when route calculation is done for a destination.
Mode	Route Map Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Example	**SEFOS(config-rmap-rtest)# match metric-type inter-area**
Related Command(s)	• **route-map** - Creates a route-map with name, sequence number, and associated access type. • **show route-map** – Displays the configured route maps.

28.12 match route-type

Command Objective	This command matches the specified route-type with the entries in route-map as per RFC 2096. The no form of the command removes `match route-type` entry from match entry list.
Syntax	**`match route-type {local |remote}`** **`no match route-type { local | remote}`**
Parameter Description	• **`local`** - Matches the route-type with the entries in route-map as local routes. • **`remote`** - Matches the route-type with the entries in route-map as remote, where the routes are matched to the non-connected routes (static or routing protocol installed routes).
Mode	Route Map Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Example	**`SEFOS(config-rmap-rtest)# match route-type local`**
Related Command(s)	• **`route-map`** - Creates a route-map with name, sequence number, and associated access type. • **`show route-map`** – Displays the configured route maps.

28.13 match as-path tag

Command Objective	This command matches the AS path (Autonomous System path) tag of the route with the existing AS-path in BGP. This value ranges from 1 to 0x7fffffff (214748367). This match applies only when redistributing routes into BGP. The no form of the command removes match AS-path entry from the match entry list.
Syntax	**match as-path tag <value(1-0x7fffffff)>** **no match as-path tag <value(1-0x7fffffff) >**
Mode	Route Map Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Example	**SEFOS(config-rmap-rtest)# match as-path tag 2828**
Related Command(s)	• **route-map** - Creates a route-map with name, sequence number, and associated access type. • **show route-map** – Displays the configured route maps.

28.14 match community

Command Objective	This command matches the BGP communities attribute in the route with the specified community. The preference is sent only to all routers in the local autonomous system. This match applies only when redistributing routes into BGP. The no form of the command removes the match community entry from the match entry list.
Syntax	**match community { internet|local-as|no-advt |no-export| comm-num <value (1-0x7fffffff)>| none }** **no match community {internet|local-as|no-advt |no-export| comm-num <integer>| none }**
Parameter Description	• **internet** - Configures and matches the BGP community attribute in the route as `internet` where it advertises this route to the Internet community. All routers in the network belong to it. • **local-as** - Configures and matches the BGP community attribute in the route as `local`, where it sends the route to peers in other sub autonomous systems within the local confederation. Does not advertise this route to an external system. • **No-advt** - Configures and matches the BGP community attribute in the route to `no-advt`, where it does not advertise all routes carrying a community attribute to other BGP peers. • **No-export** - Configures and matches the BGP community attribute to `no-export`, where all routes received that carry a community attribute containing this value MUST NOT be advertised outside a BGP confederation boundary. • **comm-num** - Sets the BGP community number. This value ranges from 1 to 0x7fffffff (214748367). • **none** - Configures the BGP community attribute as `none` which implies that no community is matched.
Mode	Route Map Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Example	**SEFOS(config-rmap-rtest)# match community internet**
Related Command(s)	• **route-map** - Creates a route-map with name, sequence number, and associated access type.

- **`show route-map`** – Displays the configured route maps.

28.15 match local-preference

Command Objective	This command matches a preference value for the autonomous system path. The preference is sent only to all routers in the local autonomous system. This value ranges from 1 to 0x7fffffff (214748367). The no form of the command removes the `match local-preference` entry from the match entry list.
Syntax	**match local-preference <value(1-0x7fffffff)>** **no match local-preference <value(1-0x7fffffff)>**
Mode	Route Map Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Example	**SEFOS(config-rmap-rtest)# match local-preference 2626**
Related Command(s)	• **route-map** - Creates a route-map with name, sequence number, and associated access type. • **show route-map** – Displays the configured route maps.

28.16 match origin

Command Objective	This command matches the origin of the route in BGP with the specified origin. The no form of the command removes the `match origin` entry from match entry list.
Syntax	**`match origin { igp |egp | incomplete }`** **`no match origin { igp |egp | incomplete }`**
Parameter Description	• **`igp`** - Specifies that the route originates through Remote Interior Gateway Protocol. • **`egp`** - Specifies that the route originates through Local Exterior Gateway Protocol. • **`incomplete`** - Specifies that the route originates through unknown heritage or Remote autonomous system.
Mode	Route Map Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Example	**`SEFOS(config-rmap-rtest)# match origin igp`**
Related Command(s)	• **`route-map`** - Creates a route-map with name, sequence number, and associated access type. • **`show route-map`** – Displays the configured route maps.

28.17 set next-hop ip

Command Objective	This command sets the next hop IP address and sets the address for a route that satisfies the match conditions of the route.This is set during the process of policy routing or route redistribution. The no form of the command removes the set IP next-hop from the set entry list.
Syntax	**`set next-hop ip <next-hop ip address>`** **`no set next-hop ip`**
Mode	Route Map Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Example	**`SEFOS(config-rmap-rtest)# set next-hop ip 12.0.0.2`**
Related Command(s)	• **`route-map`**- Creates a route-map with name, sequence number, and associated access type. • **`show route-map`** – Displays the configured route maps.

28.18 set next-hop ipv6

Command Objective	This command sets the next hop IPv6 address of the route. This is set during the process of policy routing or route redistribution. The no form of the command removes set next-hop IPv6 from the set entry list.
Syntax	**`set next-hop ipv6 <next-hop ipv6 address>`** **`no set next-hop ipv6`**
Mode	Route Map Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Example	**`SEFOS(config-rmap-rtest)# set next-hop ipv6 1111::2222`**
Related Command(s)	• **`route-map`**- Creates a route-map with name, sequence number, and associated access type. • **`show route-map`** – Displays the configured route maps.

28.19 set interface

Command Objective	This command sets the next hop interface of the route through which the next hop can be reached and is set for a route which passes the match conditions. This is set during the process of policy routing or route redistribution. The no form of the command removes the set interface entry from the set entry list.
Syntax	**set interface { Vlan <vlan-id (1-4094)> | <interface-type> <interface-id> }** **no set interface**
Parameter Description	• **Vlan <vlan-id (1-4094)>** - Sets the specified VLAN ID as the next hop interface. This is a unique value that represents the specific VLAN created or to be created. This value ranges from 1 to 4094. • **interface-type** - Sets the specified type of interface as the next hop interface. The interface can be: ▪ **fastethernet** – Officially referred to as 100BASE-T standard. This is a version of LAN standard architecture that supports data transfer upto 100 Megabits per second. ▪ **XL-ethernet** – A version of LAN standard architecture that supports data transfer upto 40 Gigabits per second. ▪ **extreme-ethernet** – A version of Ethernet that supports data transfer upto 10 Gigabits per second. ▪ **i-lan**– Internal LAN created on a bridge per IEEE 802.1ap. • **interface-id** - Sets the specified interface identifier as the next hop interface. This is a unique value that represents the specific interface. This value is a combination of slot number and port number separated by a slash, for interface type other than i-lan. For example: 0/1 represents that the slot number is 0 and port number is 1. Only i-lan ID is provided, for interface types i-lan. For example: 1 represents i-lan.
Mode	Route Map Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Example	**SEFOS(config-rmap-rtest)# set interface vlan 1**
Related Command(s)	• **route-map**- Creates a route-map with name, sequence number, and associated access type. • **show route-map** – Displays the configured route maps.

28.20 set metric

Command Objective	This command sets the metric value in the route. The semantics of the metric are determined by the routing-protocol specified. This value ranges from 1 to 0x7fffffff (214748367). This is set during the process of policy routing or route redistribution. The no form of the command removes the `set metric` entry from the set entry list.
Syntax	**`set metric <value(1-0x7fffffff)>`** **`no set metric`**
Mode	Route Map Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Example	**`SEFOS(config-rmap-rtest)# set metric 400`**
Related Command(s)	• **`route-map`** - Creates a route-map with name, sequence number, and associated access type. • **`show route-map`** – Displays the configured route maps.

28.21 set tag

Command Objective	This command sets the tag value for BGP, OSPF, or RIP routing protocols in the given route. This value ranges from 1 to 0x7fffffff (214748367). This is set during the process of policy routing or route redistribution. The no form of the command removes the `set tag` from the set entry list.
Syntax	**`set tag <value(1-0x7fffffff)>`** **`no set tag`**
Mode	Route Map Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Example	**`SEFOS(config-rmap-rtest)# set tag 282828`**
Related Command(s)	• **`route-map`**- Creates a route-map with name, sequence number, and associated access type. • **`show route-map`** – Displays the configured route maps.

28.22 set route-type

Command Objective	This command sets the route-type as per RFC 2096. This is set during the process of policy routing or route redistribution. The no form of the command removes the `set route-type` entry from set entry list.
Syntax	**`set route-type {local | remote }`** **`no set route-type`**
Parameter Description	• **`local`** - Sets the connected routes. • **`remote`** - Sets the non-connected routes (static or routing protocol installed routes).
Mode	Route Map Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Example	**`SEFOS(config-rmap-rtest)# set route-type local`**
Related Command(s)	• **`Route-map`** - Creates a route-map with name, sequence number, and associated access type. • **`show route-map`** – Displays the configured route maps.

28.23 set as-path tag

Command Objective	This command converts the tag of a route into an autonomous system path. This applies only when redistributing routes into BGP. This value ranges from 1 to 0x7fffffff (214748367). This is set during the process of policy routing or route redistribution. The no form of the command removes the set AS-path from the set entry list.
Syntax	**`set as-path tag <value(1-0x7fffffff)>`** **`no set as-path tag`**
Mode	Route Map Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Example	**`SEFOS(config-rmap-rtest)# set as-path tag 2929`**
Related Command(s)	• **`route-map`** - Creates a route-map with name, sequence number, and associated access type. • **`show route-map`** – Displays the configured route maps.

28.24 set community

Command Objective	This command sets the BGP communities attribute in the route. The no form of the command removes the set community from the set entry list. This is set during the process of policy routing or route redistribution.
Syntax	**set community { internet | local-as | no-advt | no-export | comm-num <value (0x0001000-0xfffeffff)> | none } [additive]** **no set community**
Parameter Description	• **internet** - Sets the BGP community attribute in the route as `internet` where it advertises this route to the Internet community. All routers in the network belong to it. • **local-as** - Sets the BGP community attribute in the route as `local-as`, where it sends this route to peers in other sub autonomous systems within the local confederation. Does not advertise this route to an external system. • **no-advt** - Sets the BGP community attribute in the route as `no-advt` which it does not advertise all routes carrying a communities attribute to other BGP peers. • **no-export** - Sets the BGP community attribute in the route as `no-export`, Where it receives all routes carrying a community attribute containing this value must not be advertised outside a BGP confederation boundary. • **comm-num <value (0x0001000-0xfffeffff)>** - Sets the community number in the route. This value ranges from 0x0001000 (65536) to 0xfffeffff (4294901759). • **none** - Sets the BGP community attribute in the route as `none` which implies that no community is set. • **additive** - Appends the BGP community to the existing community available in the route.
Mode	Route Map Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Example	**SEFOS(config-rmap-rtest)# set community no-export**
Related Command(s)	• **route-map –** Creates a route-map with name, sequence number, and

associated access type.

- **`show route-map`** – Displays the configured route maps.

28.25 set local-preference

Command Objective	This command specifies a preference value for the autonomous system path in the route. The preference is sent only to all routers in the local autonomous system. This value ranges from 1 to 0x7fffffff (2147483367). This is set during the process of policy routing or route redistribution. The no form of the command removes the `set local-preference` from the set entry list.
Syntax	**`set local-preference <value(1-0x7fffffff>`** **`no set local-preference`**
Mode	Route Map Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Example	**`SEFOS(config-rmap-rtest)# set local-preference 202020`**
Related Command(s)	• **`Route-map`** - Creates a route-map with name, sequence number, and associated access type. • **`show route-map`** – Displays the configured route maps.

28.26 set origin

Command Objective	This command sets the origin of the route in BGP. The no form of the command removes the `set origin` from the set entry list. This is set during the process of policy routing or route redistribution.
Syntax	**`set origin {igp |egp | incomplete }`** **`no set origin`**
Parameter Description	• **`igp`** - Sets the origin of the route in BGP as Remote Interior Gateway Protocol. • **`egp`** - Sets the origin of the route in BGP as Local Exterior Gateway Protocol. • **`incomplete`** - Sets the origin of the route in BGP as incomplete or unknown heritage.
Mode	Route Map Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Example	**`SEFOS(config-rmap-rtest)# set origin incomplete`**
Related Command(s)	• **`Route-map`** - Creates a route-map with name, sequence number, and associated access type. • **`show route-map`** – Displays the configured route maps.

28.27 set weight

Command Objective	This command sets the BGP weight for the routing table. This value ranges from 1 to 0xffff(65535). This is set during the process of policy routing or route redistribution The no form of the command removes the `set weight` from the set entry list.
Syntax	**`set weight <value(1-0xffff)>`** **`no set weight`**
Mode	Route Map Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Example	**`SEFOS(config-rmap-rtest)# set weight 1`**
Related Command(s)	• **`Route-map`** - Creates a route-map with name, sequence number, and associated access type. • **`show route-map`** – Displays the configured route maps.

28.28 set auto-tag

Command Objective	This command sets automatic tag generation. The no form of the command removes `set auto-tag` entry from set entry list. This is set during the process of policy routing or route redistribution.
Syntax	**`set auto-tag {enable | disable}`** **`no set auto-tag`**
Parameter Description	• **`enable`** - Enables automatic computing of tag table when redistributing routes from BGP into IGP. • **`disable`** - Disables automatic computing of tag table when redistributing routes from BGP into IGP.
Mode	Route Map Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Default	disable
Example	**`SEFOS(config-rmap-rtest)# set auto-tag enable`**
Related Command(s)	• **`route-map -`** Creates a route-map with name, sequence number, and associated access type. • **`show route-map`** – Displays the configured route maps.

28.29 set level

Command Objective	This command sets the level for routes that are advertised into the specified area of the routing domain. This is set during the process of policy routing or route redistribution. The no form of the command removes `set level` from the set entry list.
Syntax	**`set level {level-1 |level-2 | level-1-2 | level-stub-area | level_backbone }`** **`no set level`**
Parameter Description	• **`level-1`** - Imports routes into a Level 1 area. • **`level-2`** - Imports routes into a Level 2 subdomain. • **`level-1-`**2 - Imports routes into Level 1 and Level 2. • **`level-stub-area`** - Imports routes into an OSPF (Open Shortest Path First) NSSA (not-so-stubby area). • **`level_backbone`** - Imports routes into an OSPF backbone area.
Mode	Route Map Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Example	**`SEFOS(config-rmap-rtest)# set level level-1`**
Related Command(s)	• **`route-map -`** Creates a route-map with name, sequence number, and associated access type. • **`show route-map`** – Displays the configured route maps.

28.30 set metric-type

Command Objective	This command sets the value of metric type in the route. The no form of the command removes the `set metric-type` entry from the set entry list.
Syntax	**`set metric-type { type-1 | type-2 }`** **`no set metric-type { type-1 | type-2 }`**
Parameter Description	• **`type-1`** - Sets metric type as OSPF external type 1 metric. When set, the cost from the Router to ASBR (Autonomous Border System Router) and cost from ASBR to Destination are included when route calculation is done for a destination. • **`type-2`** - Sets metric types as OSPF external type 2 metric. When set, the cost from the Router to ASBR is included when route calculation is done for a destination.
Mode	Route Map Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Example	**`SEFOS(config-rmap-rtest)# set metric-type type-2`**
Related Command(s)	• **`route-map`** – Creates a route-map with name, sequence number, and associated access type. • **`show route-map`** – Displays the configured route maps.

28.31 show route-map

Command Objective	This command displays the configured route maps.
Syntax	**show route-map [name(1-20)]**
Parameter Description	• **name(1-20)** - Displays the route map-related configuration details for the specified route map name. This value is a string with a maximum length is 20.
Mode	Privileged EXEC Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Example	**SEFOS# show route-map** Route-map rmap1, Permit, Sequence 1 Match Clauses: -------------- destination ip 25.0.0.0 255.0.0.0 destination ipv6 1111::2222 1 source ip 25.0.0.0 255.0.0.0 source ipv6 1111::2222 6 next-hop ip 12.0.0.10 next-hop ipv6 1111::2222 interface vlan 1 metric 2000 tag 2020 metric-type inter-area metric-type type-2-external route-type local as-path tag 2828 community internet local-preference 2626 origin igp Set Clauses:

```
--------------
next-hop ipv6 1111::2223
interface vlan 1
metric 400
tag 282828
route-type local
as-path tag 2929
community no-export
local-preference 202020
origin incomplete
auto-tag enable
level level-1
extcommunity cost 1 -1
```

Related Command(s)

- **route-map** – Creates a route-map with name, sequence number, and associated access type.
- **match destination ip** – Matches the route that has a destination network address against the permitted range of addresses.
- **match destination ipv6** – Matches the route that has a destination network address against the permitted range of addresses.
- **match source ip** - Matches the route that has a source network address against the permitted range of addresses.
- **match source ipv6** - Matches the route that has a source network address against the permitted range of addresses.
- **match next-hop ip** - Matches the routes having the specified next-hop address.
- **match next-hop ipv6** - Matches the routes having the specified nexthop IPv6 address.
- **match interface** - Matches nexthop interface of the route for the specified interface.
- **match metric** - Matches the configured metric with the metric specified in the route-map.
- **match tag** - Matches the given tag with the tag specified in the route-map.
- **match metric-type** - Matches the metric type of a given route with the specified metric type.

- **match route-type** - Matches the specified route-type with the entries in route-map.
- **match as-path tag** - Matches the AS path tag of the route with the existing AS-path in BGP.
- **match community**- Matches the BGP communities attribute in the route with the specified community.
- **match local-preference**- Matches a preference value for the autonomous system path.
- **match origin** - Matches the origin of the route in BGP with the specified origin.
- **set next-hop ip**- Sets the next hop IP address and sets the address for a route.
- **set next-hop ipv6**- Sets the next hop IPv6 address of the route.
- **set interface**- Sets the next hop interface of the route.
- **set metric**- Sets the metric value in the route.
- **set tag**- Sets the tag value for BGP, OSPF, or RIP routing protocols.
- **set route-type**- Sets the route-type.
- **set as-path tag** - Sets the tag to the existing AS-path in BGP.
- **set community** - Sets the BGP communities attribute in the route.
- **set local-preference** - Specifies a preference value for the autonomous system path in the route.
- **set origin** - Sets the origin of the route in BGP.
- **set weight** – Sets the weight value.
- **set auto-tag** - Sets automatic tag generation.
- **set level**- Sets the level of the route.
- **set metric type** - Sets the value of metric type in the route.
- **set extcommunity cost** - Sets the Extended community attributes for the route-map.

28.32 set extcommunity cost

Command Objective	This command sets the Extended community attributes for the route-map. This is set during the process of policy routing or route redistribution The no form of the command disables the Extended community attributes.
Syntax	**set extcommunity cost <community-id> <cost>** **no set extcommunity cost**
Parameter Description	• **<community-id>** - Sets the community ID attribute, used in determining the BGP best route when extcommunity cost is same for the routes. Route with lowest cost is preferred. This value ranges from 1 to 255. • **<cost>** - Sets the extended cost community value that is used to determine the BGP best route. This value ranges from 1 to 4294967295.
Mode	Route Map Configuration Mode
Package	Workgroup, Enterprise, Metro_E, and Metro
Example	**SEFOS(config-rmap-rtest)# set extcommunity cost 1 4294967295**
Related Command(s)	• **route-map** - Creates a route-map with name, sequence number, and associated access type. • **show route-map** – Displays the configured route maps.

28.33 ip prefix-list

Command Objective	This command creates an IP Prefix list entry. The no form of the command deletes a IP Prefix list entry.
Syntax	**ip prefix-list <list-name(1-20)> [seq <seq-num(1-100)>] {permit | deny } <ipaddr/prefix-len> [ge <min-len>] [le <max-len>]** **no ip prefix-list <list-name(1-20)> [[seq <seq-num(1-100)>] {permit | deny } <ipaddr/prefix-len> [ge <min-len>] [le <max-len>]]**
Parameter Description	• **<list-name(1-32)>**- Configures the name of a prefix list entry. This value is a string with the size ranging between 1 and 20 characters. • **seq <seq-num>**- Configures the sequence number of an entry. This value ranges from 1 to 4294967295. Note: If sequence number is not specified it will be generated automatically. • **permit** - Allows the packet route-update with the associated sequence number value to pass the filter. • **deny** – Does not allow the packet route-update with the associated sequence number value to pass the filter. • **<ipaddr/prefix-len>** - Configures the IPv4 prefix and length. For example: 10.0.0.0/8. The prefix length value ranges between 0 and 32. • **ge <min-len>** - Configures the minimum prefix length to be matched. This value ranges from 1 to 32. Note: Minimum prefix length must be greater than prefix length and less than or equal to max prefix length. • **le <max-len>** - Configures the maximum prefix length to be matched. This value ranges from 1 to 32. Note: Maximum prefix length must be greater than prefix length and greater than or equal to min prefix length.
Mode	Global Configuration Mode
Package	Enterprise and Metro_E
Example	**SEFOS(config)# ip prefix-list list1 seq 1 permit**

	`10.0.0.0/8 ge 11 le 12`
Related Command(s)	• **`show ip prefix-list`** - Displays configured IP prefix lists.

28.34 ipv6 prefix-list

Command Objective	This command adds the specified IPv6 Prefix list rule. The no form of the command remove the specified IPv6 Prefix list rule.
Note:	If sequence number is not specified it will be generated automatically.
Syntax	**ipv6 prefix-list <list-name(1-20)> [seq <seq-num(1-100)>] {permit | deny } <ip6addr/prefix-len> [ge <min-len>] [le <max-len>]** **no ipv6 prefix-list <list-name(1-20)> [[seq <seq-num(1-100)>] {permit | deny } <ip6addr/prefix-len> [ge <min-len>] [le <max-len>]]**
Parameter Description	• **<list-name(1-20)>**- Configures the name of a prefix list entry. This value is a string with maximum size of 20 characters. • **seq <seq-num(1-100)>** - Configures the sequence number of an entry. This value ranges from 1 to 100. • **permit** - Allows the packet route -update with the associated sequence number value to pass the filter. • **deny** - Does not allow the packet route-update with the associated sequence number value to pass the filter. • **<ipaddr/prefix-len>**- Configures the IPv6 prefix and length <network>/<length>. For example: 1111::2222/24. The IPv6 address prefix length ranges between 0 and 128. • **ge <min-len>** - Configures the minimum prefix length to be matched with the IPv6 Prefix list rule. This value ranges from 1 to 128. Note: Minimum prefix length must be greater than prefix length and less than or equal to max prefix length. • **le <max-len>** - Configures the maximum prefix length to be matched with the IPv6 Prefix list rule. This value ranges from 1 to 128. • Maximum prefix length must be greater than prefix length and greater than or equal to min prefix length
Mode	Global Configuration Mode
Package	Enterprise and Metro_E

Example	**SEFOS(config)# ipv6 prefix-list list1 seq 2 permit 1111::2222/8 ge 11 le 12**
Related Command(s)	• **show ipv6 prefix-list** - Displays the configured IPv6 prefix lists.

28.35 show ip prefix-list

Command Objective	This command displays the configured IP prefix lists.
Syntax	**show ip prefix-list [<list-name(1-20)> [{seq <integer(1-100)> | <ipaddr/prefix-len> [longer]}]]**
Parameter Description	• **<list-name(1-20)>** - Displays configurations of the specified IP prefix lists. This value is a string with maximum size of 20 characters. • **seq <integer(1-100)>** - Displays the configured IP prefix entries for the specified sequence number. This value ranges from 1 to 100. • **<ipaddr/prefix-len>** - Displays the configured IP prefix entries for the specified IPv4 prefix and length. For example: 10.0.0.0/8. The prefix length value ranges between 0 and 32. • **longer** - Displays the more specific entries.
Mode	Privileged EXEC Mode
Package	Enterprise and Metro_E
Example	**SEFOS# show ip prefix-list** Prefix list name : list1 seq 5 permit 10.0.0.0/8 ge 11 le 12
Related Command(s)	• **ip prefix-list** - Adds the specified IP Prefix list rule.

28.36 show ipv6 prefix-list

Command Objective	This command displays the configured IPv6 prefix lists.
Syntax	**show ipv6 prefix-list [<list-name(1-20)> [{seq <integer> | <ipaddr/prefix-len> [longer]}]]**
Parameter Description	• **<list-name(1-20)>** - Displays configurations for the specified IPv6 prefix lists. This value is a string with maximum size of 20 characters. • **seq <integer(1-100)>** - Displays the configured IPv6 prefix entries for the specified sequence number. This value ranges from 1 to 100. • **<ipaddr/prefix-len>** - Displays the configured IPv6 prefix entries for the IPv6 prefix and length. For example: 1111::2222/24. The IPv6 address prefix length ranges between 1 and 128. • **longer** - Displays the more specific entries.
Mode	Privileged EXEC Mode
Package	Enterprise and Metro_E
Example	**SEFOS# show ipv6 prefix-list** Prefix list name : list1 seq 10 permit 1111::2222/8 ge 11 le 12
Related Command(s)	• **ipv6 prefix-list** - Adds the specified IPv6 Prefix list rule.